



## **Cisco Active Network Abstraction 3.7 Reference Guide**

February 1, 2010

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# Preface

Revised: June 24, 2010, OL-20014-02

This Guide provides reference information on Cisco Active Network Abstraction (Cisco ANA) version 3.7. This information is presented in five parts:

- Part 1—Cisco VNEs: Supplies detailed information on all of the Virtual Network Elements (VNEs) supplied with Cisco ANA.
- Part 2—Technology Support and Information Model Objects: Details the level of functionality Cisco ANA provides for each of the networking technologies it supports, and explains how the product models these technologies using VNEs and Information Model Objects (IMOs).
- Part 3—Traps and Syslogs: Lists all of the SNMP traps and syslogs supported in this version of Cisco ANA.
- Part 4—Alarms and Events: Lists and describes all of the Cisco ANA alarms and events.
- Part 5—Commands: Lists, describes, and explains how to use the commands supplied with Cisco ANA. Note that additional Cisco ANA command scripts are available for download from the Cisco ANA Tech Center at <http://developer.cisco.com/web/ana/home>.

## New and Changed Information

The following table describes information that has been added or changed since the *Cisco Active Network Abstraction 3.7 Reference Guide* was last published online.

**Table 1**      ***New and Changed Information in This Document***

| Date Released    | Revision                                                                                                                                                                               | Location                                                                                                                                                                                                                     |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| February 1, 2010 | Initial Release                                                                                                                                                                        | —                                                                                                                                                                                                                            |
| June 24, 2010    | <ul style="list-style-type: none"><li>• Removed the CFM related syslogs.</li><li>• Removed the cEtherCfmCc* traps.</li><li>• Changed MLPP to MLPPP in the short description.</li></ul> | <ul style="list-style-type: none"><li>• <a href="#">Support Information for Cisco Syslogs</a></li><li>• <a href="#">Support Information for Cisco Traps</a></li><li>• <a href="#">MLPPP Down Due To Admin Down</a></li></ul> |

# Audience

The intended audience for this guide includes:

- Network viewers who monitor the network and perform basic (nonprivileged) system functions.
- Network operators who perform day-to-day operations such as creating business tags and maps, and managing alarms.
- Network configurators who activate services and configure network elements.
- System administrators who manage and configure users, network elements, the Cisco ANA system, and overall security.
- System managers or administrators who periodically review and manage the events list using Cisco ANA EventVision.
- Networking engineers who are interested in understanding how the Cisco ANA fault and root cause analysis mechanism works. These engineers should have networking knowledge at Cisco Certified Network Associate (CCNA) level, and should have received Cisco ANA basic and administrative training.

# Conventions

This document uses the following conventions:

**Table 2**      **Conventions**

| Convention                             | Description                                                                                                                                                                                                                                                |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>string</i>                          | A string is a nonquoted set of characters. For example, when setting an SNMP community string to <b>public</b> , do not use quotation marks around the string, or the string will include the quotation marks.                                             |
| ^ or Ctrl                              | ^ or Ctrl represents the Control key. For example, the key combination ^D or <b>Ctrl-D</b> means hold down the <b>Control</b> key while you press the <b>D</b> key. Alphabetic character keys are indicated in capital letters but are not case sensitive. |
| < >                                    | Angle brackets show nonprinting characters, such as passwords.                                                                                                                                                                                             |
| !                                      | An exclamation point at the beginning of a line indicates a comment line.                                                                                                                                                                                  |
| [ ]                                    | Square brackets indicate optional elements of a command.                                                                                                                                                                                                   |
| { }                                    | Braces group alternative, mutually exclusive elements that are part of a required choice.                                                                                                                                                                  |
|                                        | A vertical bar, also known as a pipe, separates alternative, mutually exclusive elements of a choice.                                                                                                                                                      |
| <b>boldface font</b>                   | Indicates a button name, command, keyword, key combination, or menu item.                                                                                                                                                                                  |
| <b>boldface screen font</b>            | <b>Courier bold</b> shows an example of text that you must enter.                                                                                                                                                                                          |
| <i>Italic text</i>                     | Indicates a variable or attribute value, including enumerated values.                                                                                                                                                                                      |
| <i>italic screen font</i>              | Indicates variables for which you must enter a value.                                                                                                                                                                                                      |
| screen font                            | Courier plain shows an example of information displayed on the screen.                                                                                                                                                                                     |
| <a href="#">Blue text</a>              | Indicates a link or reference to a section, table or object elsewhere in this Guide or on the World Wide Web.                                                                                                                                              |
| <b>Option &gt; Network Preferences</b> | Indicates menu items to be selected, and the order in which to select them.                                                                                                                                                                                |



## Related Documentation

**Note**

We sometimes update the documentation after original publication. Therefore, you should also review the documentation on Cisco.com for any updates.

The following documentation is available for Cisco Active Network Abstraction 3.7:

*Cisco Active Network Abstraction 3.7 Theory of Operations*

*Cisco Active Network Abstraction 3.7 User Guide*

*Cisco Active Network Abstraction 3.7 Administrator Guide*

*Cisco Active Network Abstraction 3.7 Documentation Guide*

*Cisco Active Network Abstraction 3.7 Installation Guide*

*Cisco Active Network Abstraction 3.7 Release Notes*

*Cisco Active Network Abstraction 3.7 Customization User Guide*

*Cisco Active Network Abstraction Integration Developer Guide* is available on the Cisco ANA Technology Center. This guide describes how to use Cisco ANA integration interfaces.

The Cisco ANA Technology Center is an online resource for additional downloadable Cisco ANA support content, including help for integration developers who use Cisco ANA application programming interfaces (APIs). It provides information, guidance, and examples to help you integrate your applications with Cisco ANA. It also provides a platform for you to interact with subject matter experts. To view the information on the Cisco ANA Technology Center website, you must have a Cisco.com account with partner level access, or you must be a Cisco ANA licensee. You can access the Cisco ANA Technology Center at: <http://developer.cisco.com/web/ana/home>.

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.





## **PART 1**

### **Cisco VNEs**





# CHAPTER 1

## Cisco VNE Introduction

---

This chapter introduces Virtual Network Elements (VNEs) and describes the types of information available in this Guide.

This chapter contains the following topics:

- [Introduction to VNEs, page 1-1](#)
- [Understanding the Tables, page 1-1](#)

### Introduction to VNEs

VNEs (Virtual Network Elements) are independent software processes that run on the Cisco ANA Unit Servers. Each VNE is assigned to manage a single network element (NE) using the NE's management interfaces (for example, SNMP and/or Telnet). The VNEs maintain a live model, or abstraction, of each NE and the entire network.

As the VNE loads, it starts investigating the NE and automatically builds a live model of the NE, including its physical and logical inventory, its configuration and its status. After modeling the NE, the VNE begins negotiating with peer VNEs, which represent the peer NEs, in order to determine NE connectivity and topology at different layers. This model of the network topology, NE state, and NE inventory is constantly being updated by the VNEs, which track every change that occurs in the NEs and the network.

The VNEs communicate between themselves to analyze end-to-end flows, which provide information for root-cause and impact analysis, service path tracing, and more.

### Understanding the Tables

This section describes key information that can be found in the VNE support information chapters in this Guide

This section contains the following topics:

- [Software Versions, page 1-2](#)
- [ANA Versions, page 1-3](#)
- [Expedite Legend, page 1-3](#)

## Software Versions

The Software Version column in the tables in this Guide identifies the NE software versions that are compatible with Cisco ANA and that can be running on the NEs that Cisco ANA supports. For example: The “Cisco 7600 Series—Supported Software Versions” table lists Cisco IOS software version 12.2(18)SXD. This means that Cisco ANA will work with any supported Cisco 7600-series router (such as the Cisco 7603) that is running IOS release 12.2(18)SXD.

Cisco ANA may support subsequent maintenance releases of NE software versions, but only if these later NE software versions do not require changes in Cisco ANA to maintain compatibility. Changes in any of the following NE software components can affect compatibility with Cisco ANA, and may require Cisco ANA software changes: XML interfaces, SNMP commands, MIBs, and CLI commands. In cases where a new NE software version remains compatible without requiring changes in Cisco ANA, support will include recognition of the new NE software version. However, it may not include support for additional software and features (such as new hardware modules) in the NE software version.

Also, for Cisco ANA to recognize a later NE software image, the name of the NE software rebuild should be similar to a software image in the train already supported in Cisco ANA. For example, Cisco ANA 3.7 supports IOS 12.2(33)SRC4 for 7600 devices. If IOS 12.2(33)SRC5 is released, Cisco ANA will recognize IOS 12.2.(33)SRC5 with the same level of support as IOS 12.2(33)SRC4 on 7600 devices. But Cisco ANA will not support any additional software or hardware features introduced in IOS 12.2(33)SRC5.

Cisco ANA will not recognize any other maintenance or special build whose version string does not match the indicated naming pattern. For example: IOS 12.2(33)SRC4xyz (or any other variation) will not be recognized.

When an NE software release is not recognized, Cisco ANA attempts to model the NE using the default version for that device series. The default version is a device-specific fallback set of commands and MIB instrumentation that allows Cisco ANA to discover and query for basic device properties, including:

- Managed element information.
- Basic physical inventory.
- Logical Inventory (including the Routing Table, ARP, BGP and OSPF information). Modelling of other technologies is done on a best-effort basis.

The default version does not correspond to any specific supported NE software version. Building of the physical model and its containment structure depends on the instrumentation (MIB and CLI commands) used by the default version. The default version may show you different containment structures (modules and cards) from what you will see for an explicitly supported NE software version. You can discover whether the default version is being used for a particular VNE by looking in the AVM log located in *install directory/main/logs* (search for `default version`).

Cisco frequently qualifies new NE software versions for compatibility with Cisco ANA, and updates the online version of this Guide accordingly. If you are not sure whether the current version of Cisco ANA supports a recently released NE software version, check the online version of this Guide on Cisco.com for an update. The NE software version should appear in the updated version of this Guide if it has been qualified as compatible with this Cisco ANA release. If the online version of this Guide does not list the new software version, contact Cisco Professional Services or your Cisco Sales Representative.

## ANA Versions

The ANA Version column found in the tables in this Guide lists the version of Cisco ANA during which a VNE supporting the specified NE module, software, topology, or other feature was first introduced. It is therefore the earliest Cisco ANA version that supports that NE. All later versions of Cisco ANA also support the NE. For example: If the Guide indicates that Cisco 7600 routers are supported on Cisco ANA 3.6.0, they are also supported on Cisco ANA 3.6.1, 3.6.2, and so on.

## Expedite Legend

[Table 1-1](#) describes the meaning of the Expedite column found in the service event (service alarm) tables in this Reference Guide.

**Table 1-1** *Expedite Legend in Service Event Tables*

| Value | Descriptions                                                                                                                                                                                                                                |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y     | The service event is expedited by a syslog or trap generated by the device. This means that the syslog or trap causes the VNE to poll the device without waiting for the usual polling cycle, thus enabling quicker detection of the event. |
| N     | The service event is not expedited. The service event is not expedited. This means that the VNE will poll this device during the next regularly scheduled polling cycle.                                                                    |







## CHAPTER 2

# Overview—Supported Network Elements in Cisco ANA Version 3.7

This chapter provides an overview of network elements (NEs) that are supported by Cisco ANA Version 3.7 and includes the following sections:

- [Supported Cisco Security Appliances in Cisco ANA Version 3.7, page 2-1](#)
- [Supported Cisco Gateways in Cisco ANA Version 3.7, page 2-2](#)
- [Supported Cisco Routers in Cisco ANA Version 3.7, page 2-2](#)
- [Supported Cisco Switches in Cisco ANA Version 3.7, page 2-11](#)
- [Supported Generic Devices in Cisco ANA Version 3.7, page 2-17](#)

## Supported Cisco Security Appliances in Cisco ANA Version 3.7

This document includes support information for the following Cisco Security appliances:

- [Cisco Adaptive Security Appliance 5550 Series](#)
- [Cisco Adaptive Security Appliance 5580 Series](#)

**Table 2-1**      *Supported Cisco Security Appliances in Cisco ANA Version 3.7*

| NE Type                                              | Product Name                               | SysOID              | ANA Version        |
|------------------------------------------------------|--------------------------------------------|---------------------|--------------------|
| <b>Cisco Adaptive Security Appliance 5550 Series</b> |                                            |                     |                    |
| ciscoASA5550                                         | Cisco ASA 5550 Security Appliance          | 1.3.6.1.4.1.9.1.753 | 3.6.3 <sup>1</sup> |
| ciscoASA5550sc                                       | Cisco ASA 5550 Security Appliance          | 1.3.6.1.4.1.9.1.763 | 3.6.3 <sup>2</sup> |
| <b>Cisco Adaptive Security Appliance 5580 Series</b> |                                            |                     |                    |
| ciscoASA5580                                         | Cisco ASA 5580 Adaptive Security Appliance | 1.3.6.1.4.1.9.1.914 | 3.7 <sup>3</sup>   |

<sup>1,2,3</sup>Only single context is supported in ASA devices.

## Supported Cisco Gateways in Cisco ANA Version 3.7

This document includes support information for the following Cisco gateways:

- [Cisco AS5300 Series Universal Gateways](#)

**Table 2-2**      *Supported Cisco Gateways in Cisco ANA Version 3.7*

| NE Type                                       | Product Name               | SysOID              | ANA Version |
|-----------------------------------------------|----------------------------|---------------------|-------------|
| <b>Cisco AS5300 Series Universal Gateways</b> |                            |                     |             |
| ciscoAS5300                                   | Cisco AS5300 Access Server | 1.3.6.1.4.1.9.1.162 | 3.6.0       |

## Supported Cisco Routers in Cisco ANA Version 3.7

This document includes support information for the following Cisco routers:

- [Cisco 800 Series Routers](#)
- [Cisco 1000 Series Routers](#)
- [Cisco 1600 Series Routers](#)
- [Cisco 1700 Series Modular Access Routers](#)
- [Cisco 1800 Series Integrated Services Routers](#)
- [Cisco 2500 Series Routers](#)
- [Cisco 2600 Series Multiservice Platform Routers](#)
- [Cisco 2800 Series Integrated Services Routers](#)
- [Cisco 3600 Series Multiservice Platform Routers](#)
- [Cisco 3700 Series Multiservice Access Routers](#)
- [Cisco 3800 Series Integrated Services Routers](#)
- [Cisco 7200 Series Routers](#)
- [Cisco 7300 Series Routers](#)
- [Cisco 7400 Series Routers](#)
- [Cisco 7500 Series Routers](#)
- [Cisco 7600 Series Routers](#)
- [Cisco 10000 Series Routers](#)
- [Cisco 12000 Series Routers](#)
- [Cisco XR 12000 Series Routers](#)
- [Cisco CRS-1 Carrier Routing System](#)
- [Cisco ASR 1000 Series Routers](#)
- [Cisco ASR 9000 Series Aggregation Services Routers](#)
- [Cisco MWR 2900 Series Mobile Wireless Routers](#)

**Table 2-3**      **Supported Cisco Routers in Cisco ANA Version 3.7**

| NE Type                          | Product Name                              | SysOID              | ANA Version |
|----------------------------------|-------------------------------------------|---------------------|-------------|
| <b>Cisco 800 Series Routers</b>  |                                           |                     |             |
| cisco801                         | Cisco 801 ISDN Router                     | 1.3.6.1.4.1.9.1.212 | 3.6.0       |
| cisco802                         | Cisco 802 ISDN Router                     | 1.3.6.1.4.1.9.1.213 | 3.6.0       |
| cisco803                         | Cisco 803 ISDN Router                     | 1.3.6.1.4.1.9.1.214 | 3.6.0       |
| cisco804                         | Cisco 804 ISDN Router                     | 1.3.6.1.4.1.9.1.215 | 3.6.0       |
| cisco805                         | Cisco 805 Serial Router                   | 1.3.6.1.4.1.9.1.245 | 3.6.0       |
| cisco802J                        | Cisco 802 ISDN Router                     | 1.3.6.1.4.1.9.1.295 | 3.6.1       |
| cisco804J                        | Cisco 804 ISDN Router                     | 1.3.6.1.4.1.9.1.296 | 3.6.1       |
| cisco826QuadV                    | Cisco 826 ADSL Router                     | 1.3.6.1.4.1.9.1.321 | 3.6.1       |
| cisco806                         | Cisco 806 Broadband Router                | 1.3.6.1.4.1.9.1.384 | 3.6.0       |
| cisco811                         | Cisco 811 ISDN Router                     | 1.3.6.1.4.1.9.1.395 | 3.6.0       |
| cisco813                         | Cisco 813 ISDN Router                     | 1.3.6.1.4.1.9.1.396 | 3.6.0       |
| cisco826                         | Cisco 826 ADSL Router                     | 1.3.6.1.4.1.9.1.322 | 3.6.0       |
| cisco827                         | Cisco 827 ADSL Router                     | 1.3.6.1.4.1.9.1.284 | 3.6.0       |
| cisco827H                        | Cisco 827 H ADSL Router                   | 1.3.6.1.4.1.9.1.446 | 3.6.0       |
| cisco827QuadV                    | Cisco 827-4V ADSL Router                  | 1.3.6.1.4.1.9.1.270 | 3.6.0       |
| cisco828                         | Cisco 828 G.SHDSL Router                  | 1.3.6.1.4.1.9.1.382 | 3.6.0       |
| cisco831                         | Cisco 831 Ethernet Broadband Router       | 1.3.6.1.4.1.9.1.497 | 3.6.0       |
| cisco836                         | Cisco 836 ADSL over ISDN Broadband Router | 1.3.6.1.4.1.9.1.499 | 3.6.0       |
| cisco837                         | Cisco 837 ADSL Broadband Router           | 1.3.6.1.4.1.9.1.495 | 3.6.1       |
| cisco876                         | Cisco 876 Integrated Services Router      | 1.3.6.1.4.1.9.1.568 | 3.6.1       |
| cisco877                         | Cisco 877 Integrated Services Router      | 1.3.6.1.4.1.9.1.569 | 3.6.1       |
| cisco878                         | Cisco 878 Integrated Services Router      | 1.3.6.1.4.1.9.1.570 | 3.6.1       |
| cisco871                         | Cisco 871 Integrated Services Router      | 1.3.6.1.4.1.9.1.571 | 3.6.1       |
| <b>Cisco 1000 Series Routers</b> |                                           |                     |             |
| cisco1003                        | Cisco 1003 Router                         | 1.3.6.1.4.1.9.1.41  | 3.5.2       |
| cisco1004                        | Cisco 1004 Router                         | 1.3.6.1.4.1.9.1.44  | 3.5.2       |
| cisco1005                        | Cisco 1005 Router                         | 1.3.6.1.4.1.9.1.49  | 3.5.2       |
| <b>Cisco 1600 Series Routers</b> |                                           |                     |             |
| cisco1601                        | Cisco 1601 Router                         | 1.3.6.1.4.1.9.1.113 | 3.6.1       |

**Table 2-3** *Supported Cisco Routers in Cisco ANA Version 3.7 (continued)*

| <b>NE Type</b>                                       | <b>Product Name</b>                    | <b>SysOID</b>       | <b>ANA Version</b> |
|------------------------------------------------------|----------------------------------------|---------------------|--------------------|
| cisco1602                                            | Cisco 1602 Router                      | 1.3.6.1.4.1.9.1.114 | 3.6.1              |
| cisco1603                                            | Cisco 1603 Router                      | 1.3.6.1.4.1.9.1.115 | 3.6.1              |
| cisco1604                                            | Cisco 1604 Router                      | 1.3.6.1.4.1.9.1.116 | 3.6.1              |
| ciscoPro1601                                         | Cisco Pro 1601                         | 1.3.6.1.4.1.9.1.117 | 3.6.1              |
| ciscoPro1602                                         | Cisco Pro 1602                         | 1.3.6.1.4.1.9.1.118 | 3.6.1              |
| ciscoPro1603                                         | Cisco Pro 1603                         | 1.3.6.1.4.1.9.1.119 | 3.6.1              |
| cisco1605                                            | Cisco 1605 Router                      | 1.3.6.1.4.1.9.1.172 | 3.6.1              |
| <b>Cisco 1700 Series Modular Access Routers</b>      |                                        |                     |                    |
| cisco1701ADSLBRI                                     | Cisco 1701 ADSL Security Access Router | 1.3.6.1.4.1.9.1.550 | 3.6.1              |
| cisco1710                                            | Cisco 1710 Security Access Router      | 1.3.6.1.4.1.9.1.200 | 3.6.1              |
| cisco1711                                            | Cisco 1711 Security Access Router      | 1.3.6.1.4.1.9.1.538 | 3.6.1              |
| cisco1712                                            | Cisco 1712 Security Access Router      | 1.3.6.1.4.1.9.1.539 | 3.6.1              |
| cisco1720                                            | Cisco 1720 Modular Access Router       | 1.3.6.1.4.1.9.1.201 | 3.6.1              |
| cisco1721                                            | Cisco 1721 Modular Access Router       | 1.3.6.1.4.1.9.1.444 | 3.6.1              |
| cisco1750                                            | Cisco 1750 Modular Access Router       | 1.3.6.1.4.1.9.1.216 | 3.6.1              |
| cisco1760                                            | Cisco 1760-V Modular Access Router     | 1.3.6.1.4.1.9.1.416 | 3.6.1              |
| cisco1751                                            | Cisco 1751 Modular Access Router       | 1.3.6.1.4.1.9.1.326 | 3.6.1              |
| <b>Cisco 1800 Series Integrated Services Routers</b> |                                        |                     |                    |
| cisco1801                                            | Cisco 1801 Integrated Services Router  | 1.3.6.1.4.1.9.1.638 | 3.6.0              |
| cisco1802                                            | Cisco 1802 Integrated Services Router  | 1.3.6.1.4.1.9.1.639 | 3.6.0              |
| cisco1803                                            | Cisco 1803 Integrated Services Router  | 1.3.6.1.4.1.9.1.640 | 3.6.0              |
| cisco1811                                            | Cisco 1811 Integrated Services Router  | 1.3.6.1.4.1.9.1.641 | 3.6.0              |
| cisco1812                                            | Cisco 1812 Integrated Services Router  | 1.3.6.1.4.1.9.1.642 | 3.6.0              |
| cisco1841                                            | Cisco 1841 Integrated Services Router  | 1.3.6.1.4.1.9.1.620 | 3.6.0              |
| <b>Cisco 2500 Series Routers</b>                     |                                        |                     |                    |

**Table 2-3**      **Supported Cisco Routers in Cisco ANA Version 3.7 (continued)**

| NE Type                                                | Product Name             | SysOID              | ANA Version |
|--------------------------------------------------------|--------------------------|---------------------|-------------|
| cisco2500                                              | Cisco 2500 Router        | 1.3.6.1.4.1.9.1.13  | 3.6.0       |
| cisco2501                                              | Cisco 2501 Router        | 1.3.6.1.4.1.9.1.17  | 3.6.0       |
| cisco2501FRADFX                                        | Cisco 2501 Router        | 1.3.6.1.4.1.9.1.165 | 3.6.0       |
| cisco2501LANFRADFX                                     | Cisco 2501 Router        | 1.3.6.1.4.1.9.1.166 | 3.6.0       |
| cisco2502                                              | Cisco 2502 Router        | 1.3.6.1.4.1.9.1.18  | 3.6.0       |
| cisco2502LANFRADFX                                     | Cisco 2502 Router        | 1.3.6.1.4.1.9.1.167 | 3.6.0       |
| cisco2503                                              | Cisco 2503 Router        | 1.3.6.1.4.1.9.1.19  | 3.6.0       |
| cisco2504                                              | Cisco 2504 Router        | 1.3.6.1.4.1.9.1.20  | 3.6.0       |
| cisco2505                                              | Cisco 2505 Router        | 1.3.6.1.4.1.9.1.21  | 3.6.0       |
| cisco2506                                              | Cisco 2506 Router        | 1.3.6.1.4.1.9.1.22  | 3.6.0       |
| cisco2507                                              | Cisco 2507 Router        | 1.3.6.1.4.1.9.1.23  | 3.6.0       |
| cisco2508                                              | Cisco 2508 Router        | 1.3.6.1.4.1.9.1.24  | 3.6.0       |
| cisco2509                                              | Cisco 2509 Router        | 1.3.6.1.4.1.9.1.25  | 3.6.0       |
| cisco2510                                              | Cisco 2510 Access Server | 1.3.6.1.4.1.9.1.26  | 3.6.0       |
| cisco2511                                              | Cisco 2511 Router        | 1.3.6.1.4.1.9.1.27  | 3.6.0       |
| cisco2512                                              | Cisco 2512 Access Server | 1.3.6.1.4.1.9.1.28  | 3.6.0       |
| cisco2513                                              | Cisco 2513 Router        | 1.3.6.1.4.1.9.1.29  | 3.6.0       |
| cisco2514                                              | Cisco 2514 Router        | 1.3.6.1.4.1.9.1.30  | 3.6.0       |
| cisco2515                                              | Cisco 2515 Router        | 1.3.6.1.4.1.9.1.31  | 3.6.0       |
| cisco2516                                              | Cisco 2516 Router        | 1.3.6.1.4.1.9.1.42  | 3.6.0       |
| cisco2517                                              | Cisco 2517 Router        | 1.3.6.1.4.1.9.1.67  | 3.6.0       |
| cisco2518                                              | Cisco 2518 Router        | 1.3.6.1.4.1.9.1.68  | 3.6.0       |
| cisco2519                                              | Cisco 2519 Router        | 1.3.6.1.4.1.9.1.69  | 3.6.0       |
| cisco2520                                              | Cisco 2520 Router        | 1.3.6.1.4.1.9.1.70  | 3.6.0       |
| cisco2521                                              | Cisco 2521 Router        | 1.3.6.1.4.1.9.1.71  | 3.6.0       |
| cisco2522                                              | Cisco 2522 Router        | 1.3.6.1.4.1.9.1.72  | 3.6.0       |
| cisco2523                                              | Cisco 2523 Router        | 1.3.6.1.4.1.9.1.73  | 3.6.0       |
| cisco2524                                              | Cisco 2524 Router        | 1.3.6.1.4.1.9.1.74  | 3.6.0       |
| cisco2525                                              | Cisco 2525 Router        | 1.3.6.1.4.1.9.1.75  | 3.6.0       |
| ciscoPro2501                                           | Cisco Pro 2501           | 1.3.6.1.4.1.9.1.56  | 3.6.0       |
| <b>Cisco 2600 Series Multiservice Platform Routers</b> |                          |                     |             |
| cisco2610                                              | Cisco 2610               | 1.3.6.1.4.1.9.1.185 | 3.6.0       |
| cisco2610XM                                            | Cisco 2610XM             | 1.3.6.1.4.1.9.1.466 | 3.6.0       |
| cisco2610XM                                            | Cisco 2610XM-DC          | 1.3.6.1.4.1.9.1.466 | 3.6.0       |

**Table 2-3** *Supported Cisco Routers in Cisco ANA Version 3.7 (continued)*

| NE Type                                              | Product Name                                        | SysOID              | ANA Version |
|------------------------------------------------------|-----------------------------------------------------|---------------------|-------------|
| cisco2610XM                                          | Cisco 2610XM-RP5                                    | 1.3.6.1.4.1.9.1.466 | 3.6.0       |
| cisco2611                                            | Cisco 2611                                          | 1.3.6.1.4.1.9.1.186 | 3.6.0       |
| cisco2611XM                                          | Cisco 2611XM                                        | 1.3.6.1.4.1.9.1.467 | 3.6.0       |
| cisco2611XM                                          | Cisco 2611XM-DC                                     | 1.3.6.1.4.1.9.1.467 | 3.6.0       |
| cisco2611XM                                          | Cisco 2611XM-RP5                                    | 1.3.6.1.4.1.9.1.467 | 3.6.0       |
| cisco2612                                            | Cisco 2612                                          | 1.3.6.1.4.1.9.1.187 | 3.6.0       |
| cisco2613                                            | Cisco 2613                                          | 1.3.6.1.4.1.9.1.195 | 3.6.0       |
| cisco2620                                            | Cisco 2620                                          | 1.3.6.1.4.1.9.1.208 | 3.6.0       |
| cisco2620XM                                          | Cisco 2620XM                                        | 1.3.6.1.4.1.9.1.468 | 3.6.0       |
| cisco2620XM                                          | Cisco 2620XM-DC                                     | 1.3.6.1.4.1.9.1.468 | 3.6.0       |
| cisco2620XM                                          | Cisco 2620XM-RP5                                    | 1.3.6.1.4.1.9.1.468 | 3.6.0       |
| cisco2621                                            | Cisco 2621                                          | 1.3.6.1.4.1.9.1.209 | 3.6.0       |
| cisco2621XM                                          | Cisco 2621XM                                        | 1.3.6.1.4.1.9.1.469 | 3.6.0       |
| cisco2621XM                                          | Cisco 2621XM-DC                                     | 1.3.6.1.4.1.9.1.469 | 3.6.0       |
| cisco2621XM                                          | Cisco 2621XM-RP5                                    | 1.3.6.1.4.1.9.1.469 | 3.6.0       |
| cisco2650                                            | Cisco 2650                                          | 1.3.6.1.4.1.9.1.319 | 3.6.0       |
| cisco2650XM                                          | Cisco 2650XM                                        | 1.3.6.1.4.1.9.1.470 | 3.6.0       |
| cisco2650XM                                          | Cisco 2650XM-DC                                     | 1.3.6.1.4.1.9.1.470 | 3.6.0       |
| cisco2650XM                                          | Cisco 2650XM-RP5                                    | 1.3.6.1.4.1.9.1.470 | 3.6.0       |
| cisco2651                                            | Cisco 2651                                          | 1.3.6.1.4.1.9.1.320 | 3.6.0       |
| cisco2651XM                                          | Cisco 2651XM                                        | 1.3.6.1.4.1.9.1.471 | 3.6.0       |
| cisco2651XM                                          | Cisco 2651XM-DC                                     | 1.3.6.1.4.1.9.1.471 | 3.6.0       |
| cisco2651XM                                          | Cisco 2651XM-RP5                                    | 1.3.6.1.4.1.9.1.471 | 3.6.0       |
| cisco2691                                            | Cisco 2691                                          | 1.3.6.1.4.1.9.1.413 | 3.6.0       |
| cisco2610M                                           | Cisco 2610M                                         | 1.3.6.1.4.1.9.1.418 | 3.6.0       |
| cisco2610                                            | Cisco2610                                           | 1.3.6.1.4.1.9.1.185 | 3.6.2       |
| <b>Cisco 2800 Series Integrated Services Routers</b> |                                                     |                     |             |
| cisco2801                                            | Cisco 2801 Integrated Services Router               | 1.3.6.1.4.1.9.1.619 | 3.6.0       |
| cisco2811                                            | Cisco 2811 Integrated Services Router               | 1.3.6.1.4.1.9.1.576 | 3.6.0       |
| cisco2821                                            | Cisco 2821 Integrated Services Router               | 1.3.6.1.4.1.9.1.577 | 3.6.0       |
| cisco2851                                            | Cisco 2851 Integrated Services Router               | 1.3.6.1.4.1.9.1.578 | 3.6.0       |
| cisco2811 DC                                         | Cisco 2811 Integrated Services Router with DC power | 1.3.6.1.4.1.9.1.576 | 3.7         |

**Table 2-3**      **Supported Cisco Routers in Cisco ANA Version 3.7 (continued)**

| NE Type                                                | Product Name                             | SysOID              | ANA Version |
|--------------------------------------------------------|------------------------------------------|---------------------|-------------|
| cisco2821 DC                                           | Cisco 2821-DC Integrated Services Router | 1.3.6.1.4.1.9.1.577 | 3.7         |
| <b>Cisco 3600 Series Multiservice Platform Routers</b> |                                          |                     |             |
| cisco3620                                              | Cisco 3620 Multiservice Platform         | 1.3.6.1.4.1.9.1.122 | 3.6.0       |
| cisco3640                                              | Cisco 3640 Multiservice Platform         | 1.3.6.1.4.1.9.1.110 | 3.6.0       |
| cisco3660                                              | Cisco 3660 Multiservice Platform         | 1.3.6.1.4.1.9.1.205 | 3.6.0       |
| cisco3661Ac                                            | Cisco 3661Ac Multiservice Platform       | 1.3.6.1.4.1.9.1.338 | 3.6.0       |
| cisco3661Dc                                            | Cisco 3661Dc Multiservice Platform       | 1.3.6.1.4.1.9.1.339 | 3.6.0       |
| cisco3662Ac                                            | Cisco 3662Ac Multiservice Platform       | 1.3.6.1.4.1.9.1.340 | 3.6.0       |
| cisco3662AcCo                                          | Cisco 3662AcCo Multiservice Platform     | 1.3.6.1.4.1.9.1.342 | 3.6.0       |
| cisco3662Dc                                            | Cisco 3662Dc Multiservice Platform       | 1.3.6.1.4.1.9.1.341 | 3.6.0       |
| cisco3662DcCo                                          | Cisco 3662DcCo Multiservice Platform     | 1.3.6.1.4.1.9.1.343 | 3.6.0       |
| ciscoSC3640                                            | Cisco SC3640 Multiservice Platform       | 1.3.6.1.4.1.9.1.189 | 3.6.0       |
| <b>Cisco 3700 Series Multiservice Access Routers</b>   |                                          |                     |             |
| cisco3725                                              | Cisco 3725 Multiservice Access Router    | 1.3.6.1.4.1.9.1.414 | 3.6.0       |
| cisco3745                                              | Cisco 3745 Multiservice Access Router    | 1.3.6.1.4.1.9.1.436 | 3.6.0       |
| <b>Cisco 3800 Series Integrated Services Routers</b>   |                                          |                     |             |
| cisco3825                                              | Cisco 3825 Integrated Services Router    | 1.3.6.1.4.1.9.1.543 | 3.6.0       |
| cisco3845                                              | Cisco 3845 Integrated Services Router    | 1.3.6.1.4.1.9.1.544 | 3.6.0       |
| <b>Cisco 7200 Series Routers</b>                       |                                          |                     |             |
| cisco7202                                              | Cisco 7202 Router                        | 1.3.6.1.4.1.9.1.194 | 3.6.0       |
| cisco7206                                              | Cisco 7206 Router                        | 1.3.6.1.4.1.9.1.108 | 3.6.0       |
| cisco7204                                              | Cisco 7204 Router                        | 1.3.6.1.4.1.9.1.125 | 3.6.0       |
| cisco7204VXR                                           | Cisco 7204 VXR Router                    | 1.3.6.1.4.1.9.1.223 | 3.6.0       |
| cisco7206VXR                                           | Cisco 7206 VXR Router                    | 1.3.6.1.4.1.9.1.222 | 3.6.0       |
| cisco7201                                              | cisco 7201 Router                        | 1.3.6.1.4.1.9.1.821 | 3.6.4       |

**Table 2-3** *Supported Cisco Routers in Cisco ANA Version 3.7 (continued)*

| NE Type                           | Product Name            | SysOID              | ANA Version |
|-----------------------------------|-------------------------|---------------------|-------------|
| <b>Cisco 7300 Series Routers</b>  |                         |                     |             |
| cisco7304                         | Cisco 7304 Router       | 1.3.6.1.4.1.9.1.439 | 3.7         |
| cisco7301                         | Cisco 7301 Router       | 1.3.6.1.4.1.9.1.476 | 3.7         |
| <b>Cisco 7400 Series Routers</b>  |                         |                     |             |
| cisco7401ASR                      | Cisco 7401ASR           | 1.3.6.1.4.1.9.1.403 | 3.6.0       |
| <b>Cisco 7500 Series Routers</b>  |                         |                     |             |
| cisco7505                         | Cisco 7505 Router       | 1.3.6.1.4.1.9.1.48  | 3.7         |
| cisco7507                         | Cisco 7507 Router       | 1.3.6.1.4.1.9.1.45  | 3.7         |
| cisco7507MX                       | Cisco 7507MX Router     | 1.3.6.1.4.1.9.1.290 | 3.7         |
| cisco7507Z                        | Cisco 7507Z Router      | 1.3.6.1.4.1.9.1.288 | 3.7         |
| cisco7513                         | Cisco 7513 Router       | 1.3.6.1.4.1.9.1.46  | 3.7         |
| cisco7513MX                       | Cisco 7513MX Router     | 1.3.6.1.4.1.9.1.291 | 3.7         |
| cisco7513Z                        | Cisco 7513Z Router      | 1.3.6.1.4.1.9.1.289 | 3.7         |
| cisco7576                         | Cisco 7576 Router       | 1.3.6.1.4.1.9.1.204 | 3.7         |
| <b>Cisco 7600 Series Routers</b>  |                         |                     |             |
| cisco7604sysID                    | Cisco 7604 sysID Router | 1.3.6.1.4.1.9.5.63  | 3.6.1       |
| cisco7603                         | Cisco OSR 7603 Router   | 1.3.6.1.4.1.9.1.401 | 3.6.1       |
| cisco7603S                        | Cisco 7603S Router      | 1.3.6.1.4.1.9.1.862 | 3.6.1       |
| cisco7604                         | Cisco 7604 Router       | 1.3.6.1.4.1.9.1.658 | 3.6.0       |
| cisco7606                         | Cisco 7606 Router       | 1.3.6.1.4.1.9.1.402 | 3.6.0       |
| cisco7606s                        | Cisco 7606S Router      | 1.3.6.1.4.1.9.1.863 | 3.6.1       |
| cisco7606sysID                    | Cisco 7606 sysID Router | 1.3.6.1.4.1.9.5.54  | 3.6.1       |
| cisco7609                         | Cisco 7609 Router       | 1.3.6.1.4.1.9.1.509 | 3.6.0       |
| cisco7609S                        | Cisco 7609S Router      | 1.3.6.1.4.1.9.1.864 | 3.6.1       |
| cisco7609sysID                    | Cisco 7609 sysID Router | 1.3.6.1.4.1.9.5.55  | 3.6.1       |
| cisco7613                         | Cisco 7613 Router       | 1.3.6.1.4.1.9.1.528 | 3.6.0       |
| cisco7613sysID                    | Cisco 7613 sysID Router | 1.3.6.1.4.1.9.5.60  | 3.6.1       |
| cisco763sysID                     | Cisco 763 sysID Router  | 1.3.6.1.4.1.9.5.53  | 3.6.1       |
| <b>Cisco 10000 Series Routers</b> |                         |                     |             |
| cisco10005                        | Cisco 10005 Router      | 1.3.6.1.4.1.9.1.437 | 3.6.0       |
| cisco10008                        | Cisco 10008 Router      | 1.3.6.1.4.1.9.1.438 | 3.6.0       |
| <b>Cisco 12000 Series Routers</b> |                         |                     |             |
| cisco12004                        | Cisco 12004 Router      | 1.3.6.1.4.1.9.1.181 | 3.6.0       |
| cisco12006                        | Cisco 12006 Router      | 1.3.6.1.4.1.9.1.590 | 3.6.0       |
| cisco12008                        | Cisco 12008 Router      | 1.3.6.1.4.1.9.1.182 | 3.6.0       |
| cisco12010                        | Cisco 12010 Router      | 1.3.6.1.4.1.9.1.348 | 3.6.0       |



**Table 2-3**      **Supported Cisco Routers in Cisco ANA Version 3.7 (continued)**

| NE Type                                                   | Product Name                                             | SysOID               | ANA Version |
|-----------------------------------------------------------|----------------------------------------------------------|----------------------|-------------|
| cisco12012                                                | Cisco 12012 Router                                       | 1.3.6.1.4.1.9.1.173  | 3.6.0       |
| cisco12016                                                | Cisco 12016 Router                                       | 1.3.6.1.4.1.9.1.273  | 3.6.0       |
| cisco12404                                                | Cisco 12404 Router                                       | 1.3.6.1.4.1.9.1.423  | 3.6.0       |
| cisco12406                                                | Cisco 12406 Router                                       | 1.3.6.1.4.1.9.1.388  | 3.6.0       |
| cisco12410                                                | Cisco 12410 Router                                       | 1.3.6.1.4.1.9.1.394  | 3.6.0       |
| cisco12416                                                | Cisco 12416 Router                                       | 1.3.6.1.4.1.9.1.385  | 3.6.0       |
| cisco12810                                                | Cisco 12810 Router                                       | 1.3.6.1.4.1.9.1.478  | 3.6.0       |
| cisco12816                                                | Cisco 12816 Router                                       | 1.3.6.1.4.1.9.1.477  | 3.6.0       |
| <b>Cisco XR 12000 Series Routers</b>                      |                                                          |                      |             |
| cisco12012                                                | Cisco 12012 Router                                       | 1.3.6.1.4.1.9.1.173  | 3.6.0       |
| cisco12004                                                | Cisco 12004 Router                                       | 1.3.6.1.4.1.9.1.181  | 3.6.0       |
| cisco12008                                                | Cisco 12008 Router                                       | 1.3.6.1.4.1.9.1.182  | 3.6.0       |
| cisco12016                                                | Cisco 12016 Router                                       | 1.3.6.1.4.1.9.1.273  | 3.6.0       |
| cisco12010                                                | Cisco 12010 Router                                       | 1.3.6.1.4.1.9.1.348  | 3.6.0       |
| cisco12416                                                | Cisco 12416 Router                                       | 1.3.6.1.4.1.9.1.385  | 3.6.0       |
| cisco12406                                                | Cisco 12406 Router                                       | 1.3.6.1.4.1.9.1.388  | 3.6.0       |
| cisco12410                                                | Cisco 12410 Router                                       | 1.3.6.1.4.1.9.1.394  | 3.6.0       |
| cisco12816                                                | Cisco 12816 Router                                       | 1.3.6.1.4.1.9.1.477  | 3.6.0       |
| cisco12810                                                | Cisco 12810 Router                                       | 1.3.6.1.4.1.9.1.478  | 3.6.0       |
| cisco12006                                                | Cisco 12006 Router                                       | 1.3.6.1.4.1.9.1.590  | 3.6.0       |
| cisco12404                                                | Cisco 12404 Router                                       | 1.3.6.1.4.1.9.1.423  | 3.6.5       |
| <b>Cisco CRS-1 Carrier Routing System</b>                 |                                                          |                      |             |
| ciscoCrs16S                                               | Cisco CRS-1 16-Slot Carrier Routing System               | 1.3.6.1.4.1.9.1.613  | 3.6.0       |
| ciscoCrs8S                                                | Cisco CRS-1 8-Slot Single-Shelf System                   | 1.3.6.1.4.1.9.1.643  | 3.6.0       |
| ciscoCrs4S                                                | Cisco CRS-1 4-Slot Single-Shelf System                   | 1.3.6.1.4.1.9.1.822  | 3.6.0       |
| <b>Cisco ASR 1000 Series Routers</b>                      |                                                          |                      |             |
| ciscoASR1002                                              | Cisco ASR1002 Chassis, 4 built-in GE, Dual P/S, 4GB DRAM | 1.3.6.1.4.1.9.1.923  | 3.6.5       |
| ciscoASR1006                                              | Cisco ASR1006 Chassis, Dual P/S                          | 1.3.6.1.4.1.9.1.925  | 3.6.5       |
| ciscoASR1004                                              | Cisco ASR1004 Chassis, Dual P/S                          | 1.3.6.1.4.1.9.1.924  | 3.6.6       |
| ciscoASR1002F                                             | Cisco ASR 1002-F                                         | 1.3.6.1.4.1.9.1.1116 | 3.6.7       |
| <b>Cisco ASR 9000 Series Aggregation Services Routers</b> |                                                          |                      |             |

**Table 2-3**      *Supported Cisco Routers in Cisco ANA Version 3.7 (continued)*

| <b>NE Type</b>                                       | <b>Product Name</b>                  | <b>SysOID</b>        | <b>ANA Version</b> |
|------------------------------------------------------|--------------------------------------|----------------------|--------------------|
| ciscoASR9010                                         | Cisco ASR 9010 chassis               | 1.3.6.1.4.1.9.1.1017 | 3.6.5              |
| ciscoASR9006                                         | Cisco ASR 9006 chassis with DC Power | 1.3.6.1.4.1.9.1.1018 | 3.6.6              |
| ciscoASR9006                                         | Cisco ASR 9006 chassis with AC Power | 1.3.6.1.4.1.9.1.1018 | 3.6.6              |
| <b>Cisco MWR 2900 Series Mobile Wireless Routers</b> |                                      |                      |                    |
| ciscoMWR2941                                         | MWR-2941-DC                          | 1.3.6.1.4.1.9.1.1014 | 3.6.6              |

# Supported Cisco Switches in Cisco ANA Version 3.7

This document includes support information for the following Cisco switches:

- [Cisco Catalyst 2900 Series Switches](#)
- [Cisco ME 3400 Series Ethernet Access Switches](#)
- [Cisco Catalyst 3500 XL Series Switches](#)
- [Cisco Catalyst 3550 Series Switches](#)
- [Cisco Catalyst 3560 Series Switches](#)
- [Cisco Catalyst 3750 Series Switches](#)
- [Cisco Catalyst 3750 Metro Series Switches](#)
- [Cisco Catalyst 4000 Series Switches](#)
- [Cisco Catalyst 4500 Series Switches](#)
- [Cisco Catalyst 4900 Series Switches](#)
- [Cisco ME 4900 Series Ethernet Switch](#)
- [Cisco Catalyst 5000 Series Switches](#)
- [Cisco Catalyst 6500 Series \(CatOS\) Switches](#)
- [Cisco Catalyst 6500 Series \(IOS\) Switches](#)
- [Cisco ME 6500 Series Ethernet Switches \(6524\)](#)

**Table 2-4**      **Supported Cisco Switches in Cisco ANA Version 3.7**

| NE Type                                    | Product Name                         | SysOID              | ANA Version |
|--------------------------------------------|--------------------------------------|---------------------|-------------|
| <b>Cisco Catalyst 2900 Series Switches</b> |                                      |                     |             |
| wsc2948gsysID                              | Cisco Catalyst WS-C2948 Switch       | 1.3.6.1.4.1.9.5.42  | 3.6.0       |
| wsc2900sysID                               | Cisco Catalyst WS-C2900 Switch       | 1.3.6.1.4.1.9.5.12  | 3.6.0       |
| catalyst296024TT                           | Cisco Catalyst 2960-24TT Switch      | 1.3.6.1.4.1.9.1.716 | 3.6.0       |
| catalyst295048T                            | Cisco Catalyst 2950T 48 SI Switch    | 1.3.6.1.4.1.9.1.559 | 3.6.0       |
| catalyst295024GDC                          | Cisco Catalyst 2950G 24 EI DC Switch | 1.3.6.1.4.1.9.1.472 | 3.6.0       |
| catalyst295024S                            | Cisco Catalyst 2950 24S Switch       | 1.3.6.1.4.1.9.1.430 | 3.6.0       |
| catalyst295048G                            | Cisco Catalyst 2950G 48 EI Switch    | 1.3.6.1.4.1.9.1.429 | 3.6.0       |
| catalyst295024G                            | Cisco Catalyst 2950G 24 EI Switch    | 1.3.6.1.4.1.9.1.428 | 3.6.0       |
| catalyst295012G                            | Cisco Catalyst 2950G 12 EI Switch    | 1.3.6.1.4.1.9.1.427 | 3.6.0       |

**Table 2-4**      **Supported Cisco Switches in Cisco ANA Version 3.7 (continued)**

| NE Type                                              | Product Name                                          | SysOID              | ANA Version        |
|------------------------------------------------------|-------------------------------------------------------|---------------------|--------------------|
| cat2948gL3Dc                                         | Cisco Catalyst C2948G-L3 Ethernet Switch              | 1.3.6.1.4.1.9.1.386 | 3.6.0              |
| catalyst2950t24                                      | Cisco Catalyst 2950T 24 Switch                        | 1.3.6.1.4.1.9.1.359 | 3.6.0              |
| catalyst295024C                                      | Cisco Catalyst 2950C 24 Switch                        | 1.3.6.1.4.1.9.1.325 | 3.6.0              |
| catalyst295024                                       | Cisco Catalyst 2950 24 Switch                         | 1.3.6.1.4.1.9.1.324 | 3.6.0              |
| catalyst295012                                       | Cisco Catalyst 2950 12 Switch                         | 1.3.6.1.4.1.9.1.323 | 3.6.0              |
| cat2948gL3                                           | Cisco Catalyst C2948G-L3 Ethernet Switch              | 1.3.6.1.4.1.9.1.275 | 3.6.0              |
| catalyst2912MfXL                                     | Cisco Catalyst 2912MF XL Switch                       | 1.3.6.1.4.1.9.1.221 | 3.6.0              |
| catalyst2924MXL                                      | Cisco Catalyst 2924M XL Switch                        | 1.3.6.1.4.1.9.1.220 | 3.6.0              |
| catalyst2912XL                                       | Cisco Catalyst 2912 XL Switch                         | 1.3.6.1.4.1.9.1.219 | 3.6.0              |
| catalyst2924CXLv                                     | Cisco Catalyst 2924C XL Switch                        | 1.3.6.1.4.1.9.1.218 | 3.6.0              |
| catalyst2924XLv                                      | Cisco Catalyst 2924 XL Switch                         | 1.3.6.1.4.1.9.1.217 | 3.6.0              |
| catalyst2924CXL                                      | Cisco Catalyst 2924C XL Switch                        | 1.3.6.1.4.1.9.1.184 | 3.6.0              |
| catalyst2924XL                                       | Cisco Catalyst 2924 XL Switch                         | 1.3.6.1.4.1.9.1.183 | 3.6.0              |
| catalyst2916m-xl                                     | Cisco Catalyst 2916M XL Switch                        | 1.3.6.1.4.1.9.1.171 | 3.6.0              |
| catalyst2908xl                                       | Cisco Catalyst 2908 XL Switch                         | 1.3.6.1.4.1.9.1.170 | 3.6.0              |
| <b>Cisco ME 3400 Series Ethernet Access Switches</b> |                                                       |                     |                    |
| 3400-24TS                                            | Cisco Me 3400 Switch-24 10/100 + 2 SFP DC PS          | 1.3.6.1.4.1.9.1.736 | 3.6.1 <sup>1</sup> |
| 3400-24TS AC                                         | Cisco Me 3400 Software 24PT-10/100 Plus 2PT SFP AC PS | 1.3.6.1.4.1.9.1.736 | 3.6.1 <sup>2</sup> |
| 3400-24TS DC                                         | Cisco Me 3400 Software 24PT-10/100 Plus 2PT SFP DC PS | 1.3.6.1.4.1.9.1.736 | 3.6.1 <sup>3</sup> |
| cisco340024TSA                                       | Cisco ME 3400-24TS-A Switch                           | 1.3.6.1.4.1.9.1.736 | 3.6.1              |
| cisco340024TSD                                       | Cisco ME 3400-24TS-D Switch                           | 1.3.6.1.4.1.9.1.737 | 3.6.1              |
| 3400G-12CS                                           | Cisco ME 3400G-12CS Ethernet Access Switch            | 1.3.6.1.4.1.9.1.780 | 3.6.1 <sup>4</sup> |
| ciscoMe3400g12CsA                                    | Cisco ME 3400G-12CS AC Ethernet Access Switch         | 1.3.6.1.4.1.9.1.780 | 3.6.1              |
| ciscoMe3400g12CsD                                    | Cisco ME 3400G-12CS DC Ethernet Access Switch         | 1.3.6.1.4.1.9.1.781 | 3.6.1              |
| 3400G-2CS                                            | Cisco ME 3400-2CS Ethernet Access Switch              | 1.3.6.1.4.1.9.1.825 | 3.6.1 <sup>5</sup> |

**Table 2-4**      **Supported Cisco Switches in Cisco ANA Version 3.7 (continued)**

| NE Type                                       | Product Name                                          | SysOID               | ANA Version |
|-----------------------------------------------|-------------------------------------------------------|----------------------|-------------|
| ciscoMe3400g2csA                              | Cisco ME 3400-2CS AC Ethernet Access Switch           | 1.3.6.1.4.1.9.1.825  | 3.6.1       |
| ciscoMe3400eg2csA                             | Cisco ME 3400EG-2CS Ethernet Access Switch            | 1.3.6.1.4.1.9.1.1007 | 3.6.5       |
| ciscoMe3400eg12Cs m                           | Cisco ME 3400EG-12CS-M Ethernet Access Switch chassis | 1.3.6.1.4.1.9.1.1008 | 3.6.5       |
| ciscoMe3400e24Tsm                             | Cisco ME 3400E-24TS-M Ethernet Access Switch chassis  | 1.3.6.1.4.1.9.1.1009 | 3.6.5       |
| <b>Cisco Catalyst 3500 XL Series Switches</b> |                                                       |                      |             |
| cat3524tXLEn                                  | Cisco Catalyst 3524 PWR XL Switch                     | 1.3.6.1.4.1.9.1.287  | 3.6.0       |
| cat3548XL                                     | Cisco Catalyst 3548 XL Switch                         | 1.3.6.1.4.1.9.1.278  | 3.6.0       |
| catalyst3508GXL                               | Cisco Catalyst 3508G XL Switch                        | 1.3.6.1.4.1.9.1.246  | 3.6.0       |
| catalyst3512XL                                | Cisco Catalyst 3512 XL Switch                         | 1.3.6.1.4.1.9.1.247  | 3.6.0       |
| catalyst3524XL                                | Cisco Catalyst 3524 XL Switch                         | 1.3.6.1.4.1.9.1.248  | 3.6.0       |
| catalystC3524PWRXLEn                          | catalystC3524PWRXLEn                                  | 1.3.6.1.4.1.9.1.515  | 3.6.1       |
| <b>Cisco Catalyst 3550 Series Switches</b>    |                                                       |                      |             |
| catalyst355024                                | Cisco Catalyst 3550 24 Switch                         | 1.3.6.1.4.1.9.1.366  | 3.6.0       |
| catalyst355048                                | Cisco Catalyst 3550 48 Switch                         | 1.3.6.1.4.1.9.1.367  | 3.6.0       |
| catalyst355012T                               | Cisco Catalyst 3550 12T Switch                        | 1.3.6.1.4.1.9.1.368  | 3.6.0       |
| catalyst355012G                               | Cisco Catalyst 3550 12G Switch                        | 1.3.6.1.4.1.9.1.431  | 3.6.0       |
| cat355024Dc                                   | Cisco Catalyst 3550 24 DC SMI Switch                  | 1.3.6.1.4.1.9.1.452  | 3.6.0       |
| cat355024Mmf                                  | Cisco Catalyst 3550 24 FX SMI Switch                  | 1.3.6.1.4.1.9.1.453  | 3.6.1       |
| catalyst355024PWR                             | Cisco Catalyst 3550 24 PWR Switch                     | 1.3.6.1.4.1.9.1.485  | 3.6.0       |
| <b>Cisco Catalyst 3560 Series Switches</b>    |                                                       |                      |             |
| catalyst356024PS                              | Cisco Catalyst 3560-24PS Switch                       | 1.3.6.1.4.1.9.1.563  | 3.6.1       |
| catalyst356048PS                              | Cisco Catalyst 3560-48PS Switch                       | 1.3.6.1.4.1.9.1.564  | 3.6.0       |
| catalyst3560G24PS                             | Cisco Catalyst 3560G-24PS Switch                      | 1.3.6.1.4.1.9.1.614  | 3.6.1       |
| catalyst3560G24TS                             | Cisco Catalyst 3560G-24TS Switch                      | 1.3.6.1.4.1.9.1.615  | 3.6.1       |
| catalyst3560G48PS                             | Cisco Catalyst 3560G-48PS Switch                      | 1.3.6.1.4.1.9.1.616  | 3.6.1       |

**Table 2-4**      **Supported Cisco Switches in Cisco ANA Version 3.7 (continued)**

| NE Type                                          | Product Name                                 | SysOID              | ANA Version |
|--------------------------------------------------|----------------------------------------------|---------------------|-------------|
| catalyst3560G48TS                                | Cisco Catalyst 3560G-48TS Switch             | 1.3.6.1.4.1.9.1.617 | 3.6.0       |
| catalyst356024TS                                 | Cisco Catalyst 3560-24TS Switch              | 1.3.6.1.4.1.9.1.633 | 3.6.1       |
| <b>Cisco Catalyst 3750 Series Switches</b>       |                                              |                     |             |
| catalyst37xxStack                                | Catalyst 3750-48/-24/-24T/-24TS/-24FS/ Stack | 1.3.6.1.4.1.9.1.516 | 3.6.0       |
| catalyst375024                                   | Cisco Catalyst 3750-24                       | 1.3.6.1.4.1.9.1.511 | 3.6.4       |
| catalyst375024PS                                 | Cisco Catalyst 3750-24PS                     | 1.3.6.1.4.1.9.1.536 | 3.6.4       |
| catalyst375024T                                  | Cisco Catalyst 3750-24T                      | 1.3.6.1.4.1.9.1.514 | 3.6.4       |
| catalyst375024TS                                 | Cisco Catalyst 3750 - 24TS                   | 1.3.6.1.4.1.9.1.513 | 3.6.4       |
| catalyst375048                                   | Cisco Catalyst 3750-48                       | 1.3.6.1.4.1.9.1.512 | 3.6.4       |
| catalyst375048PS                                 | Cisco Catalyst 3750-48PS                     | 1.3.6.1.4.1.9.1.535 | 3.6.4       |
| catalyst3750G16TD                                | Cisco Catalyst 3750G-16TD                    | 1.3.6.1.4.1.9.1.591 | 3.6.4       |
| catalyst3750G24PS                                | Cisco Catalyst 3750G-24PS                    | 1.3.6.1.4.1.9.1.602 | 3.6.4       |
| catalyst3750G24TS1U                              | Cisco Catalyst 3750G-24TS-1U                 | 1.3.6.1.4.1.9.1.624 | 3.6.4       |
| catalyst3750G48PS                                | Cisco Catalyst 3750G-48PS                    | 1.3.6.1.4.1.9.1.603 | 3.6.4       |
| catalyst3750G48TS                                | Cisco Catalyst 3750G-48TS                    | 1.3.6.1.4.1.9.1.604 | 3.6.4       |
| catalyst3750Ge12Sfp                              | Cisco Catalyst 3750G-12Sfp                   | 1.3.6.1.4.1.9.1.530 | 3.6.4       |
| catalyst3750Ge12SfpDc                            | Cisco catalyst 3750G-12S-SD                  | 1.3.6.1.4.1.9.1.688 | 3.6.4       |
| catalyst3750G24WS50                              | Cisco Catalyst 3750G-24WS-50                 | 1.3.6.1.4.1.9.1.779 | 3.6.4       |
| catalyst3750E48TD                                | Cisco Catalyst 3750E-48TD                    | 1.3.6.1.4.1.9.1.790 | 3.6.4       |
| catalyst3750E24PD                                | Cisco Catalyst 3750E-24PD                    | 1.3.6.1.4.1.9.1.792 | 3.6.4       |
| catalyst3750E24TD                                | Cisco Catalyst 3750E-24TD                    | 1.3.6.1.4.1.9.1.789 | 3.6.4       |
| catalyst3750E48PD                                | Cisco Catalyst 3750E-48PD                    | 1.3.6.1.4.1.9.1.791 | 3.6.4       |
| catalyst3750G24WS25                              | Cisco Catalyst 3750G-24WS-25                 | 1.3.6.1.4.1.9.1.778 | 3.6.4       |
| <b>Cisco Catalyst 3750 Metro Series Switches</b> |                                              |                     |             |
| catalyst375024ME                                 | Cisco Catalyst 3750 Metro 24-DC Switch       | 1.3.6.1.4.1.9.1.574 | 3.6.0       |
| <b>Cisco Catalyst 4000 Series Switches</b>       |                                              |                     |             |
| wsc4003sysID                                     | Cisco Catalyst 4003 Switch                   | 1.3.6.1.4.1.9.5.40  | 3.6.0       |
| wsc4006sysID                                     | Cisco Catalyst 4006 Switch                   | 1.3.6.1.4.1.9.5.46  | 3.6.0       |

**Table 2-4**      **Supported Cisco Switches in Cisco ANA Version 3.7 (continued)**

| NE Type                                            | Product Name                                   | SysOID              | ANA Version |
|----------------------------------------------------|------------------------------------------------|---------------------|-------------|
| catalyst4kGateway                                  | Cisco Catalyst 4604 Access Gateway             | 1.3.6.1.4.1.9.1.318 | 3.6.0       |
| cat4232L3                                          | Cisco Catalyst 4006 Switch                     | 1.3.6.1.4.1.9.1.300 | 3.6.0       |
| cat4840gL3                                         | Cisco Catalyst 4840G Switch                    | 1.3.6.1.4.1.9.1.312 | 3.6.0       |
| cisco4000                                          | Cisco Catalyst 4000 Switch                     | 1.3.6.1.4.1.9.1.7   | 3.6.0       |
| <b>Cisco Catalyst 4500 Series Switches</b>         |                                                |                     |             |
| cisco4500                                          | Cisco Catalyst 4500 switch                     | 1.3.6.1.4.1.9.1.14  | 3.6.0       |
| cat4506                                            | Cisco Catalyst 4506 switch                     | 1.3.6.1.4.1.9.1.502 | 3.6.0       |
| wsc4506sysID                                       | Cisco Catalyst 4506 switch                     | 1.3.6.1.4.1.9.5.59  | 3.6.0       |
| cat4507                                            | Cisco Catalyst 4507 switch                     | 1.3.6.1.4.1.9.1.501 | 3.6.0       |
| cat4503                                            | Cisco Catalyst 4503 switch                     | 1.3.6.1.4.1.9.1.503 | 3.6.0       |
| wsc4503sysID                                       | Cisco Catalyst 4503 Switch                     | 1.3.6.1.4.1.9.5.58  | 3.6.3       |
| catalyst4503E                                      | Cisco Catalyst 4503E Switch                    | 1.3.6.1.4.1.9.1.874 | 3.6.6       |
| catalyst4507R-E                                    | Cisco Catalyst 4507R-E Switch                  | 1.3.6.1.4.1.9.1.876 | 3.6.6       |
| catalyst4506E                                      | Cisco Catalyst 4506-E Switch                   | 1.3.6.1.4.1.9.1.875 | 3.6.7       |
| catalyst4510                                       | Cisco Catalyst 4510R Switch                    | 1.3.6.1.4.1.9.1.537 | 3.6.7       |
| catalyst4510RE                                     | Cisco Catalyst 4510R-E Switch                  | 1.3.6.1.4.1.9.1.877 | 3.6.7       |
| <b>Cisco Catalyst 4900 Series Switches</b>         |                                                |                     |             |
| catalyst4948                                       | Cisco Catalyst 4948 Switch                     | 1.3.6.1.4.1.9.1.626 | 3.6.1       |
| catalyst494810GE                                   | Cisco Catalyst 4948 10 Gigabit Ethernet Switch | 1.3.6.1.4.1.9.1.659 | 3.6.1       |
| WS-C4900M                                          | Base System with 8-port (X2) and 2 Half Slots  | 1.3.6.1.4.1.9.1.917 | 3.7         |
| <b>Cisco ME 4900 Series Ethernet Switch</b>        |                                                |                     |             |
| ciscoMe492410GE                                    | Cisco ME 4924-10GE Ethernet Aggregation Switch | 1.3.6.1.4.1.9.1.788 | 3.6.1       |
| <b>Cisco Catalyst 5000 Series Switches</b>         |                                                |                     |             |
| cisco5002                                          | Cisco Catalyst 5002 Switch                     | 1.3.6.1.4.1.9.5.29  | 3.7         |
| cisco5000                                          | Cisco Catalyst 5000 Switch                     | 1.3.6.1.4.1.9.5.7   | 3.7         |
| catalyst5500                                       | Cisco Catalyst 5500 Switch                     | 1.3.6.1.4.1.9.5.17  | 3.7         |
| catalyst5505                                       | Cisco Catalyst 5505 Switch                     | 1.3.6.1.4.1.9.5.34  | 3.7         |
| catalyst5509                                       | Cisco Catalyst 5509 Switch                     | 1.3.6.1.4.1.9.5.36  | 3.7         |
| <b>Cisco Catalyst 6500 Series (CatOS) Switches</b> |                                                |                     |             |
| wsc6009sysID                                       | Catalyst 6009                                  | 1.3.6.1.4.1.9.5.39  | 3.6.0       |
| wsc6506sysID                                       | Catalyst 6506                                  | 1.3.6.1.4.1.9.5.45  | 3.6.0       |
| wsc6509nebasysID                                   | Catalyst 6509NEBA                              | 1.3.6.1.4.1.9.5.61  | 3.6.4       |
| wsc6509nebsysID                                    | Catalyst 6509-NEB                              | 1.3.6.1.4.1.9.5.47  | 3.6.0       |

**Table 2-4** *Supported Cisco Switches in Cisco ANA Version 3.7 (continued)*

| NE Type                                              | Product Name                           | SysOID              | ANA Version |
|------------------------------------------------------|----------------------------------------|---------------------|-------------|
| wsc6513sysID                                         | Catalyst 6513                          | 1.3.6.1.4.1.9.5.50  | 3.6.0       |
| wsc6509sysID                                         | Catalyst 6509                          | 1.3.6.1.4.1.9.5.44  | 3.6.0       |
| wsc6509esysID                                        | Catalyst 6509-E                        | 1.3.6.1.4.1.9.5.44  | 3.6.0       |
| wsc6504esysID                                        | Catalyst 6504-E                        | 1.3.6.1.4.1.9.5.64  | 3.6.1       |
| wsc6503sysID                                         | Catalyst 6503                          | 1.3.6.1.4.1.9.5.56  | 3.6.1       |
| cat6500FirewallSm                                    | Catalyst 6500 Firewall Services Module | 1.3.6.1.4.1.9.1.522 | 3.6.1       |
| cat6500SslSm                                         | Catalyst 6500 SSL Services Module      | 1.3.6.1.4.1.9.1.554 | 3.6.1       |
| <b>Cisco Catalyst 6500 Series (IOS) Switches</b>     |                                        |                     |             |
| cat6006                                              | Cisco Catalyst 6006 Switch             | 1.3.6.1.4.1.9.1.280 | 3.6.0       |
| ciscoWSC6509neba                                     | Cisco Catalyst 6509-NEB-A Switch       | 1.3.6.1.4.1.9.1.534 | 3.6.0       |
| cat6509Sp                                            | Cisco Catalyst 6509-NEB Switch         | 1.3.6.1.4.1.9.1.310 | 3.6.0       |
| ciscoWSC6503                                         | Cisco Catalyst 6503 Switch             | 1.3.6.1.4.1.9.1.449 | 3.6.0       |
| cat6506                                              | Cisco Catalyst 6506 Switch             | 1.3.6.1.4.1.9.1.282 | 3.6.0       |
| cat6509                                              | Cisco Catalyst 6509 Switch             | 1.3.6.1.4.1.9.1.283 | 3.6.0       |
| ciscoWSC6504E                                        | Cisco Catalyst 6504-E Switch Chassis   | 1.3.6.1.4.1.9.1.657 | 3.6.0       |
| ciscoWSC6513                                         | Cisco Catalyst 6513 Switch             | 1.3.6.1.4.1.9.1.400 | 3.6.0       |
| cisco6500VSS                                         | Cisco Catalyst 6500 VSS                | 1.3.6.1.4.1.9.1.896 | 3.6.3       |
| <b>Cisco ME 6500 Series Ethernet Switches (6524)</b> |                                        |                     |             |
| cisco6524 (ME-C6524GS-8S)                            | Cisco ME 6524                          | 1.3.6.1.4.1.9.1.719 | 3.6.0       |
| cisco6524 (ME-C6524GT-8S)                            | Cisco ME 6524                          | 1.3.6.1.4.1.9.1.720 | 3.6.0       |

<sup>1, 2, 3</sup>Same as cisco340024TSA. Differs based on chassis/power supply.<sup>4</sup>Same as ciscoMe3400g12CsA. Differs based on chassis/power supply.<sup>5</sup>Same as ciscoMe3400g2csA. Differs based on chassis/power supply.



# Supported Generic Devices in Cisco ANA Version 3.7

This document includes support information for the following Generic devices:

- [Generic VNE](#)

**Table 2-5**      *Supported Generic Devices in Cisco ANA Version 3.7*

| NE Type                     | Product Name | SysOID    | ANA Version |
|-----------------------------|--------------|-----------|-------------|
| <a href="#">Generic VNE</a> |              |           |             |
| Generic device              |              | 1.3.999.3 | 3.6.0       |





## CHAPTER 3

# Support Information for Cisco Security Appliances

This chapter contains support information for Virtual Network Elements (VNEs) that manage Cisco security appliances in Cisco ANA Version 3.7. For more information about the objects and attributes described in this chapter, see Part 2, Technology Support and Information Objects.

This chapter contains the following topics:

- [Cisco Adaptive Security Appliance 5550 Series, page 3-1](#)
- [Cisco Adaptive Security Appliance 5580 Series, page 3-3](#)
- [Supported Technologies on Cisco Security Appliances, page 3-5](#)

## Cisco Adaptive Security Appliance 5550 Series

This section includes the following information about Cisco ASA 5550 Series security appliances (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Adaptive Security Appliance 5550 Series](#)):

- [Cisco ASA 5550 Series—Supported Software Versions, page 3-1](#)
- [Cisco ASA 5550 Series—Supported Topologies, page 3-2](#)
- [Cisco ASA 5550 Series—Supported Modules, page 3-2](#)
- [Cisco ASA 5550 Series—Supported Technologies, page 3-2](#)
- [Cisco ASA 5550 Series—Supported Service Events, page 3-2](#)

## Cisco ASA 5550 Series—Supported Software Versions

**Table 3-1**      *Supported Software Versions for Cisco ASA 5550 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 7.2(3)12         | 3.6.3       |

## Cisco ASA 5550 Series—Supported Topologies

**Table 3-2** *Supported Topologies for Cisco ASA 5550 Series—Cisco ANA Version 3.7*

| Topology Type | Link Type | ANA Version |
|---------------|-----------|-------------|
| Ethernet      | Ethernet  | 3.6.3       |

## Cisco ASA 5550 Series—Supported Modules

**Table 3-3** *Supported Modules for Cisco ASA 5550 Series—Cisco ANA Version 3.7*

| Module Name | ANA Version | Module Description                    |
|-------------|-------------|---------------------------------------|
| SSM-4GE-INC | 3.6.3       | SSM-4GE Included with ASA 5550 System |

## Cisco ASA 5550 Series—Supported Technologies

The following technologies are supported by the Cisco ASA 5550 Series in Cisco ANA Version 3.7:

- [IP](#), page 3-5
- [Ethernet \(IEEE 802.3\)](#), page 3-8
- [Physical Equipment](#), page 3-12
- [Base Logical Components](#), page 3-13
- [Common](#), page 3-14

## Cisco ASA 5550 Series—Supported Service Events

**Table 3-4** *Supported Service Events for Cisco ASA 5550 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | Y         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.3       | Y         |
| Interface Status Down/Up                            | 3.6.3       | Y         |
| Card In/Out                                         | 3.6.3       | Y         |
| Link Down/Up                                        | 3.6.3       | Y         |
| Device Unreachable                                  | 3.6.3       | Y         |
| CPU Over Utilized                                   | 3.6.3       | Y         |
| Memory Over Utilized                                | 3.6.3       | Y         |

**Table 3-4** Supported Service Events for Cisco ASA 5550 Series—Cisco ANA Version 3.7

| Event Name         | ANA Version | Expedited |
|--------------------|-------------|-----------|
| Device Unsupported | 3.6.3       | Y         |
| Discard Packets    | 3.6.3       | N         |
| Dropped Packets    | 3.6.3       | N         |
| Module Unsupported | 3.6.3       | N         |
| Port Down          | 3.6.3       | Y         |
| Card Up/Down       | 3.6.3       | Y         |

## Cisco Adaptive Security Appliance 5580 Series

This section includes the following information about Cisco ASA 5580 Series security appliances (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Adaptive Security Appliance 5580 Series](#)):

- [Cisco ASA 5580 Series—Supported Software Versions](#), page 3-3
- [Cisco ASA 5580 Series—Supported Topologies](#), page 3-3
- [Cisco ASA 5580 Series—Supported Modules](#), page 3-4
- [Cisco ASA 5580 Series—Supported Technologies](#), page 3-4
- [Cisco ASA 5580 Series—Supported Service Events](#), page 3-4

## Cisco ASA 5580 Series—Supported Software Versions

**Table 3-5** Supported Software Versions for Cisco ASA 5580 Series—Cisco ANA Version 3.7

| Software Version | ANA Version |
|------------------|-------------|
| 8.1(2)           | 3.7         |
| 8.1(2)12         | 3.7         |

## Cisco ASA 5580 Series—Supported Topologies

**Table 3-6** Supported Topologies for Cisco ASA 5580 Series—Cisco ANA Version 3.7

| Topology Type | Link Type | ANA Version |
|---------------|-----------|-------------|
| Ethernet      | Ethernet  | 3.7         |

## Cisco ASA 5580 Series—Supported Modules

**Table 3-7** Supported Modules for Cisco ASA 5580 Series—Cisco ANA Version 3.7

| Module Name       | ANA Version | Module Description                                                     |
|-------------------|-------------|------------------------------------------------------------------------|
| ASA5580-4GE-CU    | 3.7         | Cisco ASA 5580 4-port 10/100/1000 Ethernet interface card, RJ45        |
| ASA5580-4GE-FI    | 3.7         | Cisco ASA 5580 4-port Gigabit Ethernet fiber interface card, SR, LC    |
| ASA5580-2X10GE-SR | 3.7         | Cisco ASA 5580 2-port 10 Gigabit Ethernet fiber interface card, SR, LC |

## Cisco ASA 5580 Series—Supported Technologies

The following technologies are supported by the Cisco ASA 5580 Series in Cisco ANA Version 3.7:

- [IP](#), page 3-5
- [Ethernet \(IEEE 802.3\)](#), page 3-8
- [Physical Equipment](#), page 3-12
- [Base Logical Components](#), page 3-13
- [Common](#), page 3-14

## Cisco ASA 5580 Series—Supported Service Events

**Table 3-8** Supported Service Events for Cisco ASA 5580 Series—Cisco ANA Version 3.7

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.7         | Y         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.7         | Y         |
| Interface Status Down/Up                            | 3.7         | Y         |
| Card In/Out                                         | 3.7         | Y         |
| Link Down/Up                                        | 3.7         | Y         |
| Device Unreachable                                  | 3.7         | Y         |
| CPU Over Utilized                                   | 3.7         | Y         |
| Memory Over Utilized                                | 3.7         | Y         |
| Device Unsupported                                  | 3.7         | Y         |
| Discard Packets                                     | 3.7         | N         |
| Dropped Packets                                     | 3.7         | N         |

**Table 3-8** Supported Service Events for Cisco ASA 5580 Series—Cisco ANA Version 3.7

| Event Name         | ANA Version | Expedited |
|--------------------|-------------|-----------|
| Module Unsupported | 3.7         | N         |
| Port Down          | 3.7         | Y         |
| Card Up/Down       | 3.7         | Y         |

## Supported Technologies on Cisco Security Appliances

The following sections list the objects and attributes that are supported on Cisco security appliances in Cisco ANA Version 3.7 per technology:

- [IP, page 3-5](#)
- [Ethernet \(IEEE 802.3\), page 3-8](#)
- [Physical Equipment, page 3-12](#)
- [Base Logical Components, page 3-13](#)
- [Common, page 3-14](#)

### IP

**Table 3-9** IP Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7

| Attribute                     | ASA5550 | ASA5580 |
|-------------------------------|---------|---------|
| <b>IMO Name—IIPIInterface</b> |         |         |
| IP Address                    | Y       | Y       |
| Subnetwork Mask               | Y       | Y       |
| IP Interface Addresses Array  | Y       | Y       |
| Interface Name                | Y       | Y       |
| Interface Description         | Y       | Y       |
| IP Interface State            | Y       | Y       |
| OSPF Interface Cost           |         |         |
| Broadcast Address             |         |         |
| MTU                           |         |         |
| Lookup Method                 |         |         |
| Address Resolution Type       |         |         |
| ARP Timeout                   |         |         |
| Secured ARP                   |         |         |
| ICMP Mask Reply               |         |         |

**Table 3-9 IP Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7**

| Attribute                                 | ASA5550 | ASA5580 |
|-------------------------------------------|---------|---------|
| IGMP Proxy                                |         |         |
| HSRP Groups                               |         |         |
| IP Multiplexing Table                     |         |         |
| IANA Type                                 |         |         |
| Containing CTPs                           |         |         |
| Contained CTPs                            |         |         |
| <b>IMO Name—IIPMuxEntry</b>               |         |         |
| Termination Point                         |         |         |
| Destination IP Subnet                     |         |         |
| <b>IMO Name—IRoutingEntity</b>            |         |         |
| Routing Table                             | Y       | Y       |
| ARP Entity                                | Y       | Y       |
| Routing Table Changes                     |         |         |
| Name                                      | Y       | Y       |
| Logical Sons                              | Y       | Y       |
| <b>IMO Name—IRoutingEntry</b>             |         |         |
| Destination IP Subnet                     | Y       | Y       |
| Next Hop IP Address                       | Y       | Y       |
| Type                                      | Y       | Y       |
| Routing Protocol Type                     | Y       | Y       |
| Outgoing Interface Name                   | Y       | Y       |
| <b>IMO Name—IARPEntity</b>                |         |         |
| ARP Table                                 | Y       | Y       |
| <b>IMO Name—IARPEntity</b>                |         |         |
| IP Address                                | Y       | Y       |
| MAC Address                               | Y       | Y       |
| Port                                      | Y       | Y       |
| Entry Type                                | Y       | Y       |
| <b>IMO Name—IIPPool</b>                   |         |         |
| IP Address Pool Entries                   |         |         |
| Name                                      |         |         |
| Index                                     |         |         |
| <b>IMO Name—IIPRangeBasedIIPPoolEntry</b> |         |         |
| Start IP Address                          |         |         |
| End IP Address                            |         |         |



**Table 3-9 IP Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7**

| Attribute                                 | ASA5550 | ASA5580 |
|-------------------------------------------|---------|---------|
| Unused Addresses                          |         |         |
| Used Addresses                            |         |         |
| Reserved Addresses                        |         |         |
| <b>IMO Name—IIPSubnetBasedIPPoolEntry</b> |         |         |
| IP Subnet                                 |         |         |
| Unused Addresses                          |         |         |
| Used Addresses                            |         |         |
| Reserved Addresses                        |         |         |
| <b>IMO Name—HSRPGroupEntry</b>            |         |         |
| Group Number                              |         |         |
| Port Description                          |         |         |
| Priority                                  |         |         |
| Coupled Router                            |         |         |
| State                                     |         |         |
| Tracking Interfaces                       |         |         |
| Virtual IP Address                        |         |         |
| Virtual MAC Address                       |         |         |
| <b>IMO Name—ITunnelGRE</b>                |         |         |
| Name                                      |         |         |
| Tunnel Destination and Source             |         |         |
| IP Address                                |         |         |
| IP Interface State                        |         |         |
| IANA Type                                 |         |         |
| Containing CTPs                           |         |         |
| Contained CTPs                            |         |         |
| Keep Alive Time                           |         |         |
| Keep Alive Retry                          |         |         |

## Ethernet (IEEE 802.3)

**Table 3-10** *Ethernet (IEEE 802.3) Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7*

| Attribute                                      | ASA5550 | ASA5580 |
|------------------------------------------------|---------|---------|
| <b>IMO Name—ILinkAggregationGroup802dot3ad</b> |         |         |
| dot3adAggMACAddress                            |         |         |
| dot3adAggActorSystemPriority                   |         |         |
| dot3adAggActorSystemID                         |         |         |
| dot3adAggActorAdminKey                         |         |         |
| dot3adAggActorOperKey                          |         |         |
| dot3adAggPartnerSystemID                       |         |         |
| dot3adAggPartnerSystemPriority                 |         |         |
| dot3adAggPartnerOperKey                        |         |         |
| dot3adAggCollectorMaxDelay                     |         |         |
| GroupNumber                                    |         |         |
| AggregationProtocolType                        |         |         |
| MacAddress                                     |         |         |
| ChannelAdminStatus                             |         |         |
| ChannelOperStatus                              |         |         |
| <b>IMO Name—IEthernet</b>                      |         |         |
| MAC Address                                    | Y       | Y       |
| Duplex Mode                                    |         |         |
| Output Flow Control                            |         |         |
| Input Flow Control                             |         |         |
| IANA Type                                      | Y       | Y       |
| Containing CTPs                                |         |         |
| Contained CTPs                                 |         |         |
| Port Type                                      |         |         |
| <b>IMO Name—IVlanInterface</b>                 |         |         |
| Mode                                           |         |         |
| Native VLAN Identification                     |         |         |
| Virtual LAN Table                              |         |         |
| IANA Type                                      |         |         |
| Containing CTPs                                |         |         |
| Contained CTPs                                 |         |         |

**Table 3-10 Ethernet (IEEE 802.3) Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)**

| Attribute                     | ASA5550 | ASA5580 |
|-------------------------------|---------|---------|
| vlanAdminType                 |         |         |
| vlanencapType                 |         |         |
| getAccess                     |         |         |
| Allowed Vlans                 |         |         |
| <b>IMO Name—IVlanEncapMux</b> |         |         |
| IANA Type                     |         |         |
| Containing CTPs               |         |         |
| Contained CTPs                |         |         |
| <b>IMO Name—IVlanMapping</b>  |         |         |
| direction                     |         |         |
| vlanMatchCriteria             |         |         |
| vlanRewriteDefinition         |         |         |
| Drop                          |         |         |
| Vlan                          |         |         |
| innerVlan                     |         |         |
| translatedVlan                |         |         |
| translatedInnerVlan           |         |         |
| <b>IMO Name—IIEEE802</b>      |         |         |
| VLAN Identification           |         |         |
| Binding Information           |         |         |
| Binding Status                |         |         |
| IANA Type                     |         |         |
| Containing CTPs               |         |         |
| Contained CTPs                |         |         |
| <b>IMO Name—IStpService</b>   |         |         |
| StpProtocol                   |         |         |
| StpMaxAge                     |         |         |
| StpHelloTime                  |         |         |
| StpBridgeForwardDelay         |         |         |
| StpInstanceInfoTable          |         |         |
| Same as ISystemService        |         |         |
| StpUplinkFastState            |         |         |
| StpBackboneFastState          |         |         |
| StpForwardDelay               |         |         |

**Table 3-10** *Ethernet (IEEE 802.3) Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)*

| Attribute                          | ASA5550 | ASA5580 |
|------------------------------------|---------|---------|
| StpBridgeMaxAge                    |         |         |
| StpBridgeHelloTime                 |         |         |
| <b>IMO Name—IMstService</b>        |         |         |
| MstProperties                      |         |         |
| Same as IStpService                |         |         |
| <b>IMO Name—IPvstpService</b>      |         |         |
| UpLinkFast                         |         |         |
| BackboneFast                       |         |         |
| <b>IMO Name—IMstProperties</b>     |         |         |
| MstForceVersion                    |         |         |
| MstCfgIdFmtSel                     |         |         |
| MstExternalRootCost                |         |         |
| MstMaxInstances                    |         |         |
| MstCfgIdName                       |         |         |
| MstCfgIdRevLevel                   |         |         |
| <b>IMO Name—IStpInstanceInfo</b>   |         |         |
| Object Identification              |         |         |
| StpBridgeId                        |         |         |
| BridgePriority                     |         |         |
| Designated Parent and Root Bridges |         |         |
| StpRootCost                        |         |         |
| IsRoot                             |         |         |
| StpRootPort                        |         |         |
| StpPortInfoTable                   |         |         |
| STP Instance Id                    |         |         |
| Vlan Id                            |         |         |
| StpDesignatedBridge                |         |         |
| StpDesignatedRoot                  |         |         |
| <b>IMO Name—IMstInstanceInfo</b>   |         |         |
| MstVlanIds                         |         |         |
| Same as IStpInstanceInfo           |         |         |
| <b>IMO Name—IPvstpInstanceInfo</b> |         |         |
| Protocol Type                      |         |         |

**Table 3-10 Ethernet (IEEE 802.3) Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)**

| Attribute                         | ASA5550 | ASA5580 |
|-----------------------------------|---------|---------|
| StpBridgeMaxAge                   |         |         |
| StpBridgeHelloTime                |         |         |
| StpBridgeForwardDelay             |         |         |
| StpProtocolSpecification          |         |         |
| StpVlanId                         |         |         |
| StpForwardDelay                   |         |         |
| StpMaxAge                         |         |         |
| <b>IMO Name—IRstpInstanceInfo</b> |         |         |
| StpForceVersion                   |         |         |
| Same as IStpInstanceInfo          |         |         |
| <b>IMO Name—IStpPortInfo</b>      |         |         |
| StpPort                           |         |         |
| StpPortPriority                   |         |         |
| StpPortState                      |         |         |
| StpPortPathCost                   |         |         |
| StpPortEdgePort                   |         |         |
| StpPortPointToPoint               |         |         |
| StpPortRole                       |         |         |
| StpDesignatedPortIdentifier       |         |         |
| StpDesignatedBridge               |         |         |
| StpPortIdentifier                 |         |         |
| StpPortBpduGuardState             |         |         |
| StpPortBpduFilterState            |         |         |
| <b>IMO Name—IMstPortInfo</b>      |         |         |
| MstPortHelloTime                  |         |         |
| Same as IStpPortInfo              |         |         |
| <b>IMO Name—IPvstpPortInfo</b>    |         |         |
| PvstpPortFastState                |         |         |
| <b>IMO Name—IEthernetChannel</b>  |         |         |
| Group Number                      |         |         |
| Bandwidth                         |         |         |
| Aggregation Protocol              |         |         |
| IANA Type                         |         |         |
| Containing CTPs                   |         |         |

**Table 3-10** *Ethernet (IEEE 802.3) Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)*

| Attribute      | ASA5550 | ASA5580 |
|----------------|---------|---------|
| Contained CTPs |         |         |
| Mac Address    |         |         |
| Admin Status   |         |         |
| Oper Status    |         |         |

## Physical Equipment

**Table 3-11** *Physical Equipment Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7*

| Attribute                   | ASA5550 | ASA5580 |
|-----------------------------|---------|---------|
| <b>IMO Name—IChassis</b>    |         |         |
| Description                 |         | Y       |
| Equipment Holder Type       | Y       | Y       |
| Contained Equipment Holders |         |         |
| Contained Equipments        |         |         |
| Serial Number               |         | Y       |
| <b>IMO Name—IShelf</b>      |         |         |
| Description                 |         |         |
| Status                      |         |         |
| Equipment Holder Type       |         |         |
| Contained Equipment Holders |         |         |
| Contained Equipments        |         |         |
| Serial Number               |         |         |
| <b>IMO Name—IModule</b>     |         |         |
| Module Name                 | Y       | Y       |
| Module Description          | Y       | Y       |
| Software Version            | Y       | Y       |
| Operational Status          | Y       |         |
| Hardware Type + Version     | Y       | Y       |
| Managed IP Address          |         |         |
| Redundant Equipment         |         |         |
| Configured Redundancy       |         |         |

**Table 3-11**      *Physical Equipment Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)*

| Attribute                             | ASA5550 | ASA5580 |
|---------------------------------------|---------|---------|
| Redundancy Status                     |         |         |
| Operational Status Last Changed       |         |         |
| Supported Physical Termination Points |         |         |
| Serial Number (soft property)         | Y       | Y       |
| Slots Number                          |         |         |

## Base Logical Components

**Table 3-12**      *Base Logical Components Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7*

| Attribute                       | ASA5550 | ASA5580 |
|---------------------------------|---------|---------|
| <b>IMO Name—IManagedElement</b> |         |         |
| IP Address                      | Y       | Y       |
| Communication State             | Y       | Y       |
| Investigation State             | Y       | Y       |
| Element Category                | Y       | Y       |
| Element Type and Key            | Y       | Y       |
| Device Name                     | Y       | Y       |
| System Name                     | Y       | Y       |
| System Description              | Y       | Y       |
| Up Time                         | Y       | Y       |
| Software Version                | Y       | Y       |
| Vendor Identity                 | Y       | Y       |
| Memory and CPU Usage            | Y       | Y       |
| DRAM Free                       |         |         |
| DRAM Used                       |         |         |
| Flash Device Size               | Y       |         |
| NVRAM Size                      | Y       |         |
| Processor DRAM                  |         |         |
| Sys Contact                     | Y       | Y       |
| Sys Location                    | Y       | Y       |

**Table 3-12** *Base Logical Components Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7 (continued)*

| Attribute                             | ASA5550 | ASA5580 |
|---------------------------------------|---------|---------|
| Serial Number                         | Y       | Y       |
| File Systems                          |         |         |
| <b>IMO Name—IContext</b>              |         |         |
| Name                                  |         |         |
| Bounded Connections                   |         |         |
| IP Address Pools                      |         |         |
| Forwarding Components List            |         |         |
| Traffic Descriptors List              |         |         |
| Tunnel Containers List                |         |         |
| Data Link Aggregation Containers List |         |         |
| <b>IMO Name—ISystemService</b>        |         |         |
| Type                                  |         |         |
| Status                                |         |         |
| Up Time                               | Y       | Y       |

## Common

**Table 3-13** *Common Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7*

| Attribute                                  | ASA5550 | ASA5580 |
|--------------------------------------------|---------|---------|
| <b>IMO Name—IPhysicalLayer</b>             |         |         |
| Media Type                                 | Y       | Y       |
| Clocking Source                            |         |         |
| Maximum Speed                              | Y       | Y       |
| Is Internal Port                           | Y       | Y       |
| Discarded Bandwidth                        |         |         |
| Dropped Bandwidth                          |         |         |
| Input Bandwidth                            |         |         |
| Output Bandwidth                           |         |         |
| Discarded and Received Input Data Counters |         |         |



**Table 3-13 Common Attribute Support on Cisco Security Appliances—Cisco ANA Version 3.7**

| Attribute                                | ASA5550 | ASA5580 |
|------------------------------------------|---------|---------|
| Dropped and Forward Output Data Counters |         |         |
| Administrative Status                    | Y       | Y       |
| Operational Status                       | Y       | Y       |
| Last Changed                             |         |         |
| IANA Type                                | Y       | Y       |
| Containing CTPs                          |         |         |
| Contained CTPs                           |         |         |
| Port Alias                               | Y       | Y       |
| Location                                 | Y       | Y       |
| Sending Alarms                           | Y       | Y       |
| Connector Description                    | Y       |         |
| Part ID                                  | Y       |         |
| Connector Serial Num                     | Y       |         |
| Product                                  | Y       | Y       |
| Status                                   | Y       | Y       |
| Managed                                  | Y       | Y       |
| <b>IMO Name—IBridge</b>                  |         |         |
| Bridge Table                             |         |         |
| Type                                     |         |         |
| MAC Address                              |         |         |
| IP Interface                             |         |         |
| Name                                     |         |         |
| Logical Sons                             |         |         |
| Vlan Type                                |         |         |
| <b>IMO Name—IBridgeEntry</b>             |         |         |
| Destination MAC                          |         |         |
| Outgoing Interface                       |         |         |





## CHAPTER 4

# Support Information for Cisco Gateways

This chapter contains support information for Virtual Network Elements (VNEs) that manage Cisco gateways in Cisco ANA Version 3.7. For more information about the objects and attributes described in this chapter, see Part 2, Technology Support and Information Objects.

This chapter contains the following topics:

- [Cisco AS5300 Series Universal Gateways, page 4-1](#)
- [Supported Technologies on Cisco Gateways, page 4-3](#)

## Cisco AS5300 Series Universal Gateways

This section includes the following information about Cisco AS5300 Series gateways (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco AS5300 Series Universal Gateways](#)):

- [Cisco AS5300 Series—Supported Software Versions, page 4-1](#)
- [Cisco AS5300 Series—Supported Topologies, page 4-2](#)
- [Cisco AS5300 Series—Supported Modules, page 4-2](#)
- [Cisco AS5300 Series—Supported Technologies, page 4-2](#)
- [Cisco AS5300 Series—Supported Service Events, page 4-3](#)

## Cisco AS5300 Series—Supported Software Versions

**Table 4-1**      *Supported Software Versions for Cisco AS5300 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.0(3)T1        | 3.6.0       |
| 12.1(10a)        | 3.6.0       |
| 12.1(11b)        | 3.6.0       |
| 12.1(22b)        | 3.6.0       |
| 12.19(22b)       | 3.6.0       |
| 12.3(10c)        | 3.6.0       |
| 12.3(3)          | 3.6.0       |

## Cisco AS5300 Series—Supported Topologies

**Table 4-2** *Supported Topologies for Cisco AS5300 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | <a href="#">ANA Version</a> |
|----------------|----------------|-----------------------------|
| Ethernet       | Ethernet       | 3.6.0                       |
| Physical Layer | Physical Layer | 3.6.0                       |

## Cisco AS5300 Series—Supported Modules

**Table 4-3** *Supported Modules for Cisco AS5300 Series—Cisco ANA Version 3.7*

| Module Name            | <a href="#">ANA Version</a> | Module Description                        |
|------------------------|-----------------------------|-------------------------------------------|
| AS5300-8CE1-4T         | 3.6.0                       | Octal Port Channelized E1/PRI and 4T Card |
| AS5300-AMAZON2-CARRIER | 3.6.0                       | Access Server MICA Modem Carrier Card     |
| PM-DTD-12M             | 3.6.0                       | MICA 12-Modem Module Card                 |
| CPU-AS5300             | 3.6.0                       | AS5300                                    |
| AS5300-4CE1            | 3.6.0                       | Quad Port Channelized E1/PRI Card         |
| AS5300-DTD-CARRIER     | 3.6.0                       | Access Server MICA Modem Carrier Card     |
| PM-DTD-6M              | 3.6.0                       | MICA 6-Modem Module Card                  |

## Cisco AS5300 Series—Supported Technologies

The following technologies are supported by the Cisco AS5300 Series in Cisco ANA Version 3.7:

- [IP](#), page 4-4
- [Ethernet \(IEEE 802.3\)](#), page 4-6
- [ACL](#), page 4-10
- [Physical Equipment](#), page 4-11
- [Base Logical Components](#), page 4-12
- [Common](#), page 4-13
- [CDP](#), page 4-15
- [Discovery Protocol](#), page 4-15

## Cisco AS5300 Series—Supported Service Events

**Table 4-4**      *Supported Service Events for Cisco AS5300 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| Card Up/Down         | 3.6.0       | Y         |

## Supported Technologies on Cisco Gateways

The following sections list the objects and attributes that are supported on Cisco gateways in Cisco ANA Version 3.7 per technology:

- [IP, page 4-4](#)
- [Ethernet \(IEEE 802.3\), page 4-6](#)
- [ACL, page 4-10](#)
- [Physical Equipment, page 4-11](#)
- [Base Logical Components, page 4-12](#)
- [Common, page 4-13](#)
- [CDP, page 4-15](#)
- [Discovery Protocol, page 4-15](#)

## IP

**Table 4-5** IP Attribute Support on Cisco Gateways—Cisco ANA Version 3.7

| Attribute                       | AS5300 |
|---------------------------------|--------|
| <b>IMO Name—IIPInterface</b>    |        |
| IP Address                      | Y      |
| Subnetwork Mask                 | Y      |
| IP Interface Addresses Array    | Y      |
| Interface Name                  | Y      |
| Interface Description           | Y      |
| IP Interface State              | Y      |
| OSPF Interface Cost             |        |
| Broadcast Address               |        |
| MTU                             |        |
| Lookup Method                   |        |
| Address Resolution Type         |        |
| ARP Timeout                     |        |
| Secured ARP                     |        |
| ICMP Mask Reply                 |        |
| IGMP Proxy                      |        |
| HSRP Groups                     |        |
| IP Multiplexing Table           |        |
| IANA Type                       |        |
| Containing CTPs                 |        |
| Contained CTPs                  |        |
| <b>IMO Name—IIPMuxEntry</b>     |        |
| Termination Point               |        |
| Destination IP Subnet           |        |
| <b>IMO Name—IIRoutingEntity</b> |        |
| Routing Table                   | Y      |
| ARP Entity                      | Y      |
| Routing Table Changes           |        |
| Name                            |        |
| Logical Sons                    |        |
| <b>IMO Name—IIRoutingEntry</b>  |        |
| Destination IP Subnet           | Y      |
| Next Hop IP Address             | Y      |

**Table 4-5** IP Attribute Support on Cisco Gateways—Cisco ANA Version 3.7 (continued)

| Attribute                                  | AS5300 |
|--------------------------------------------|--------|
| Type                                       | Y      |
| Routing Protocol Type                      | Y      |
| Outgoing Interface Name                    | Y      |
| <b>IMO Name—IARPEntity</b>                 |        |
| ARP Table                                  | Y      |
| <b>IMO Name—IARPEntity</b>                 |        |
| IP Address                                 | Y      |
| MAC Address                                | Y      |
| Port                                       | Y      |
| Entry Type                                 | Y      |
| <b>IMO Name—IIPPool</b>                    |        |
| IP Address Pool Entries                    |        |
| Name                                       |        |
| Index                                      |        |
| <b>IMO Name—IIPRangeBasedIIPPoolEntry</b>  |        |
| Start IP Address                           |        |
| End IP Address                             |        |
| Unused Addresses                           |        |
| Used Addresses                             |        |
| Reserved Addresses                         |        |
| <b>IMO Name—IIPSubnetBasedIIPPoolEntry</b> |        |
| IP Subnet                                  |        |
| Unused Addresses                           |        |
| Used Addresses                             |        |
| Reserved Addresses                         |        |
| <b>IMO Name—HSRPGGroupEntry</b>            |        |
| Group Number                               |        |
| Port Description                           |        |
| Priority                                   |        |
| Coupled Router                             |        |
| State                                      |        |
| Tracking Interfaces                        |        |
| Virtual IP Address                         |        |
| Virtual MAC Address                        |        |

**Table 4-5** *IP Attribute Support on Cisco Gateways—Cisco ANA Version 3.7 (continued)*

| Attribute                     | AS5300 |
|-------------------------------|--------|
| <b>IMO Name—I Tunnel GRE</b>  |        |
| Name                          |        |
| Tunnel Destination and Source |        |
| IP Address                    |        |
| IP Interface State            |        |
| IANA Type                     |        |
| Containing CTPs               |        |
| Contained CTPs                |        |
| Keep Alive Time               |        |
| Keep Alive Retry              |        |

## Ethernet (IEEE 802.3)

**Table 4-6** *Ethernet (IEEE 802.3) Attribute Support on Cisco Gateways—Cisco ANA Version 3.7*

| Attribute                                        | AS5300 |
|--------------------------------------------------|--------|
| <b>IMO Name—I Link Aggregation Group 802.3ad</b> |        |
| dot3adAggMACAddress                              |        |
| dot3adAggActorSystemPriority                     |        |
| dot3adAggActorSystemID                           |        |
| dot3adAggActorAdminKey                           |        |
| dot3adAggActorOperKey                            |        |
| dot3adAggPartnerSystemID                         |        |
| dot3adAggPartnerSystemPriority                   |        |
| dot3adAggPartnerOperKey                          |        |
| dot3adAggCollectorMaxDelay                       |        |
| GroupNumber                                      |        |
| AggregationProtocolType                          |        |
| MacAddress                                       |        |
| ChannelAdminStatus                               |        |
| ChannelOperStatus                                |        |
| <b>IMO Name—I Ethernet</b>                       |        |
| MAC Address                                      | Y      |



**Table 4-6 Ethernet (IEEE 802.3) Attribute Support on Cisco Gateways—Cisco ANA Version 3.7**

| Attribute                      | AS5300 |
|--------------------------------|--------|
| Duplex Mode                    |        |
| Output Flow Control            |        |
| Input Flow Control             |        |
| IANA Type                      |        |
| Containing CTPs                |        |
| Contained CTPs                 |        |
| Port Type                      |        |
| <b>IMO Name—IVlanInterface</b> |        |
| Mode                           |        |
| Native VLAN Identification     |        |
| Virtual LAN Table              |        |
| IANA Type                      |        |
| Containing CTPs                |        |
| Contained CTPs                 |        |
| vlanAdminType                  |        |
| vlanencapType                  |        |
| getAccess                      |        |
| Allowed Vlans                  |        |
| <b>IMO Name—IVlanEncapMux</b>  |        |
| IANA Type                      |        |
| Containing CTPs                |        |
| Contained CTPs                 |        |
| <b>IMO Name—IVlanMapping</b>   |        |
| direction                      |        |
| vlanMatchCriteria              |        |
| vlanRewriteDefinition          |        |
| Drop                           |        |
| Vlan                           |        |
| innerVlan                      |        |
| translatedVlan                 |        |
| translatedInnerVlan            |        |
| <b>IMO Name—IIEEE802</b>       |        |
| VLAN Identification            |        |
| Binding Information            |        |
| Binding Status                 |        |

**Table 4-6 Ethernet (IEEE 802.3) Attribute Support on Cisco Gateways—Cisco ANA Version 3.7**

|                                    |               |
|------------------------------------|---------------|
| <b>Attribute</b>                   | <b>AS5300</b> |
| IANA Type                          |               |
| Containing CTPs                    |               |
| Contained CTPs                     |               |
| <b>IMO Name—IStpService</b>        |               |
| StpProtocol                        |               |
| StpMaxAge                          |               |
| StpHelloTime                       |               |
| StpBridgeForwardDelay              |               |
| StpInstanceInfoTable               |               |
| Same as ISystemService             |               |
| StpUplinkFastState                 |               |
| StpBackboneFastState               |               |
| StpForwardDelay                    |               |
| StpBridgeMaxAge                    |               |
| StpBridgeHelloTime                 |               |
| <b>IMO Name—IMstService</b>        |               |
| MstProperties                      |               |
| Same as IStpService                |               |
| <b>IMO Name—IPvstpService</b>      |               |
| UpLinkFast                         |               |
| BackboneFast                       |               |
| <b>IMO Name—IMstProperties</b>     |               |
| MstForceVersion                    |               |
| MstCfgIdFmtSel                     |               |
| MstExternalRootCost                |               |
| MstMaxInstances                    |               |
| MstCfgIdName                       |               |
| MstCfgIdRevLevel                   |               |
| <b>IMO Name—IStpInstanceInfo</b>   |               |
| Object Identification              |               |
| StpBridgeId                        |               |
| BridgePriority                     |               |
| Designated Parent and Root Bridges |               |
| StpRootCost                        |               |

**Table 4-6 Ethernet (IEEE 802.3) Attribute Support on Cisco Gateways—Cisco ANA Version 3.7**

| Attribute                          | AS5300 |
|------------------------------------|--------|
| IsRoot                             |        |
| StpRootPort                        |        |
| StpPortInfoTable                   |        |
| STP Instance Id                    |        |
| Vlan Id                            |        |
| StpDesignatedBridge                |        |
| StpDesignatedRoot                  |        |
| <b>IMO Name—IMstInstanceInfo</b>   |        |
| MstVlanIds                         |        |
| Same as IStpInstanceInfo           |        |
| <b>IMO Name—IPvstpInstanceInfo</b> |        |
| Protocol Type                      |        |
| StpBridgeMaxAge                    |        |
| StpBridgeHelloTime                 |        |
| StpBridgeForwardDelay              |        |
| StpProtocolSpecification           |        |
| StpVlanId                          |        |
| StpForwardDelay                    |        |
| StpMaxAge                          |        |
| <b>IMO Name—IRstpInstanceInfo</b>  |        |
| StpForceVersion                    |        |
| Same as IStpInstanceInfo           |        |
| <b>IMO Name—IStpPortInfo</b>       |        |
| StpPort                            |        |
| StpPortPriority                    |        |
| StpPortState                       |        |
| StpPortPathCost                    |        |
| StpPortEdgePort                    |        |
| StpPortPointToPoint                |        |
| StpPortRole                        |        |
| StpDesignatedPortIdentifier        |        |
| StpDesignatedBridge                |        |
| StpPortIdentifier                  |        |
| StpPortBpduGuardState              |        |
| StpPortBpduFilterState             |        |

**Table 4-6 Ethernet (IEEE 802.3) Attribute Support on Cisco Gateways—Cisco ANA Version 3.7**

| Attribute                        | AS5300 |
|----------------------------------|--------|
| <b>IMO Name—IMstPortInfo</b>     |        |
| MstPortHelloTime                 |        |
| Same as IStpPortInfo             |        |
| <b>IMO Name—IPvstpPortInfo</b>   |        |
| PvstpPortFastState               |        |
| <b>IMO Name—IEthernetChannel</b> |        |
| Group Number                     |        |
| Bandwidth                        |        |
| Aggregation Protocol             |        |
| IANA Type                        |        |
| Containing CTPs                  |        |
| Contained CTPs                   |        |
| Mac Address                      |        |
| Admin Status                     |        |
| Oper Status                      |        |

## ACL

**Table 4-7 ACL Attribute Support on Cisco Gateways—Cisco ANA Version 3.7**

| Attribute                          | AS5300 |
|------------------------------------|--------|
| <b>IMO Name—IAccessList</b>        |        |
| Type                               |        |
| Access List Entries                |        |
| Name or Id                         |        |
| Index                              |        |
| <b>IMO Name—IAccessListEntry</b>   |        |
| Entry Identification               | Y      |
| Action Logic                       | Y      |
| Source and Destination Address     | Y      |
| Source and Destination Wildcard    | Y      |
| Protocol Type                      | Y      |
| Source and Destination Port Ranges | Y      |

**Table 4-7** *ACL Attribute Support on Cisco Gateways—Cisco ANA Version 3.7 (continued)*

| Attribute                          | AS5300 |
|------------------------------------|--------|
| Source and Destination Port Action | Y      |
| Protocol Specific Info             | Y      |
| Differential Services Code Points  | Y      |
| Type of Service                    | Y      |
| Precedence                         | Y      |
| Matches                            | Y      |

## Physical Equipment

**Table 4-8** *Physical Equipment Attribute Support on Cisco Gateways—Cisco ANA Version 3.7*

| Attribute                   | AS5300 |
|-----------------------------|--------|
| <b>IMO Name—IChassis</b>    |        |
| Description                 |        |
| Equipment Holder Type       |        |
| Contained Equipment Holders |        |
| Contained Equipments        |        |
| Serial Number               | Y      |
| <b>IMO Name—IShelf</b>      |        |
| Description                 |        |
| Status                      |        |
| Equipment Holder Type       |        |
| Contained Equipment Holders |        |
| Contained Equipments        |        |
| Serial Number               |        |
| <b>IMO Name—IModule</b>     |        |
| Module Name                 | Y      |
| Module Description          | Y      |
| Software Version            | Y      |
| Operational Status          | Y      |
| Hardware Type + Version     | Y      |
| Managed IP Address          |        |
| Redundant Equipment         |        |

**Table 4-8**      *Physical Equipment Attribute Support on Cisco Gateways—Cisco ANA Version 3.7*

| Attribute                             | AS5300 |
|---------------------------------------|--------|
| Configured Redundancy                 |        |
| Redundancy Status                     |        |
| Operational Status Last Changed       |        |
| Supported Physical Termination Points |        |
| Serial Number (soft property)         | Y      |
| Slots Number                          |        |

## Base Logical Components

**Table 4-9**      *Base Logical Components Attribute Support on Cisco Gateways—Cisco ANA Version 3.7*

| Attribute                       | AS5300 |
|---------------------------------|--------|
| <b>IMO Name—IManagedElement</b> |        |
| IP Address                      | Y      |
| Communication State             | Y      |
| Investigation State             | Y      |
| Element Category                | Y      |
| Element Type and Key            | Y      |
| Device Name                     | Y      |
| System Name                     | Y      |
| System Description              | Y      |
| Up Time                         | Y      |
| Software Version                | Y      |
| Vendor Identity                 | Y      |
| Memory and CPU Usage            | Y      |
| DRAM Free                       |        |
| DRAM Used                       |        |
| Flash Device Size               | Y      |
| NVRAM Size                      | Y      |
| Processor DRAM                  |        |
| Sys Contact                     | Y      |
| Sys Location                    | Y      |

**Table 4-9** *Base Logical Components Attribute Support on Cisco Gateways—Cisco ANA Version 3.7 (continued)*

| Attribute                             | AS5300 |
|---------------------------------------|--------|
| Serial Number                         | Y      |
| File Systems                          |        |
| <b>IMO Name—IContext</b>              |        |
| Name                                  |        |
| Bounded Connections                   |        |
| IP Address Pools                      |        |
| Forwarding Components List            |        |
| Traffic Descriptors List              |        |
| Tunnel Containers List                |        |
| Data Link Aggregation Containers List |        |
| <b>IMO Name—ISystemService</b>        |        |
| Type                                  |        |
| Status                                |        |
| Up Time                               |        |

## Common

**Table 4-10** *Common Attribute Support on Cisco Gateways—Cisco ANA Version 3.7*

| Attribute                                  | AS5300 |
|--------------------------------------------|--------|
| <b>IMO Name—IPhysicalLayer</b>             |        |
| Media Type                                 | Y      |
| Clocking Source                            |        |
| Maximum Speed                              | Y      |
| Is Internal Port                           | Y      |
| Discarded Bandwidth                        |        |
| Dropped Bandwidth                          |        |
| Input Bandwidth                            |        |
| Output Bandwidth                           |        |
| Discarded and Received Input Data Counters | Y      |
| Dropped and Forward Output Data Counters   | Y      |

**Table 4-10** Common Attribute Support on Cisco Gateways—Cisco ANA Version 3.7 (continued)

| Attribute                    | AS5300 |
|------------------------------|--------|
| Administrative Status        | Y      |
| Operational Status           | Y      |
| Last Changed                 | Y      |
| IANA Type                    | Y      |
| Containing CTPs              |        |
| Contained CTPs               |        |
| Port Alias                   | Y      |
| Location                     | Y      |
| Sending Alarms               | Y      |
| Connector Description        | Y      |
| Part ID                      | Y      |
| Connector Serial Num         | Y      |
| Product                      | Y      |
| Status                       | Y      |
| Managed                      | Y      |
| <b>IMO Name—IBridge</b>      |        |
| Bridge Table                 |        |
| Type                         |        |
| MAC Address                  |        |
| IP Interface                 |        |
| Name                         |        |
| Logical Sons                 |        |
| Vlan Type                    |        |
| <b>IMO Name—IBridgeEntry</b> |        |
| Destination MAC              |        |
| Outgoing Interface           |        |



## CDP

**Table 4-11** CDP Attribute Support on Cisco Gateways—Cisco ANA Version 3.7

| Attribute                    | AS5300 |
|------------------------------|--------|
| <b>IMO Name—ICdpService</b>  |        |
| cdpHoldtime                  | Y      |
| cdpMessageInterval           | Y      |
| cdpDeviceId                  | Y      |
| cdpState                     | Y      |
| cdpVersion                   | Y      |
| <b>IMO Name—ICdpNeighbor</b> |        |
| remoteDeviceId               | Y      |
| remotePortId                 | Y      |
| remoteIPAddress              | Y      |
| localPortId                  | Y      |

## Discovery Protocol

**Table 4-12** Discovery Protocol Attribute Support on Cisco Gateways—Cisco ANA Version 3.7

| Attribute                          | AS5300 |
|------------------------------------|--------|
| <b>IMO Name—IDiscoveryProtocol</b> |        |
| DiscoveryProtocolType              | Y      |
| Info                               | Y      |





## CHAPTER 5

# Support Information for Cisco Routers

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This chapter contains support information for Virtual Network Elements (VNEs) that manage Cisco routers in Cisco ANA Version 3.7. For more information about the objects and attributes described in this chapter, see Part 2, Technology Support and Information Objects.

This chapter contains the following topics:

- [Cisco 800 Series Routers, page 5-2](#)
- [Cisco 1000 Series Routers, page 5-3](#)
- [Cisco 1600 Series Routers, page 5-5](#)
- [Cisco 1700 Series Modular Access Routers, page 5-7](#)
- [Cisco 1800 Series Integrated Services Routers, page 5-10](#)
- [Cisco 2500 Series Routers, page 5-14](#)
- [Cisco 2600 Series Multiservice Platform Routers, page 5-16](#)
- [Cisco 2800 Series Integrated Services Routers, page 5-20](#)
- [Cisco 3600 Series Multiservice Platform Routers, page 5-25](#)
- [Cisco 3700 Series Multiservice Access Routers, page 5-28](#)
- [Cisco 3800 Series Integrated Services Routers, page 5-32](#)
- [Cisco 7200 Series Routers, page 5-35](#)
- [Cisco 7300 Series Routers, page 5-43](#)
- [Cisco 7400 Series Routers, page 5-47](#)
- [Cisco 7500 Series Routers, page 5-51](#)
- [Cisco 7600 Series Routers, page 5-55](#)
- [Cisco 10000 Series Routers, page 5-73](#)
- [Cisco 12000 Series Routers, page 5-78](#)
- [Cisco XR 12000 Series Routers, page 5-88](#)
- [Cisco CRS-1 Carrier Routing System, page 5-100](#)
- [Cisco ASR 1000 Series Routers, page 5-112](#)
- [Cisco ASR 9000 Series Aggregation Services Routers, page 5-118](#)
- [Cisco MWR 2900 Series Mobile Wireless Routers, page 5-122](#)
- [Supported Technologies on Cisco Routers, page 5-127](#)

# Cisco 800 Series Routers

This section includes the following information about Cisco 800 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 800 Series Routers](#)):

- [Cisco 800 Series—Supported Software Versions, page 5-2](#)
- [Cisco 800 Series—Supported Topologies, page 5-2](#)
- [Cisco 800 Series—Supported Technologies, page 5-3](#)
- [Cisco 800 Series—Supported Service Events, page 5-3](#)

## Cisco 800 Series—Supported Software Versions

**Table 5-1**      *Supported Software Versions for Cisco 800 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.0(4)XM        | 3.6.1       |
| 12.0(7)T3        | 3.6.1       |
| 12.3(14)T        | 3.6.2       |
| 12.4(11)T        | 3.6.2       |

## Cisco 800 Series—Supported Topologies

**Table 5-2**      *Supported Topologies for Cisco 800 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 800 Series—Supported Technologies

The following technologies are supported by the Cisco 800 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Physical Technologies, page 5-143](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 800 Series—Supported Service Events

**Table 5-3**      *Supported Service Events for Cisco 800 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Device Unreachable   | 3.6.1       | N         |
| CPU Over Utilized    | 3.6.1       | N         |
| Memory Over Utilized | 3.6.1       | N         |
| Device Unsupported   | 3.6.1       | N         |

## Cisco 1000 Series Routers

This section includes the following information about Cisco 1000 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 1000 Series Routers](#)):

- [Cisco 1000 Series—Supported Software Versions, page 5-4](#)
- [Cisco 1000 Series—Supported Topologies, page 5-4](#)
- [Cisco 1000 Series—Supported Technologies, page 5-4](#)
- [Cisco 1000 Series—Supported Service Events, page 5-5](#)

## Cisco 1000 Series—Supported Software Versions

**Table 5-4** *Supported Software Versions for Cisco 1000 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| IOS 12.1(27)     | 3.6.1       |
| IOS 12.1(22)     | 3.6.1       |

## Cisco 1000 Series—Supported Topologies

**Table 5-5** *Supported Topologies for Cisco 1000 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.1       |
| Framerelay     | Framerelay     | 3.6.1       |
| PPP/HDLC       | PPP or HDLC    | 3.6.1       |
| GRE Tunnel     | GRE Tunnel     | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |

## Cisco 1000 Series—Supported Technologies

The following technologies are supported by the Cisco 1000 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 1000 Series—Supported Service Events

**Table 5-6** Supported Service Events for Cisco 1000 Series—Cisco ANA Version 3.7

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.1       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.1       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.1       | Y         |
| Interface Status Down/Up                            | 3.6.1       | Y         |
| Link Down/Up                                        | 3.6.1       | Y         |
| Device Unreachable                                  | 3.6.1       | N         |
| CPU Over Utilized                                   | 3.6.1       | N         |
| Memory Over Utilized                                | 3.6.1       | N         |
| Device Unsupported                                  | 3.6.1       | N         |
| Discard Packets                                     | 3.6.1       | N         |
| Dropped Packets                                     | 3.6.1       | N         |
| Port Flapping                                       | 3.6.1       | N         |
| Port Down                                           | 3.6.1       | Y         |
| Rx Over Utilized                                    | 3.6.1       | N         |
| Tx Over Utilized                                    | 3.6.1       | N         |

## Cisco 1600 Series Routers

This section includes the following information about Cisco 1600 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 1600 Series Routers](#)):

- [Cisco 1600 Series—Supported Software Versions](#), page 5-5
- [Cisco 1600 Series—Supported Topologies](#), page 5-6
- [Cisco 1600 Series—Supported Technologies](#), page 5-6
- [Cisco 1600 Series—Supported Service Events](#), page 5-6

## Cisco 1600 Series—Supported Software Versions

**Table 5-7** Supported Software Versions for Cisco 1600 Series—Cisco ANA Version 3.7

| Software Version | ANA Version |
|------------------|-------------|
| 12.0(12)         | 3.6.1       |

## Cisco 1600 Series—Supported Topologies

**Table 5-8** *Supported Topologies for Cisco 1600 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.1       |
| Framerelay     | Framerelay     | 3.6.1       |
| PPP/HDLC       | PPP or HDLC    | 3.6.1       |
| GRE Tunnel     | GRE Tunnel     | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |

## Cisco 1600 Series—Supported Technologies

The following technologies are supported by the Cisco 1600 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 1600 Series—Supported Service Events

**Table 5-9** *Supported Service Events for Cisco 1600 Series—Cisco ANA Version 3.7*

| Event Name                               | ANA Version | Expedited |
|------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive   | 3.6.1       | Y         |
| Secondary HSRP Interface Active/Inactive | 3.6.1       | Y         |



**Table 5-9** Supported Service Events for Cisco 1600 Series—Cisco ANA Version 3.7 (continued)

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.1       | Y         |
| Interface Status Down/Up                            | 3.6.1       | Y         |
| Card In/Out                                         | 3.6.1       | Y         |
| Link Down/Up                                        | 3.6.1       | Y         |
| Device Unreachable                                  | 3.6.1       | N         |
| CPU Over Utilized                                   | 3.6.1       | N         |
| Memory Over Utilized                                | 3.6.1       | N         |
| Device Unsupported                                  | 3.6.1       | N         |
| Discard Packets                                     | 3.6.1       | N         |
| Dropped Packets                                     | 3.6.1       | N         |
| Module Unsupported                                  | 3.6.1       | N         |
| Port Flapping                                       | 3.6.1       | N         |
| Port Down                                           | 3.6.1       | Y         |
| Rx Over Utilized                                    | 3.6.1       | N         |
| Tx Over Utilized                                    | 3.6.1       | N         |
| BGP Neighbor Down                                   | 3.6.1       | Y         |
| Card Up/Down                                        | 3.6.1       | Y         |

## Cisco 1700 Series Modular Access Routers

This section includes the following information about Cisco 1700 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 1700 Series Modular Access Routers](#)):

- [Cisco 1700 Series—Supported Software Versions, page 5-7](#)
- [Cisco 1700 Series—Supported Topologies, page 5-8](#)
- [Cisco 1700 Series—Supported Modules, page 5-8](#)
- [Cisco 1700 Series—Supported Technologies, page 5-9](#)
- [Cisco 1700 Series—Supported Service Events, page 5-10](#)

## Cisco 1700 Series—Supported Software Versions

**Table 5-10** Supported Software Versions for Cisco 1700 Series—Cisco ANA Version 3.7

| Software Version | ANA Version |
|------------------|-------------|
| 12.1(3)XP3       | 3.6.1       |
| 12.4(11)T        | 3.6.2       |

**Table 5-10** Supported Software Versions for Cisco 1700 Series—Cisco ANA Version 3.7

| Software Version | ANA Version |
|------------------|-------------|
| 12.3(14)T        | 3.6.2       |
| 12.3(14)T7       | 3.6.4       |

## Cisco 1700 Series—Supported Topologies

**Table 5-11** Supported Topologies for Cisco 1700 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |

## Cisco 1700 Series—Supported Modules

**Table 5-12** Supported Modules for Cisco 1700 Series—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description                                                                   |
|-----------------|-------------|--------------------------------------------------------------------------------------|
| WIC-1SHDSL-V3   | 3.6.0       | 1-port G.shdsl WIC with Four Wire Support (spare + system)                           |
| VWIC-2MFT-T1    | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - T1                                                    |
| VWIC-2MFT-E1    | 3.6.0       | 2-port RJ-48 Multiflex Trunk - E1                                                    |
| VWIC-2MFT-T1-DI | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - T1 With Drop and Insert                               |
| VWIC-2MFT-E1-DI | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - E1 With Drop and Insert                               |
| WIC-1ENET       | 3.6.0       | 1-port ethernet WAN Interface card                                                   |
| MPC860          | 3.6.0       | Power PC processor, such as in the Cisco 1700 Series                                 |
| WIC-1DSU-T1     | 3.6.0       | 1-port T1/Fractional T1 DSU/CSU WAN Interface card                                   |
| AIM-VPN/BP      | 3.6.0       | DES/3DES VPN Encryption AIM-Base Performance                                         |
| AIM-VPN/BPII    | 3.6.0       | DES/3DES/AES and Layer 3 (IPPCP) Compression VPN Encryption AIM-Base Performance     |
| AIM-VPN/EPII    | 3.6.0       | DES/3DES/AES and Layer 3 (IPPCP) Compression VPN Encryption AIM-Enhanced Performance |
| WIC-1DSU-T1-V2  | 3.6.0       | Updated one-port T1/fractional T1 DSU/CSU WIC                                        |

**Table 5-12**      **Supported Modules for Cisco 1700 Series—Cisco ANA Version 3.7 (continued)**

| Module Name    | ANA Version | Module Description                          |
|----------------|-------------|---------------------------------------------|
| VWIC-1MFT-E1   | 3.6.0       | 1-Port RJ-48 Multiflex Trunk-E1             |
| WIC-1ADSL      | 3.6.0       | 1-port ADSLoPOTS HWIC                       |
| WIC-1T         | 3.6.0       | 1-Port Serial WAN Interface Card            |
| WIC-2A/S       | 3.6.0       | 2-Port Async/Sync Serial WAN Interface Card |
| WIC-2T         | 3.6.0       | 2-Port Serial WAN Interface Card            |
| WIC-1ADSL-DG   | 3.6.2       | 1-port ADSLoPOTS WIC with Dying Gasp        |
| WIC-1ADSL-I-DG | 3.6.2       | 1-port ADSLoISDN Wan Interface Card         |
| WIC-1B-U-V2    | 3.6.2       | 1-Port ISDN BRI NT-1 WIC                    |
| WIC-1SHDSL     | 3.6.2       | One port G.shdsl WIC with 4-wire support    |

## Cisco 1700 Series—Supported Technologies

The following technologies are supported by the Cisco 1700 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 1700 Series—Supported Service Events

**Table 5-13**      *Supported Service Events for Cisco 1700 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.1       | Y         |
| Link Down/Up         | 3.6.1       | Y         |
| Device Unreachable   | 3.6.1       | N         |
| CPU Over Utilized    | 3.6.1       | N         |
| Memory Over Utilized | 3.6.1       | N         |
| Device Unsupported   | 3.6.1       | N         |
| Module Unsupported   | 3.6.1       | N         |
| Port Flapping        | 3.6.1       | N         |
| Port Down            | 3.6.1       | Y         |
| Card Up/Down         | 3.6.1       | Y         |

## Cisco 1800 Series Integrated Services Routers

This section includes the following information about Cisco 1800 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 1800 Series Integrated Services Routers](#)):

- [Cisco 1800 Series—Supported Software Versions](#), page 5-11
- [Cisco 1800 Series—Supported Topologies](#), page 5-11
- [Cisco 1800 Series—Supported Modules](#), page 5-12
- [Cisco 1800 Series—Supported Technologies](#), page 5-13
- [Cisco 1800 Series—Supported Service Events](#), page 5-13

## Cisco 1800 Series—Supported Software Versions

**Table 5-14** Supported Software Versions for Cisco 1800 Series—Cisco ANA Version 3.7

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.3(14)T        | 3.6.2              |
| 12.3(8)T11       | 3.6.4              |
| 12.4(11)T        | 3.6.2              |
| 12.4(12)         | 3.6.4              |
| 12.4(12b)        | 3.6.4              |
| 12.4(17)         | 3.6.4              |
| 12.4(22)T        | 3.6.7 <sup>1</sup> |
| 12.4(24)T        | 3.7 <sup>2</sup>   |
| 12.4(3)          | 3.6.3              |
| 12.4(3b)         | 3.6.2              |
| 12.4(5a)         | 3.6.4              |
| 12.4(5b)         | 3.6.4              |
| 12.4(8)          | 3.6.4              |

<sup>1,2</sup>ANA recognizes all maintenance builds in this IOS release train.

## Cisco 1800 Series—Supported Topologies

**Table 5-15** Supported Topologies for Cisco 1800 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 1800 Series—Supported Modules

**Table 5-16**      *Supported Modules for Cisco 1800 Series—Cisco ANA Version 3.7*

| Module Name                            | ANA Version | Module Description                                              |
|----------------------------------------|-------------|-----------------------------------------------------------------|
| AIM-VPN-EPII-PLUS                      | 3.6.0       | Virtual Private Network (VPN) Module                            |
| C1841 MOTHERBOARD WITH 2 FAST ETHERNET | 3.6.0       | C1841 Motherboard with 2 Fast Ethernet                          |
| HWIC-16A                               | 3.6.0       | 16-Port Async HWIC                                              |
| HWIC-4A/S                              | 3.6.0       | 4-Port Async/Sync Serial HWIC                                   |
| HWIC-4T                                | 3.6.0       | 4-Port Serial HWIC                                              |
| HWIC-8A                                | 3.6.0       | 8-Port Async HWIC                                               |
| HWIC-8A/S-232                          | 3.6.0       | 8-Port Async/Sync Serial HWIC, EIA-232                          |
| VWIC-2MFT-E1-DI                        | 3.6.0       | 2-port RJ-48 multiflex trunk-E1 with drop and insertñ data only |
| VWIC-2MFT-G703                         | 3.6.0       | 2-port RJ-48 multiflex trunk-G.703ñ data only                   |
| VWIC-2MFT-T1-DI                        | 3.6.0       | 2-port RJ-48 multiflex trunk-T1 with drop and insertñ data only |
| WIC-1ADSL                              | 3.6.0       | 1-port asymmetric DSL (ADSL) over basic telephone service WIC   |
| WIC-1ADSL-DG                           | 3.6.0       | 1-port ADSLoPOTS WIC with Dying Gasp                            |
| WIC-1B-U-V2                            | 3.6.2       | 1-Port ISDN BRI NT-1 WIC                                        |
| WIC-1DSU-T1-V2                         | 3.6.0       | 1-port T1/Fractional-T1 CSU/DSU WIC                             |
| WIC-1SHDSL-V3                          | 3.6.0       | One port G.shdsl WIC with 4-wire support                        |
| WIC-1T                                 | 3.6.0       | 1-Port Serial WAN Interface Card                                |
| WIC-2A/S                               | 3.6.0       | 2-Port Async/Sync Serial WAN Interface Card                     |
| WIC-2AM                                | 3.6.0       | 2-port analog modem WIC                                         |
| WIC-2T                                 | 3.6.0       | 2-Port Serial WAN Interface Card                                |

## Cisco 1800 Series—Supported Technologies

The following technologies are supported by the Cisco 1800 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [VTP, page 5-162](#)

## Cisco 1800 Series—Supported Service Events

**Table 5-17**      *Supported Service Events for Cisco 1800 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | Y         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | Y         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | Y         |
| CPU Over Utilized                                   | 3.6.0       | Y         |
| Memory Over Utilized                                | 3.6.0       | Y         |
| Device Unsupported                                  | 3.6.0       | Y         |

**Table 5-17**      *Supported Service Events for Cisco 1800 Series—Cisco ANA Version 3.7 (continued)*

| Event Name         | ANA Version | Expedited |
|--------------------|-------------|-----------|
| Discard Packets    | 3.6.0       | N         |
| Dropped Packets    | 3.6.0       | N         |
| Module Unsupported | 3.6.0       | N         |
| Port Flapping      | 3.6.0       | N         |
| Port Down          | 3.6.0       | Y         |
| Rx Over Utilized   | 3.6.0       | N         |
| Tx Over Utilized   | 3.6.0       | N         |
| VPN Leak           | 3.6.0       | N         |
| Cloud Problem      | 3.6.0       | N         |
| BGP Neighbor Down  | 3.6.0       | Y         |
| Card Up/Down       | 3.6.0       | Y         |

## Cisco 2500 Series Routers

This section includes the following information about Cisco 2500 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 2500 Series Routers](#)):

- [Cisco 2500 Series—Supported Software Versions, page 5-14](#)
- [Cisco 2500 Series—Supported Topologies, page 5-15](#)
- [Cisco 2500 Series—Supported Modules, page 5-15](#)
- [Cisco 2500 Series—Supported Technologies, page 5-15](#)
- [Cisco 2500 Series—Supported Service Events, page 5-16](#)

## Cisco 2500 Series—Supported Software Versions

**Table 5-18**      *Supported Software Versions for Cisco 2500 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 11.2(18)         | 3.6.0       |
| 12.0(17a)        | 3.6.0       |



## Cisco 2500 Series—Supported Topologies

**Table 5-19**      *Supported Topologies for Cisco 2500 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 2500 Series—Supported Modules

**Table 5-20**      *Supported Modules for Cisco 2500 Series—Cisco ANA Version 3.7*

| Module Name | ANA Version | Module Description  |
|-------------|-------------|---------------------|
| CPU-2500    | 3.6.0       | Cisco 2500 CPU card |

## Cisco 2500 Series—Supported Technologies

The following technologies are supported by the Cisco 2500 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 2500 Series—Supported Service Events

**Table 5-21**      *Supported Service Events for Cisco 2500 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |

## Cisco 2600 Series Multiservice Platform Routers

This section includes the following information about Cisco 2600 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 2600 Series Multiservice Platform Routers](#)):

- [Cisco 2600 Series—Supported Software Versions](#), page 5-17
- [Cisco 2600 Series—Supported Topologies](#), page 5-17
- [Cisco 2600 Series—Supported Modules](#), page 5-18
- [Cisco 2600 Series—Supported Technologies](#), page 5-19
- [Cisco 2600 Series—Supported Service Events](#), page 5-20

## Cisco 2600 Series—Supported Software Versions

**Table 5-22**      *Supported Software Versions for Cisco 2600 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 11.3(10)T        | 3.6.1       |
| 12.0(3)T3        | 3.6.1       |
| 12.2(15)T        | 3.6.1       |
| 12.2(17a)        | 3.6.1       |
| 12.2(8)T5        | 3.6.1       |
| 12.3(15a)        | 3.6.2       |
| 12.3(17a)        | 3.6.1       |
| 12.3(3i)         | 3.6.4       |
| 12.3(4)          | 3.6.1       |
| 12.4(10)         | 3.6.1       |

## Cisco 2600 Series—Supported Topologies

**Table 5-23**      *Supported Topologies for Cisco 2600 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 2600 Series—Supported Modules

**Table 5-24**      *Supported Modules for Cisco 2600 Series—Cisco ANA Version 3.7*

| Module Name           | ANA Version | Module Description                                                                                    |
|-----------------------|-------------|-------------------------------------------------------------------------------------------------------|
| AIM-VOICE-30          | 3.6.0       | AIM supporting voice/fax DSP features                                                                 |
| ATM-AIM               | 3.6.0       | AIM(Advanced Integration Module) supporting ATM features for Cisco 2600, 2600XM, 2691, 3660, and 3700 |
| NM-16AM-V2            | 3.6.0       | 16-port analog modem network module with V.92                                                         |
| NM-1A-T3 AND NM-1A-E3 | 3.6.0       | DS3/E3 ATM Network Modules for the Cisco 2600, 2800, 3600, 3700 and 3800 Series Routers               |
| NM-1CE1T1-PRI         | 3.6.0       | 1-port Channelized E1/T1/ISDN PRI network module                                                      |
| NM-1FE1R2W            | 3.6.0       | 1 10/100 Ethernet 14/16 Token Ring 2 WAN card slot network module                                     |
| NM-1FE2W              | 3.6.0       | 1 10/100 Ethernet 2 WAN card slot network module                                                      |
| NM-1T3/E3             | 3.6.0       | One-port clear-channel T3/E3 network module                                                           |
| NM-1T3/E3(12)         | 3.6.0       | 1-port Clear Channel                                                                                  |
| NM-2CE1T1-PRI         | 3.6.0       | 2-port Channelized E1/T1/ISDN PRI network module                                                      |
| NM-2FE2W              | 3.6.0       | 2 10/100 Ethernet 2 WAN card slot network module                                                      |
| NM-2W                 | 3.6.0       | 2 WIC slot network module, (WAN I/F cards offered separately)                                         |
| NM-8AM-V2             | 3.6.0       | 8-port analog modem network module with V.92                                                          |
| NM-AIC-64(6)          | 3.6.0       | Alarm monitoring and control network module; 64 contact points and 16 control points                  |
| NM-CUE-EC             | 3.6.0       | Cisco Unity Express Network Module Enhanced Capacity                                                  |
| NM-HDV2               | 3.6.0       | IP Communications high-density digital voice network module                                           |
| NM-NAM                | 3.6.0       | Network analysis module                                                                               |
| VIC2-2E/M             | 3.6.0       | 2-port E+M voice/fax interface card                                                                   |
| VIC2-2FXS             | 3.6.0       | 2-port FXS voice/fax interface card                                                                   |
| VIC-2FXO              | 3.6.0       | Two-port FXO voice/fax interface card [also see VIC-2FXO-M1]                                          |
| VIC-4FXS/DID          | 3.6.0       | 4-port FXS voice/fax interface card (Note                                                             |
| VWIC-1MFT-E1          | 3.6.0       | 1-Port RJ-48 Multiflex Trunk-E1                                                                       |
| VWIC-1MFT-T1          | 3.6.0       | 1-Port RJ-48 Multiflex Trunk-T1                                                                       |
| VWIC-2MFT-E1          | 3.6.0       | 2-Port RJ-48 Multiflex Trunk-E1                                                                       |
| VWIC-2MFT-E1-DI       | 3.6.0       | 2-Port RJ-48 Multiflex Trunk-E1 With Drop and Insert                                                  |
| VWIC-2MFT-T1          | 3.6.0       | 2-Port RJ-48 Multiflex Trunk-T1                                                                       |

**Table 5-24**      **Supported Modules for Cisco 2600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name      | ANA Version | Module Description                                   |
|------------------|-------------|------------------------------------------------------|
| VWIC-2MFT-T1-DIR | 3.6.0       | 2-Port RJ-48 Multiflex Trunk-T1 With Drop and Insert |
| WIC-1ADSL        | 3.6.0       | 1-port ADSLoPOTS WAN Interface Card (System)         |

## Cisco 2600 Series—Supported Technologies

The following technologies are supported by the Cisco 2600 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 2600 Series—Supported Service Events

**Table 5-25**      *Supported Service Events for Cisco 2600 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.1       | N         |
| Interface Status Down/Up                            | 3.6.1       | N         |
| Card In/Out                                         | 3.6.1       | Y         |
| Link Down/Up                                        | 3.6.1       | Y         |
| Device Unreachable                                  | 3.6.1       | N         |
| CPU Over Utilized                                   | 3.6.1       | N         |
| Memory Over Utilized                                | 3.6.1       | N         |
| Device Unsupported                                  | 3.6.1       | N         |
| Module Unsupported                                  | 3.6.1       | N         |
| Port Flapping                                       | 3.6.1       | N         |
| Port Down                                           | 3.6.1       | Y         |
| Card Up/Down                                        | 3.6.1       | Y         |

## Cisco 2800 Series Integrated Services Routers

This section includes the following information about Cisco 2800 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 2800 Series Integrated Services Routers](#)):

- [Cisco 2800 Series—Supported Software Versions](#), page 5-21
- [Cisco 2800 Series—Supported Topologies](#), page 5-22
- [Cisco 2800 Series—Supported Modules](#), page 5-22
- [Cisco 2800 Series—Supported Technologies](#), page 5-24
- [Cisco 2800 Series—Supported Service Events](#), page 5-25

## Cisco 2800 Series—Supported Software Versions

**Table 5-26**      *Supported Software Versions for Cisco 2800 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.3(11)T5       | 3.6.2              |
| 12.3(11)T6       | 3.6.2              |
| 12.3(14)T        | 3.6.2              |
| 12.3(14)T7       | 3.6.2              |
| 12.3(8)T11       | 3.6.4              |
| 12.3(8)T5        | 3.6.4              |
| 12.3(8)T6        | 3.6.4              |
| 12.3(8)T8        | 3.6.4              |
| 12.3(8)T9        | 3.6.4              |
| 12.4(1)          | 3.6.1              |
| 12.4(10)         | 3.6.1              |
| 12.4(11)T        | 3.6.2              |
| 12.4(12)         | 3.6.1              |
| 12.4(13c)        | 3.6.4              |
| 12.4(13d)        | 3.6.4              |
| 12.4(15)T        | 3.6.7              |
| 12.4(17)         | 3.6.3              |
| 12.4(17)         | 3.6.4              |
| 12.4(1a)         | 3.6.4              |
| 12.4(2)T2        | 3.6.4              |
| 12.4(22)T        | 3.6.7 <sup>1</sup> |
| 12.4(24)T        | 3.7                |
| 12.4(24)T1       | 3.7 <sup>2</sup>   |
| 12.4(3)          | 3.6.1              |
| 12.4(3a)         | 3.7 <sup>3</sup>   |
| 12.4(5)          | 3.6.1              |
| 12.4(7)          | 3.6.1              |
| 12.4(8)          | 3.6.1              |

<sup>1,2</sup>ANA recognizes all maintenance builds in this IOS release train.

<sup>3</sup>Support tested and validated using AdvanceEnterprise image of 12.4(3a).

## Cisco 2800 Series—Supported Topologies

**Table 5-27** Supported Topologies for Cisco 2800 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 2800 Series—Supported Modules

**Table 5-28** Supported Modules for Cisco 2800 Series—Cisco ANA Version 3.7

| Module Name       | ANA Version | Module Description                                                      |
|-------------------|-------------|-------------------------------------------------------------------------|
| AIM-VPN/EPII-PLUS | 3.7         | Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM |
| EM-4BRI-NTTE      | 3.6.0       | 4-port BRI voice and fax expansion module                               |
| HWIC-16A          | 3.6.0       | 16-Port Async HWIC                                                      |
| HWIC-1ADSLI       | 3.6.0       | 1-port ADSL over ISDN HWIC                                              |
| HWIC-1FE          | 3.6.0       | 1-port Fast Ethernet HWIC                                               |
| HWIC-1GE-SFP      | 3.6.0       | Cisco Gigabit Ethernet High-Speed Interface Card                        |
| HWIC-2SHDSL       | 3.6.0       | 2-port G.SHDSL HWIC with 2-wire and 4-wire support                      |
| HWIC-4AS          | 3.6.0       | 4-Port Async/Sync Serial HWIC                                           |
| HWIC-4ESW         | 3.6.0       | 4-port Cisco EtherSwitch 10BASE-T/100BASE-TX autosensing HWIC           |
| HWIC-4SHDSL       | 3.6.0       | 4-port G.SHDSL HWIC with 2-wire, 4-wire, and 8-wire support             |
| HWIC-4T           | 3.6.0       | 4-Port serial HWIC                                                      |
| HWIC-8A           | 3.6.0       | 8-Port Async HWIC                                                       |
| HWIC-8A/S-232     | 3.6.0       | 8-Port Async/Sync Serial HWIC, EIA-232                                  |
| HWIC-ADSL-BST     | 3.6.0       | 2-port HWIC with 1-port ADSLoPOTS and 1-port ISDN BRI-S/T               |
| HWIC-D-9ESW       | 3.6.7       | 9 Port FE Switch                                                        |
| NM-16A            | 3.6.0       | 16-Port Async HWIC                                                      |
| NM-16AM-V2        | 3.6.0       | 16-port analog modem network module with v.92                           |



**Table 5-28**      **Supported Modules for Cisco 2800 Series—Cisco ANA Version 3.7 (continued)**

| Module Name     | ANA Version | Module Description                                              |
|-----------------|-------------|-----------------------------------------------------------------|
| NM-16AS         | 3.6.2       | 16-Port Async/Sync Serial Network Module                        |
| NM-1A-E3        | 3.6.2       | 1-Port E3 ATM Network Module                                    |
| NM-1A-T3        | 3.6.0       | 1-Port DS3 ATM Network Module                                   |
| NM-1CE1T1-PRI   | 3.6.0       | 1-port Channelized E1/T1/ISDN PRI network module                |
| NM-1HSSI        | 3.6.2       | Single port HSSI network module                                 |
| NM-1T3E3        | 3.6.0       | 1-port clear-channel T3/E3 network module                       |
| NM-2CE1T1-PRI   | 3.6.0       | 2-port Channelized E1/T1/ISDN PRI network module                |
| NM-32A          | 3.6.0       | 32 port Asynchronous Module                                     |
| NM-4A/S         | 3.6.0       | 4-Port Async/Sync Serial Network Module                         |
| NM-4B-ST        | 3.6.2       | 4-Port ISDN-BRI Network Module                                  |
| NM-4B-U         | 3.6.0       | 4-Port ISDN-BRI with NT-1 Network Module                        |
| NM-4T           | 3.6.0       | 4-Port Serial Network Module                                    |
| NM-8AM-V2       | 3.6.0       | 8-port analog modem network module with v.92                    |
| NM-8B-ST        | 3.6.2       | 8-Port ISDN-BRI Network Module                                  |
| NM-8B-U         | 3.6.0       | 8-Port ISDN-BRI with NT-1 Network Module                        |
| NM-CUE-EC       | 3.6.0       | Cisco Unity Express Voice-Mail Network Module extended capacity |
| NM-HD-2V        | 3.6.0       | 2-slot IP Communications voice and fax network module           |
| NM-HDV2         | 3.6.0       | IP Communications high-density voice and fax network module     |
| NM-NAM          | 3.6.0       | network analysis module                                         |
| VIC2-2BRI-NTTE  | 3.6.0       | 2-port VIC card-BRI (NT and TE)                                 |
| VIC2-2FXS       | 3.6.0       | 2-port VIC-FXS                                                  |
| VWIC-1MFT-G703  | 3.6.7       | 1-Port RJ-48 Multiflex Trunk - E1 for unstructured G.703        |
| VWIC2-1MFT-G703 | 3.6.7       | 1-Port T1/E1 Voice/WAN with D+I + unstructured E1 (G703)        |
| VWIC2-1MFT-T1E1 | 3.6.0       | 1-Port T1/E1 Voice/WAN with Drop + Insert                       |
| VWIC-2MFT-E1-DI | 3.6.0       | 2-port RJ-48 multiflex trunk-E1 with drop and insert            |
| VWIC-2MFT-G703  | 3.6.0       | 2-port RJ-48 multiflex trunk-G.703                              |
| VWIC-2MFT-T1-DI | 3.6.0       | 2-port RJ-48 multiflex trunk-T1 with drop and insert            |
| WIC-1ADSL       | 3.6.0       | 1-port asymmetric DSL (ADSL) over POTS service WIC              |
| WIC-1ADSL-DG    | 3.6.2       | 1-port ADSLoPOTS WIC with Dying Gasp                            |
| WIC-1ADSL-I-DG  | 3.6.2       | 1-port ADSLoISDN Wan Interface Card                             |
| WIC-1AM-V2      | 3.6.0       | 1-port analog modem WIC (updated version)                       |

**Table 5-28**      **Supported Modules for Cisco 2800 Series—Cisco ANA Version 3.7 (continued)**

| Module Name    | ANA Version | Module Description                                         |
|----------------|-------------|------------------------------------------------------------|
| WIC-1B-U-V2    | 3.6.2       | 1-Port ISDN BRI NT-1 WIC                                   |
| WIC-1DSU-T1-V2 | 3.6.2       | Updated 1-Port T1/Fractional T1 DSU/CSU WAN Interface Card |
| WIC-1SHDSL     | 3.6.2       | One port G.shdsl WIC with 4-wire support                   |
| WIC-1SHDSL-V3  | 3.6.0       | 1-port G.SHDSL WIC with 4-wire support                     |
| WIC-1T         | 3.6.0       | 1-Port Serial WAN Interface Card                           |
| WIC-2AM-V2     | 3.6.0       | 2-port analog modem WIC (updated version)                  |
| WIC-2AS        | 3.6.0       | 2-Port Async/Sync Serial WAN Interface Card                |
| WIC-2T         | 3.6.0       | 2-Port Serial WAN Interface Card                           |

## Cisco 2800 Series—Supported Technologies

The following technologies are supported by the Cisco 2800 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [VTP, page 5-162](#)

## Cisco 2800 Series—Supported Service Events

**Table 5-29**      *Supported Service Events for Cisco 2800 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.1       | Y         |
| Interface Status Down/Up                            | 3.6.1       | Y         |
| Card In/Out                                         | 3.6.1       | Y         |
| Link Down/Up                                        | 3.6.1       | Y         |
| Device Unreachable                                  | 3.6.1       | N         |
| CPU Over Utilized                                   | 3.6.1       | N         |
| Memory Over Utilized                                | 3.6.1       | N         |
| Device Unsupported                                  | 3.6.1       | N         |
| Module Unsupported                                  | 3.6.1       | N         |
| Port Flapping                                       | 3.6.1       | N         |
| Port Down                                           | 3.6.1       | Y         |
| Card Up/Down                                        | 3.6.1       | Y         |

## Cisco 3600 Series Multiservice Platform Routers

This section includes the following information about Cisco 3600 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 3600 Series Multiservice Platform Routers](#)):

- [Cisco 3600 Series—Supported Software Versions, page 5-26](#)
- [Cisco 3600 Series—Supported Topologies, page 5-26](#)
- [Cisco 3600 Series—Supported Modules, page 5-26](#)
- [Cisco 3600 Series—Supported Technologies, page 5-27](#)
- [Cisco 3600 Series—Supported Service Events, page 5-27](#)

## Cisco 3600 Series—Supported Software Versions

**Table 5-30**      *Supported Software Versions for Cisco 3600 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| IOS 12.0(0.20)T  | 3.6.0       |
| IOS 12.0(3)T3    | 3.6.0       |
| IOS 12.0(4)T     | 3.6.0       |
| IOS 12.0(5)      | 3.6.0       |
| IOS 12.0(5)T1    | 3.6.0       |
| IOS 12.0(6.5)T3  | 3.6.0       |
| IOS 12.0(7)XK1   | 3.6.0       |
| IOS 12.1(20)     | 3.6.0       |
| IOS 12.2(12)     | 3.6.0       |
| IOS 12.2(4)T1    | 3.6.0       |
| IOS 12.2(8)T5    | 3.6.0       |
| IOS 12.2(27)     | 3.6.2       |

## Cisco 3600 Series—Supported Topologies

**Table 5-31**      *Supported Topologies for Cisco 3600 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 3600 Series—Supported Modules

**Table 5-32**      *Supported Modules for Cisco 3600 Series—Cisco ANA Version 3.7*

| Module Name        | ANA Version | Module Description                               |
|--------------------|-------------|--------------------------------------------------|
| CPU-3600           | 3.6.0       | Cisco 3600 CPU                                   |
| NM-2FE-2W          | 3.6.0       | FastEthernet/WAN                                 |
| PM-1E              | 3.6.0       | One Port Ethernet                                |
| PM-2CE1-UNBALANCED | 3.6.0       | Two Port Channelized E1/PRI (75 ohm, unbalanced) |
| PM-4E              | 3.6.0       | Four Port Ethernet                               |
| PM-C3600-1FE-TX    | 3.6.0       | One port Fastethernet TX                         |
| WIC-SERIAL-1T      | 3.6.0       | WAN Interface Card - Serial (1T)                 |

## Cisco 3600 Series—Supported Technologies

The following technologies are supported by the Cisco 3600 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 3600 Series—Supported Service Events

**Table 5-33**      *Supported Service Events for Cisco 3600 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |

**Table 5-33** *Supported Service Events for Cisco 3600 Series—Cisco ANA Version 3.7 (continued)*

| Event Name                   | ANA Version | Expedited |
|------------------------------|-------------|-----------|
| Memory Over Utilized         | 3.6.0       | N         |
| Device Unsupported           | 3.6.0       | N         |
| Discard Packets              | 3.6.0       | N         |
| Dropped Packets              | 3.6.0       | N         |
| Module Unsupported           | 3.6.0       | N         |
| Port Flapping                | 3.6.0       | N         |
| Port Down                    | 3.6.0       | Y         |
| Rx Over Utilized             | 3.6.0       | N         |
| Tx Over Utilized             | 3.6.0       | N         |
| VPN Leak                     | 3.6.0       | N         |
| Cloud Problem                | 3.6.0       | N         |
| Broken LSP Discovered        | 3.6.0       | N         |
| MPLS Black Hole              | 3.6.0       | N         |
| Layer 2 Tunnel Down          | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping | 3.6.0       | N         |
| BGP Neighbor Down            | 3.6.0       | N         |
| Card Up/Down                 | 3.6.0       | Y         |

## Cisco 3700 Series Multiservice Access Routers

This section includes the following information about Cisco 3700 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 3700 Series Multiservice Access Routers](#)):

- [Cisco 3700 Series—Supported Software Versions](#), page 5-28
- [Cisco 3700 Series—Supported Topologies](#), page 5-29
- [Cisco 3700 Series—Supported Modules](#), page 5-29
- [Cisco 3700 Series—Supported Technologies](#), page 5-30
- [Cisco 3700 Series—Supported Service Events](#), page 5-31

## Cisco 3700 Series—Supported Software Versions

**Table 5-34** *Supported Software Versions for Cisco 3700 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.3(15b)        | 3.6.2       |
| 12.4(9)T         | 3.6.0       |

## Cisco 3700 Series—Supported Topologies

**Table 5-35** Supported Topologies for Cisco 3700 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco 3700 Series—Supported Modules

**Table 5-36** Supported Modules for Cisco 3700 Series—Cisco ANA Version 3.7

| Module Name    | ANA Version | Module Description                                          |
|----------------|-------------|-------------------------------------------------------------|
| NM-16ESW       | 3.6.0       | 16 port 10/100 EtherSwitch NM                               |
| NM-1FE2W       | 3.6.0       | 1 10/100 Ethernet 2 WAN Card Slot Network Module            |
| NM-2FE2W       | 3.6.0       | 2 10/100 Ethernet 2 WAN Card Slot Network Module            |
| NM-2W          | 3.6.0       | 2 WAN Card Slot Network Module(no LAN)                      |
| NM-1T3/E3      | 3.6.0       | 1-Port Clear-channel T3/E3 Network Module                   |
| NM-1HSSI       | 3.6.0       | Single port HSSI network module                             |
| NM-1CE1T1-PRI  | 3.6.0       | 1-Port Channelized T1 / E1 Modules with PRI Network Modules |
| NM-2CE1T1-PRI  | 3.6.0       | 2-Port Channelized T1 / E1 Modules with PRI Network Modules |
| VIC-2E/M       | 3.6.0       | Two-port Voice Interface Card - EandM                       |
| VIC-2FXO       | 3.6.0       | Two-port Voice Interface Card - FXO                         |
| VIC-2FXS       | 3.6.0       | Two-port Voice Interface Card - FXS                         |
| VWIC-2MFT-G703 | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - G.703                        |
| VWIC-2MFT-T1   | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - T1                           |
| VWIC-2MFT-E1   | 3.6.0       | 2-Port RJ-48 Multiflex Trunk - E1                           |
| WIC-2AM        | 3.6.0       | Two-port Analog Modem WAN Interface Card                    |
| WIC-1ADSL-I-DG | 3.6.0       | 1-Port ADSLoISDN WAN Interface Card                         |
| NM-2FE2W-V2    | 3.7         | 2-port 10/100 Ethernet 2 WAN Card Slot Network Module       |

## Cisco 3700 Series—Supported Technologies

The following technologies are supported by the Cisco 3700 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)



## Cisco 3700 Series—Supported Service Events

**Table 5-37**      *Supported Service Events for Cisco 3700 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | Y         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | Y         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | Y         |
| CPU Over Utilized                                   | 3.6.0       | Y         |
| Memory Over Utilized                                | 3.6.0       | Y         |
| Device Unsupported                                  | 3.6.0       | Y         |
| Module Unsupported                                  | 3.6.0       | Y         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | Y         |
| Broken LSP Discovered                               | 3.6.0       | Y         |
| MPLS Black Hole                                     | 3.6.0       | Y         |
| Layer 2 Tunnel Down                                 | 3.6.0       | Y         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | Y         |
| BGP Neighbor Down                                   | 3.6.0       | Y         |
| Card Up/Down                                        | 3.6.0       | Y         |

# Cisco 3800 Series Integrated Services Routers

This section includes the following information about Cisco 3800 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 3800 Series Integrated Services Routers](#)):

- [Cisco 3800 Series—Supported Software Versions](#), page 5-32
- [Cisco 3800 Series—Supported Topologies](#), page 5-32
- [Cisco 3800 Series—Supported Modules](#), page 5-33
- [Cisco 3800 Series—Supported Technologies](#), page 5-34
- [Cisco 3800 Series—Supported Service Events](#), page 5-35

## Cisco 3800 Series—Supported Software Versions

**Table 5-38**      *Supported Software Versions for Cisco 3800 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| IOS 12.3(14)T    | 3.6.2              |
| IOS 12.3(14)T7   | 3.6.2              |
| IOS 12.4(11)T    | 3.6.2 <sup>1</sup> |
| IOS 12.4(22)T    | 3.6.7 <sup>2</sup> |
| IOS 12.4(24)T    | 3.7 <sup>3</sup>   |

<sup>1</sup>ANA models pluggable ports for this IOS version.

<sup>2,3</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco 3800 Series—Supported Topologies

**Table 5-39**      *Supported Topologies for Cisco 3800 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| PWE3 (Martini) | Tunnel         | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| VPN (VRF)      | VPN            | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 3800 Series—Supported Modules

**Table 5-40**      *Supported Modules for Cisco 3800 Series—Cisco ANA Version 3.7*

| Module Name       | ANA Version | Module Description                                      |
|-------------------|-------------|---------------------------------------------------------|
| AIM-VPN/EPII-PLUS | 3.6.1       | DES/3DES/AES VPN Encryption/Compression                 |
| HWIC-16A          | 3.6.1       | 16-Port Async HWIC                                      |
| HWIC-1GE-SFP      | 3.6.1       | GigE High Speed WIC With One SFP Slot                   |
| HWIC-4A/S         | 3.6.1       | 4-Port Async/Sync Serial HWIC                           |
| HWIC-4T           | 3.6.1       | 4-Port Serial HWIC                                      |
| HWIC-8A           | 3.6.1       | 8-Port Async HWIC                                       |
| HWIC-8A/S-232     | 3.6.1       | 8-Port Async/Sync Serial HWIC, EIA-232                  |
| NM-16A            | 3.6.1       | 16 port Asynchronous Module                             |
| NM-16A/S          | 3.6.2       | 16-Port Async/Sync Serial Network Module                |
| NM-1A-E3          | 3.6.2       | 1-Port E3 ATM Network Module                            |
| NM-1A-T3          | 3.6.1       | 1-Port DS3 ATM Network Module                           |
| NM-1CE1T1-PRI     | 3.6.1       | 1-Port Channelized E1/T1/ISDN-PRI Network Module        |
| NM-1FE1R2W        | 3.6.1       | 1 10/100 Ethernet 1 4/16 Token-Ring 2 WAN Card Slot NM  |
| NM-1FE2W          | 3.6.1       | Network Module with One-Fast Ethernet and Two-WIC slots |
| NM-1GE            | 3.6.2       | 1 Port GE Network Module                                |
| NM-1HSSI          | 3.6.1       | Single port HSSI network module                         |
| NM-1T3/E3         | 3.6.1       | One port T3/E3 network module                           |
| NM-2CE1T1-PRI     | 3.6.1       | 2-Port Channelized E1/T1/ISDN-PRI Network Module        |
| NM-2FE2W-V2=      | 3.6.7       | 2-port 10/100 Ethernet 2 WAN Card Slot Network Module   |
| NM-2W             | 3.6.1       | 2 WAN Card Slot Network Module(no LAN)                  |
| NM-32A            | 3.6.1       | 32 port Asynchronous Module                             |
| NM-4A/S           | 3.6.1       | 4-Port Async/Sync Serial Network Module                 |
| NM-4B-S/T         | 3.6.2       | 4-Port ISDN-BRI Network Module                          |
| NM-4B-U           | 3.6.1       | 4-Port ISDN-BRI with NT-1 Network Module                |
| NM-4T             | 3.6.1       | 4-Port Serial Network Module                            |
| NM-8B-S/T         | 3.6.2       | 8-Port ISDN-BRI Network Module                          |
| NM-8B-U           | 3.6.1       | 8-Port ISDN-BRI with NT-1 Network Module                |
| WIC-1ADSL         | 3.6.1       | 1-port ADSL WAN Interface Card                          |
| WIC-1ADSL-DG      | 3.6.2       | 1-port ADSLoPOTS WIC with Dying Gasp                    |
| WIC-1ADSL-I-DG    | 3.6.2       | 1-port ADSLoISDN Wan Interface Card                     |

**Table 5-40**      **Supported Modules for Cisco 3800 Series—Cisco ANA Version 3.7 (continued)**

| Module Name    | ANA Version | Module Description                                         |
|----------------|-------------|------------------------------------------------------------|
| WIC-1B-U-V2    | 3.6.2       | 1-Port ISDN BRI NT-1 WIC                                   |
| WIC-1DSU-T1-V2 | 3.6.2       | Updated 1-Port T1/Fractional T1 DSU/CSU WAN Interface Card |
| WIC-1SHDSL     | 3.6.2       | 1-port G.shdsl WIC (two wire only)                         |
| WIC-1SHDSL-V2  | 3.6.1       | 1-Port G.SHDSL WIC with Four Wire Support                  |
| WIC-1T         | 3.6.1       | 1-Port Serial WAN Interface Card                           |
| WIC-2A/S       | 3.6.1       | 2-Port Async/Sync Serial WAN Interface Card                |
| WIC-2T         | 3.6.1       | 2-Port Serial WAN Interface Card                           |

## Cisco 3800 Series—Supported Technologies

The following technologies are supported by the Cisco 3800 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 3800 Series—Supported Service Events

**Table 5-41**      *Supported Service Events for Cisco 3800 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| BGP Neighbor Down    | 3.6.0       | Y         |
| Card Up/Down         | 3.6.0       | Y         |
| DS0 Bundle Up        | 3.7         | N         |

## Cisco 7200 Series Routers

This section includes the following information about Cisco 7200 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 7200 Series Routers](#)):

- [Cisco 7200 Series—Supported Software Versions](#), page 5-35
- [Cisco 7200 Series—Supported Topologies](#), page 5-37
- [Cisco 7200 Series—Supported Modules](#), page 5-38
- [Cisco 7200 Series—Supported Technologies](#), page 5-40
- [Cisco 7200 Series—Supported Service Events](#), page 5-42

## Cisco 7200 Series—Supported Software Versions

**Table 5-42**      *Supported Software Versions for Cisco 7200 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.2(31)SB3x     | 3.6.1       |
| IOS 11.3(7)T     | 3.6.1       |

**Table 5-42**      **Supported Software Versions for Cisco 7200 Series—Cisco ANA Version 3.7**

| <b>Software Version</b> | <b>ANA Version</b> |
|-------------------------|--------------------|
| IOS 12.0(21)s7          | 3.6.2              |
| IOS 12.0(22)S5          | 3.6.1              |
| IOS 12.0(23)S3.0619     | 3.6.1              |
| IOS 12.0(23)S4          | 3.6.1              |
| IOS 12.0(23)S6          | 3.6.1              |
| IOS 12.0(23)S6.0412     | 3.6.1              |
| IOS 12.0(24)S3          | 3.6.1              |
| IOS 12.0(25)S2          | 3.6.1              |
| IOS 12.0(26)S4          | 3.6.1              |
| IOS 12.0(26)S5          | 3.6.1              |
| IOS 12.0(26)S6          | 3.6.1              |
| IOS 12.0(27)S1          | 3.6.1              |
| IOS 12.0(32)S6          | 3.6.0              |
| IOS 12.0(33)S           | 3.6.2              |
| IOS 12.0(33)S1          | 3.6.2 <sup>1</sup> |
| IOS 12.1(10)E           | 3.6.0              |
| IOS 12.1(19)E6          | 3.6.0              |
| IOS 12.1(1a)            | 3.6.0              |
| IOS 12.2(12)            | 3.6.0              |
| IOS 12.2(15)B           | 3.6.0              |
| IOS 12.2(15)T5          | 3.6.0              |
| IOS 12.2(18)S12         | 3.6.2              |
| IOS 12.2(18)s3          | 3.6.2              |
| IOS 12.2(18.2)          | 3.6.0              |
| IOS 12.2(25)s2          | 3.6.2              |
| IOS 12.2(25)s6          | 3.6.2              |
| IOS 12.2(25)s9          | 3.6.2              |
| IOS 12.2(27)SBC2        | 3.6.2              |
| IOS 12.2(31)SB          | 3.6.4              |
| IOS 12.2(31)SB10        | 3.6.3 <sup>2</sup> |
| IOS 12.2(31)SB12        | 3.6.4              |
| IOS 12.2(33)SRA         | 3.6.0              |
| IOS 12.2(33)SRC         | 3.6.2 <sup>3</sup> |
| IOS 12.2(33)SRC3        | 3.6.7 <sup>4</sup> |
| IOS 12.2(33)SRD1        | 3.6.6 <sup>5</sup> |
| IOS 12.2(34)            | 3.6.0 <sup>6</sup> |

**Table 5-42** Supported Software Versions for Cisco 7200 Series—Cisco ANA Version 3.7

| Software Version  | ANA Version         |
|-------------------|---------------------|
| IOS 12.2(37)      | 3.6.0 <sup>7</sup>  |
| IOS 12.2(40)      | 3.6.0 <sup>8</sup>  |
| IOS 12.2.(31)SB11 | 3.7 <sup>9</sup>    |
| IOS 12.3(10)      | 3.6.0 <sup>10</sup> |
| IOS 12.3(10b)     | 3.6.2               |
| IOS 12.3(10c)     | 3.6.2               |
| IOS 12.3(10d)     | 3.6.2               |
| IOS 12.3(12.10)   | 3.6.0               |
| IOS 12.3(15a)     | 3.6.0               |
| IOS 12.3(17)      | 3.6.2               |
| IOS 12.3(17a)     | 3.6.2               |
| IOS 12.3(20)      | 3.6.2               |
| IOS 12.3(21)      | 3.6.2               |
| IOS 12.3(26)      | 3.6.4 <sup>11</sup> |
| IOS 12.3(3)B1     | 3.6.0               |
| IOS 12.3(6e)      | 3.6.2               |
| IOS 12.3(6f)      | 3.6.2               |
| IOS 12.3(7)XI7a   | 3.6.0               |
| IOS 12.4(11)T1    | 3.6.1               |
| IOS 12.4(20)T     | 3.7 <sup>12</sup>   |

<sup>1,2,9,10,11</sup>ANA models pluggable ports for this IOS version.

<sup>3,5</sup>ANA recognizes all maintenance builds in this IOS release train. Physical Inventory for this IOS version will not be modeled since inventory data is not available using CLI and SNMP. ANA models pluggable ports for this IOS version.

<sup>4</sup>Physical Inventory for this IOS version will not be modeled since inventory data is not available using CLI and SNMP. Support tested + validated using AdvancedEnterprises image. ANA models pluggable ports for this IOS version.

<sup>6,12</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

<sup>7,8</sup>ANA recognizes all maintenance builds in this IOS release train.

## Cisco 7200 Series—Supported Topologies

**Table 5-43** Supported Topologies for Cisco 7200 Series—Cisco ANA Version 3.7

| Topology Type | Link Type  | ANA Version |
|---------------|------------|-------------|
| ATM           | ATM        | 3.6.0       |
| BGP           | BGP        | 3.6.0       |
| Ethernet      | Ethernet   | 3.6.0       |
| Framerelay    | Framerelay | 3.6.0       |

**Table 5-43**      *Supported Topologies for Cisco 7200 Series—Cisco ANA Version 3.7 (continued)*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |

## Cisco 7200 Series—Supported Modules

**Table 5-44**      *Supported Modules for Cisco 7200 Series—Cisco ANA Version 3.7*

| Module Name              | ANA Version | Module Description                                                                    |
|--------------------------|-------------|---------------------------------------------------------------------------------------|
| 7201                     | 3.6.4       | Cisco 7201 (c7201) processor                                                          |
| ATM WAN OC3+ (MM) /PA-A1 | 3.6.0       | ATM WAN OC3+ (MM) Port adapter, 1 port. Port adapter                                  |
| C7200-I/O-2FE/E          | 3.6.0       | Cisco 7200 Series 2-Port 10/100 Auto-Sensing Fast Ethernet Input/Output Controller    |
| C7200-I/O-FE             | 3.6.1       | 7200 I/O FE Controller.                                                               |
| C7200-I/O-GE+E           | 3.6.0       | Cisco 7200 Series 1-Port Gigabit Ethernet and 1-Port Ethernet Input/Output Controller |
| C7200-IO                 | 3.6.0       | I/O controller with no Ethernet port                                                  |
| C7200-JC-PA              | 3.6.7       | Cisco 7200VXR Series Port Adapter Jacket Card.                                        |
| CX-FEIP-1FX              | 3.6.0       | 1-port fast ethernet interface processor (100TX)                                      |
| NPE-100                  | 3.6.0       | Cisco 7200 Series Network Processing Engine 100                                       |
| NPE-150                  | 3.6.0       | Cisco 7200 Series Network Processing Engine 150                                       |
| NPE-200                  | 3.6.0       | Network Processing Engine NPE-200                                                     |
| NPE-225                  | 3.6.0       | Cisco 7200 Network Processing Engine NPE-225                                          |
| NPE-300                  | 3.6.0       | Network Processing Engine NPE-300                                                     |
| NPE-400                  | 3.6.0       | Cisco 7200VXR Network Processing Engine NPE-400, including 256 MB SDRAM               |
| NPE-G1                   | 3.6.0       | Cisco 7200 Series NPE-G1 including 256 MB default DRAM and 64 MB default flash memory |
| NPE-G2                   | 3.6.0       | Cisco 7200VXR NPE-G2 Network Processing Engine                                        |
| NPE-G2                   | 3.7         | Cisco 7201 Series NPE-G2 Network Processing Engine                                    |
| NSE-1                    | 3.6.0       | Cisco 7200 Series Network Services Engine, NSE-1                                      |
| OSM-1OC48-POS-SI         | 3.6.0       | 1-port OC-48/STM-16 SONET/SDH enhanced OSM, single-mode, intermediate-reach with 4 GE |
| PA-2FE-TX                | 3.6.0       | 2-Port Fast Ethernet 100Base TX Port Adapter                                          |



**Table 5-44 Supported Modules for Cisco 7200 Series—Cisco ANA Version 3.7 (continued)**

| Module Name    | ANA Version | Module Description                                                            |
|----------------|-------------|-------------------------------------------------------------------------------|
| PA-2T3/E3-EC   | 3.6.7       | Cisco 2-Port Clear Channel Enhanced Capability Port Adapter                   |
| PA-2T3+        | 3.6.0       | Two-port clear-channel DS3 port adap                                          |
| PA-4E          | 3.6.0       | 4-Port 10BaseT Ethernet Port Adapter                                          |
| PA-4R-DTR      | 3.6.0       | 4-port dedicated Token Ring, 4/16 Mbps, half duplex(HDX) or full duplex (FDX) |
| PA-8E          | 3.6.0       | 8-Port 10BaseT Ethernet Port Adapter                                          |
| PA-8T1         | 3.6.1       | 8-port channelized T1                                                         |
| PA-A3-E3       | 3.6.1       | 1-Port ATM Enhanced E3 Port Adapter                                           |
| PA-A3-OC3MM    | 3.6.0       | Single port ATM OC3c/STM1 Multi Mode Port Adapter                             |
| PA-A3-OC3SMI   | 3.6.0       | Single port ATM OC3c/STM1 Single Mode (IR) Port Adapter                       |
| PA-A3-OC3SML   | 3.6.0       | Single port ATM OC3c/STM1 Single Mode (LR) Port Adapter                       |
| PA-A3-T3       | 3.6.1       | 1-Port ATM Enhanced DS3 Port Adapter                                          |
| PA-A6-OC3MM    | 3.6.1       | 1 Port Enh ATM OC3c/STM1 Multimode Port Adapter                               |
| PA-A6-OC3SMI   | 3.6.0       | 1-Port Enhanced ATM OC3c/STM1 Singlemode (IR) Port Adapter                    |
| PA-A6-T3       | 3.6.2       | 1Port Enh ATM DS3 Port Adapter                                                |
| PA-CHSTM1      | 3.6.1       | 4 port channelized STM-1 card                                                 |
| PA-FE-FX       | 3.6.0       | 1-Port Fast Ethernet 100BaseFx Port Adapter                                   |
| PA-FE-TX       | 3.6.0       | 1-Port Fast Ethernet 100BaseTx Port Adapter                                   |
| PA-GE          | 3.6.0       | Gigabit Ethernet Port Adapter                                                 |
| PA-H           | 3.6.1       | 1-Port HSSI Port Adapter, Spare                                               |
| PA-ISA         | 3.7         | PA-ISA port adapter card for Cisco 7200 series                                |
| PA-MC-2E1/120  | 3.6.0       | 2-Port Multichannel E1/PRI Port Adapter                                       |
| PA-MC-2T       | 3.6.0       | 2-port multichannel T1 with integrated channel service units (CSUs)/DSUs      |
| PA-MC-2T       | 3.6.0       | Two-port enhanced multichannel T3 port adapter                                |
| PA-MC-2T3-EC   | 3.6.1       | 2 port multichannel T3 port adapter                                           |
| PA-MC-8E1      | 3.6.0       | 8-port MultiChannel E1 Port Adapter                                           |
| PA-MC-8TE1     | 3.6.0       | 8 port multichannel T1/E1 8PRI port adapter                                   |
| PA-MC-8TE1+    | 3.6.7       | 8-port multichannel T1/E1 8PRI port adapter                                   |
| PA-MC-E3       | 3.6.0       | 1-port MultiChannel E3 Port Adapter                                           |
| PA-MC-STM1-SMI | 3.6.1       | 1 port multichannel STM-1 single mode port adapter Spare                      |

**Table 5-44**      **Supported Modules for Cisco 7200 Series—Cisco ANA Version 3.7 (continued)**

| Module Name   | ANA Version | Module Description                                                                                                                                                                                                            |
|---------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PA-MC-T3      | 3.6.0       | Single port enhanced multichannel T3 port adapter                                                                                                                                                                             |
| PA-MC-T3-EC   | 3.6.1       | Enhanced 1 port multichannel PA                                                                                                                                                                                               |
| PA-MCX-4TE1   | 3.6.0       | 4 port MIX-enabled multichannel T1/E1 with CSU/DSU                                                                                                                                                                            |
| PA-MCX-8TE1   | 3.6.0       | 8 port multichannel T1/E1 8PRI port adapter                                                                                                                                                                                   |
| PA-POS-1OC3   | 3.6.1       | 2 Port Packet/SONET OC3c/STM1 Port Adapter                                                                                                                                                                                    |
| PA-POS-OC3    | 3.6.4       | 1-Port Packet/SONET OC3c/STM1 Port Adapter                                                                                                                                                                                    |
| PA-POS-OC3MM  | 3.6.0       | MultiMode PoS, OC3 Port Adapter                                                                                                                                                                                               |
| PA-POS-OC3SMI | 3.6.0       | Single-Mode Intermediate Reach PoS, OC3 Port Adapter                                                                                                                                                                          |
| PA-POS-OC3SML | 3.6.0       | Single-Mode Long Reach PoS, OC3 Port Adapter                                                                                                                                                                                  |
| PA-T3         | 3.6.0       | One-port clear-channel DS3 port adapter                                                                                                                                                                                       |
| PA-T3+        | 3.6.7       | 1-port T3 Serial Port Adapter Enhanced                                                                                                                                                                                        |
| PWR-7200-AC   | 3.6.6       | Cisco 7200 AC power supply                                                                                                                                                                                                    |
| PWR-7200-DC   | 3.6.4       | Cisco 7200 DC power supply                                                                                                                                                                                                    |
| SA-VAM        | 3.6.1       | VPN Acceleration Module                                                                                                                                                                                                       |
| SA-VAM2       | 3.6.2       | AES wide key crypto card                                                                                                                                                                                                      |
| SA-VAM2+      | 3.7         | The VPN Acceleration Module 2+ (VAM2+) is a port adapter that installs in any single port-adapter slot on the Cisco 7204VXR or Cisco 7206VXR router with the NPE-225, NPE-400, or NPE-G1 processor, or the Cisco 7301 router. |
| SFP-GE-L      | 3.6.7       | 1000BASE-LX/LH short wavelength; with digital optical monitoring                                                                                                                                                              |
| SFP-GE-S      | 3.6.7       | 1000BASE-SX short wavelength; with digital optical monitoring                                                                                                                                                                 |
| SFP-OC3-IR1   | 3.7         | OC3 Single Mode Intermediate Reach SFP                                                                                                                                                                                        |
| VAM2          | 3.6.2       | VPN Acceleration Module 2                                                                                                                                                                                                     |
| VSA           | 3.6.1       | VPN Service Adapter                                                                                                                                                                                                           |
| WS-G5484      | 3.6.1       | 1000Base-ZX extended reach GBIC(singlemode)                                                                                                                                                                                   |
| WS-G5486      | 3.6.1       | 1000Base-ZX extended reach GBIC(singlemode)                                                                                                                                                                                   |
| WS-G5487      | 3.6.1       | 1000Base-ZX extended reach GBIC(singlemode)                                                                                                                                                                                   |
| WS-X6582-2PA  | 3.6.0       | Enhanced FlexWAN Module, Fabric-enabled                                                                                                                                                                                       |

## Cisco 7200 Series—Supported Technologies

The following technologies are supported by the Cisco 7200 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)

- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 7200 Series—Supported Service Events

**Table 5-45**      *Supported Service Events for Cisco 7200 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | N         |
| Cloud Problem                                       | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| MPLS Black Hole                                     | 3.6.0       | N         |
| Layer 2 Tunnel Down                                 | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Sonet Path Port Down                                | 3.7         | N         |
| Sonet Path Port Up                                  | 3.7         | N         |
| Sonet Path link down due to Admin down              | 3.7         | N         |
| Sonet Path link down due to Oper down               | 3.7         | N         |
| Sonet Path link Up                                  | 3.7         | N         |

**Table 5-45** Supported Service Events for Cisco 7200 Series—Cisco ANA Version 3.7 (continued)

| Event Name            | ANA Version | Expedited |
|-----------------------|-------------|-----------|
| Keepalive set         | 3.7         | N         |
| Keepalive not set     | 3.7         | N         |
| DS0 Bundle Admin down | 3.7         | N         |
| DS0 Bundle Oper down  | 3.7         | N         |
| DS0 Bundle Up         | 3.7         | N         |

## Cisco 7300 Series Routers

This section includes the following information about Cisco 7300 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 7300 Series Routers](#)):

- [Cisco 7300 Series—Supported Software Versions](#), page 5-43
- [Cisco 7300 Series—Supported Topologies](#), page 5-45
- [Cisco 7300 Series—Supported Modules](#), page 5-45
- [Cisco 7300 Series—Supported Technologies](#), page 5-46
- [Cisco 7300 Series—Supported Service Events](#), page 5-46

## Cisco 7300 Series—Supported Software Versions

**Table 5-46** Supported Software Versions for Cisco 7300 Series—Cisco ANA Version 3.7

| Software Version    | ANA Version      |
|---------------------|------------------|
| 11.3(7)T            | 3.7              |
| 12.0(21)s7          | 3.7              |
| 12.0(22)S5          | 3.7              |
| 12.0(23)S3.0619     | 3.7              |
| 12.0(23)S4          | 3.7              |
| 12.0(23)S6          | 3.7              |
| 12.0(25)S2          | 3.7              |
| 12.0(26)S4          | 3.7              |
| 12.0(26)S5          | 3.7              |
| 12.0(26)S6          | 3.7              |
| 12.0(27)S1          | 3.7              |
| 12.0(32.S7.051907A) | 3.7              |
| 12.0(33)S1          | 3.7 <sup>1</sup> |
| 12.1(10)E           | 3.7              |
| 12.1(19)E6          | 3.7              |

**Table 5-46**      **Supported Software Versions for Cisco 7300 Series—Cisco ANA Version 3.7**

| Software Version | ANA Version       |
|------------------|-------------------|
| 12.1(1a)         | 3.7               |
| 12.2(12)         | 3.7               |
| 12.2(15)B        | 3.7               |
| 12.2(15)T5       | 3.7               |
| 12.2(18)s3       | 3.7               |
| 12.2(18.2)       | 3.7               |
| 12.2(25)s2       | 3.7               |
| 12.2(25)s6       | 3.7               |
| 12.2(25)s9       | 3.7               |
| 12.2(27)SBC2     | 3.7               |
| 12.2(31)SB       | 3.7               |
| 12.2(31)SB11     | 3.7 <sup>2</sup>  |
| 12.2(31)SB12     | 3.7               |
| 12.2(31)SB3      | 3.7               |
| 12.2(31)SB3x     | 3.7               |
| 12.2(33)SRA      | 3.7               |
| 12.2(33)SRC      | 3.7 <sup>3</sup>  |
| 12.2(33)SRC3     | 3.7 <sup>4</sup>  |
| 12.2(33)SRD1     | 3.7 <sup>5</sup>  |
| 12.3(10)         | 3.7 <sup>6</sup>  |
| 12.3(10b)        | 3.7               |
| 12.3(10c)        | 3.7               |
| 12.3(10d)        | 3.7               |
| 12.3(12.10)      | 3.7               |
| 12.3(17)         | 3.7               |
| 12.3(17a)        | 3.7               |
| 12.3(20)         | 3.7               |
| 12.3(21)         | 3.7               |
| 12.3(26)         | 3.7 <sup>7</sup>  |
| 12.3(6b)         | 3.7 <sup>8</sup>  |
| 12.3(6e)         | 3.7               |
| 12.3(6f)         | 3.7               |
| 12.4(20)T        | 3.7 <sup>9</sup>  |
| 12.0(32)S        | 3.7 <sup>10</sup> |
| 12.2(34)         | 3.7 <sup>11</sup> |
| 12.3             | 3.7 <sup>12</sup> |

**Table 5-46** Supported Software Versions for Cisco 7300 Series—Cisco ANA Version 3.7

| Software Version | ANA Version       |
|------------------|-------------------|
| 12.3(14)         | 3.7 <sup>13</sup> |
| 12.3(15)         | 3.7 <sup>14</sup> |
| 12.4             | 3.7 <sup>15</sup> |
| 12.4(11)T        | 3.7 <sup>16</sup> |
| 12.4(12)         | 3.7 <sup>17</sup> |
| 12.4(20)T1       | 3.7 <sup>18</sup> |

<sup>1, 2, 3, 4, 5, 6, 7, 8, 9, 11</sup>ANA models pluggable ports for this IOS version.

<sup>10, 12, 13, 14, 15, 16, 18</sup>ANA supports all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

<sup>17</sup>ANA supports all maintenance builds in this IOS release train.

## Cisco 7300 Series—Supported Topologies

**Table 5-47** Supported Topologies for Cisco 7300 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Business       | Business       | 3.7         |
| Ethernet       | Ethernet       | 3.7         |
| Physical Layer | Physical Layer | 3.7         |

## Cisco 7300 Series—Supported Modules

**Table 5-48** Supported Modules for Cisco 7300 Series—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description |
|-----------------|-------------|--------------------|
| NSE-150         | 3.7         |                    |
| NSE-100         | 3.7         |                    |
| SFP-OC3-MM      | 3.7         |                    |
| SFP-OC3-IR1     | 3.7         |                    |
| SFP-OC3-LR1     | 3.7         |                    |
| 7300-PA-CC      | 3.7         |                    |
| C7304-MS100-SPA | 3.7         |                    |

## Cisco 7300 Series—Supported Technologies

The following technologies are supported by the Cisco 7300 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 7300 Series—Supported Service Events

**Table 5-49**      *Supported Service Events for Cisco 7300 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | N         |
| Interface Status Down/Up                            | 3.6.0       | N         |
| Card In/Out                                         | 3.6.0       | N         |
| Link Down/Up                                        | 3.6.0       | N         |
| Device Unreachable                                  | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | N         |



# Cisco 7400 Series Routers

This section includes the following information about Cisco 7400 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 7400 Series Routers](#)):

- [Cisco 7400 Series—Supported Software Versions, page 5-47](#)
- [Cisco 7400 Series—Supported Topologies, page 5-48](#)
- [Cisco 7400 Series—Supported Modules, page 5-49](#)
- [Cisco 7400 Series—Supported Technologies, page 5-50](#)
- [Cisco 7400 Series—Supported Service Events, page 5-50](#)

## Cisco 7400 Series—Supported Software Versions

**Table 5-50**      *Supported Software Versions for Cisco 7400 Series—Cisco ANA Version 3.7*

| Software Version    | ANA Version        |
|---------------------|--------------------|
| IOS 11.3(7)T        | 3.6.1              |
| IOS 12.0(22)S5      | 3.6.1              |
| IOS 12.0(23)S3.0619 | 3.6.1              |
| IOS 12.0(23)S4      | 3.6.1              |
| IOS 12.0(23)S6      | 3.6.1              |
| IOS 12.0(23)S6.0412 | 3.6.1              |
| IOS 12.0(24)S3      | 3.6.1              |
| IOS 12.0(25)S2      | 3.6.1              |
| IOS 12.0(26)S4      | 3.6.1              |
| IOS 12.0(26)S5      | 3.6.1              |
| IOS 12.0(26)S6      | 3.6.1              |
| IOS 12.0(27)S1      | 3.6.1              |
| IOS 12.0(32)S6      | 3.6.0 <sup>1</sup> |
| IOS 12.0(33)S       | 3.6.2              |
| IOS 12.0(33)S1      | 3.6.2 <sup>2</sup> |
| IOS 12.1(10)E       | 3.6.0              |
| IOS 12.1(19)E6      | 3.6.0              |
| IOS 12.1(1a)        | 3.6.0              |
| IOS 12.2(12)        | 3.6.0              |
| IOS 12.2(15)B       | 3.6.0              |
| IOS 12.2(15)T5      | 3.6.0              |
| IOS 12.2(18.2)      | 3.6.0              |
| IOS 12.2(28)SB      | 3.6.2              |
| IOS 12.2(31)SB3x    | 3.6.1              |

**Table 5-50**      *Supported Software Versions for Cisco 7400 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| IOS 12.2(33)SRA  | 3.6.2              |
| IOS 12.2(34)     | 3.6.0 <sup>3</sup> |
| IOS 12.3(10)     | 3.6.0 <sup>4</sup> |
| IOS 12.3(12.10)  | 3.6.0              |
| IOS 12.3(14)     | 3.6.2 <sup>5</sup> |
| IOS 12.3(15a)    | 3.6.0              |
| IOS 12.3(3)B1    | 3.6.0              |
| IOS 12.3(7)XI7a  | 3.6.0 <sup>6</sup> |
| IOS 12.4(11)T1   | 3.6.1 <sup>7</sup> |

1, 2, 3, 4, 5, 6, 7 ANA models pluggable ports for this IOS version.

## Cisco 7400 Series—Supported Topologies

**Table 5-51**      *Supported Topologies for Cisco 7400 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco 7400 Series—Supported Modules

**Table 5-52**      *Supported Modules for Cisco 7400 Series—Cisco ANA Version 3.7*

| Module Name   | ANA Version | Module Description                                                            |
|---------------|-------------|-------------------------------------------------------------------------------|
| PA-2FE-TX     | 3.6.0       | 2-Port Fast Ethernet 100Base TX Port Adapter                                  |
| PA-2T3        | 3.6.0       | Two-port clear-channel DS3 port adap                                          |
| PA-4E         | 3.6.0       | 4-Port 10BaseT Ethernet Port Adapter                                          |
| PA-4R-DTR     | 3.6.0       | 4-port dedicated Token Ring, 4/16 Mbps, half duplex(HDX) or full duplex (FDX) |
| PA-8E         | 3.6.0       | 8-Port 10BaseT Ethernet Port Adapter                                          |
| PA-A3-OC3MM   | 3.6.0       | Single port ATM OC3c/STM1 Multi Mode Port Adapter                             |
| PA-A3-OC3SMI  | 3.6.0       | Single port ATM OC3c/STM1 Single Mode (IR) Port Adapter                       |
| PA-A3-OC3SML  | 3.6.0       | Single port ATM OC3c/STM1 Single Mode (LR) Port Adapter                       |
| PA-FE-FX      | 3.6.0       | 1-Port Fast Ethernet 100BaseFx Port Adapter                                   |
| PA-FE-TX      | 3.6.0       | 1-Port Fast Ethernet 100BaseTx Port Adapter                                   |
| PA-GE         | 3.6.0       | Gigabit Ethernet Port Adapter                                                 |
| PA-MC-2E1/120 | 3.6.0       | 2-Port Multichannel E1/PRI Port Adapter                                       |
| PA-MC-2T      | 3.6.0       | 2-port multichannel T1 with integrated channel service units (CSUs)/DSUs      |
| PA-MC-8E1     | 3.6.0       | 8-port MultiChannel E1 Port Adapter                                           |
| PA-MC-8TE1    | 3.6.0       | 8 port multichannel T1/E1 8PRI port adapter                                   |
| PA-MC-E3      | 3.6.0       | 1-port MultiChannel E3 Port Adapter                                           |
| PA-MC-T3      | 3.6.0       | Single port enhanced multichannel T3 port adapter                             |
| PA-POS-OC3MM  | 3.6.0       | MultiMode PoS, OC3 Port Adapter                                               |
| PA-POS-OC3SMI | 3.6.0       | Single-Mode Intermediate Reach PoS, OC3 Port Adapter                          |
| PA-POS-OC3SML | 3.6.0       | Single-Mode Long Reach PoS, OC3 Port Adapter                                  |
| PA-T3         | 3.6.0       | One-port clear-channel DS3 port adapter                                       |

## Cisco 7400 Series—Supported Technologies

The following technologies are supported by the Cisco 7400 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco 7400 Series—Supported Service Events

**Table 5-53**      *Supported Service Events for Cisco 7400 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |

**Table 5-53**      **Supported Service Events for Cisco 7400 Series—Cisco ANA Version 3.7 (continued)**

| Event Name                   | ANA Version | Expedited |
|------------------------------|-------------|-----------|
| Memory Over Utilized         | 3.6.0       | N         |
| Device Unsupported           | 3.6.0       | N         |
| Discard Packets              | 3.6.0       | N         |
| Dropped Packets              | 3.6.0       | N         |
| Module Unsupported           | 3.6.0       | N         |
| Port Flapping                | 3.6.0       | N         |
| Port Down                    | 3.6.0       | Y         |
| Rx Over Utilized             | 3.6.0       | N         |
| Tx Over Utilized             | 3.6.0       | N         |
| VPN Leak                     | 3.6.0       | N         |
| Cloud Problem                | 3.6.0       | N         |
| Broken LSP Discovered        | 3.6.0       | N         |
| MPLS Black Hole              | 3.6.0       | N         |
| Layer 2 Tunnel Down          | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping | 3.6.0       | N         |
| BGP Neighbor Down            | 3.6.0       | N         |
| Card Up/Down                 | 3.6.0       | Y         |

## Cisco 7500 Series Routers

This section includes the following information about Cisco 7500 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 7500 Series Routers](#)):

- [Cisco 7500 Series—Supported Software Versions](#), page 5-52
- [Cisco 7500 Series—Supported Topologies](#), page 5-53
- [Cisco 7500 Series—Supported Modules](#), page 5-54
- [Cisco 7500 Series—Supported Technologies](#), page 5-54
- [Cisco 7500 Series—Supported Service Events](#), page 5-55

## Cisco 7500 Series—Supported Software Versions

**Table 5-54**      *Supported Software Versions for Cisco 7500 Series—Cisco ANA Version 3.7*

| Software Version      | ANA Version      |
|-----------------------|------------------|
| 11.3(7)T              | 3.7              |
| 12.0(20060619:094154) | 3.7              |
| 12.0(21)s7            | 3.7              |
| 12.0(23)S3.0619       | 3.7              |
| 12.0(23)S4            | 3.7              |
| 12.0(23)S6            | 3.7              |
| 12.0(25)S2            | 3.7              |
| 12.0(26)S4            | 3.7              |
| 12.0(26)S5            | 3.7              |
| 12.0(26)S6            | 3.7              |
| 12.0(27)S1            | 3.7              |
| 12.0(32.S7.051907A)   | 3.7              |
| 12.0(33)S1            | 3.7 <sup>1</sup> |
| 12.1(10)E             | 3.7              |
| 12.1(19)E6            | 3.7              |
| 12.1(1a)              | 3.7              |
| 12.2(12)              | 3.7              |
| 12.2(15)B             | 3.7              |
| 12.2(15)T5            | 3.7              |
| 12.2(18)s3            | 3.7              |
| 12.2(18.2)            | 3.7              |
| 12.2(25)s2            | 3.7              |
| 12.2(25)s6            | 3.7              |
| 12.2(25)s9            | 3.7              |
| 12.2(27)SBC2          | 3.7              |
| 12.2(31)SB            | 3.7              |
| 12.2(31)SB11          | 3.7 <sup>2</sup> |
| 12.2(31)SB12          | 3.7              |
| 12.2(31)SB3           | 3.7              |
| 12.2(31)SB3x          | 3.7              |
| 12.2(33)SRA           | 3.7              |
| 12.2(33)SRC           | 3.7 <sup>3</sup> |
| 12.2(33)SRC3          | 3.7 <sup>4</sup> |
| 12.2(33)SRD1          | 3.7 <sup>5</sup> |

**Table 5-54** Supported Software Versions for Cisco 7500 Series—Cisco ANA Version 3.7

| Software Version | ANA Version       |
|------------------|-------------------|
| 12.3(10)         | 3.7 <sup>6</sup>  |
| 12.3(10b)        | 3.7               |
| 12.3(10c)        | 3.7               |
| 12.3(10d)        | 3.7               |
| 12.3(12.10)      | 3.7               |
| 12.3(17)         | 3.7               |
| 12.3(17a)        | 3.7               |
| 12.3(20)         | 3.7               |
| 12.3(21)         | 3.7               |
| 12.3(26)         | 3.7 <sup>7</sup>  |
| 12.3(6b)         | 3.7 <sup>8</sup>  |
| 12.3(6e)         | 3.7               |
| 12.3(6f)         | 3.7               |
| 12.4(20)T        | 3.7 <sup>9</sup>  |
| 12.0(32)S        | 3.7 <sup>10</sup> |
| 12.2(128)SB      | 3.7               |
| 12.2(34)         | 3.7 <sup>11</sup> |
| 12.3             | 3.7 <sup>12</sup> |
| 12.3(14)         | 3.7 <sup>13</sup> |
| 12.3(15)         | 3.7 <sup>14</sup> |
| 12.4             | 3.7 <sup>15</sup> |
| 12.4(11)T        | 3.7 <sup>16</sup> |
| 12.4(12)         | 3.7               |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 ANA models pluggable ports for this IOS version.

## Cisco 7500 Series—Supported Topologies

**Table 5-55** Supported Topologies for Cisco 7500 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Business       | Business       | 3.7         |
| Ethernet       | Ethernet       | 3.7         |
| Physical Layer | Physical Layer | 3.7         |

## Cisco 7500 Series—Supported Modules

**Table 5-56**      *Supported Modules for Cisco 7500 Series—Cisco ANA Version 3.7*

| Module Name | ANA Version | Module Description                         |
|-------------|-------------|--------------------------------------------|
| NSE-150     | 3.7         | Cisco 7304 NSE-150 Network Services Engine |
| NSE-100     | 3.7         | Cisco 7304 NSE-100 Network Services Engine |

## Cisco 7500 Series—Supported Technologies

The following technologies are supported by the Cisco 7500 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [VPN, page 5-148](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)



## Cisco 7500 Series—Supported Service Events

**Table 5-57**      *Supported Service Events for Cisco 7500 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | N         |
| Interface Status Down/Up                            | 3.6.0       | N         |
| Card In/Out                                         | 3.6.0       | N         |
| Link Down/Up                                        | 3.6.0       | N         |
| Device Unreachable                                  | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | N         |

## Cisco 7600 Series Routers

This section includes the following information about Cisco 7600 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 7600 Series Routers](#)):

- [Cisco 7600 Series—Supported Software Versions, page 5-56](#)
- [Cisco 7600 Series—Supported Topologies, page 5-57](#)
- [Cisco 7600 Series—Supported Modules, page 5-57](#)
- [Cisco 7600 Series—Supported Technologies, page 5-70](#)
- [Cisco 7600 Series—Supported Service Events, page 5-71](#)
- [Cisco 7600 Series—Supported Commands, page 5-73](#)

## Cisco 7600 Series—Supported Software Versions

**Table 5-58**      *Supported Software Versions for Cisco 7600 Series—Cisco ANA Version 3.7*

| Software Version  | ANA Version         |
|-------------------|---------------------|
| IOS 12.1(13)E6    | 3.6.1               |
| IOS 12.1(20)E3    | 3.6.1               |
| IOS 12.2(18)SXD   | 3.6.0               |
| IOS 12.2(18)SXD2  | 3.6.1               |
| IOS 12.2(18)SXD5  | 3.6.0               |
| IOS 12.2(18)SXE   | 3.6.0 <sup>1</sup>  |
| IOS 12.2(18)SXE6b | 3.6.0               |
| IOS 12.2(18)SXF   | 3.6.0               |
| IOS 12.2(18)SXF7  | 3.6.2 <sup>2</sup>  |
| IOS 12.2(33)SRA   | 3.6.0 <sup>3</sup>  |
| IOS 12.2(33)SRA2  | 3.6.0               |
| IOS 12.2(33)SRA6  | 3.6.3 <sup>4</sup>  |
| IOS 12.2(33)SRB   | 3.6.0 <sup>5</sup>  |
| IOS 12.2(33)SRB1  | 3.6.1 <sup>6</sup>  |
| IOS 12.2(33)SRB2  | 3.6.2               |
| IOS 12.2(33)SRB3  | 3.6.3 <sup>7</sup>  |
| IOS 12.2(33)SRB4  | 3.6.4 <sup>8</sup>  |
| IOS 12.2(33)SRC   | 3.6.2 <sup>9</sup>  |
| IOS 12.2(33)SRC1  | 3.6.3 <sup>10</sup> |
| IOS 12.2(33)SRC2  | 3.6.4 <sup>11</sup> |
| IOS 12.2(33)SRC3  | 3.6.7 <sup>12</sup> |
| IOS 12.2(33)SRC4  | 3.7 <sup>13</sup>   |
| IOS 12.2(33)SRD1  | 3.6.4 <sup>14</sup> |
| IOS 12.2(33)SRD2  | 3.6.6 <sup>15</sup> |
| IOS 12.2(33)SRD3  | 3.7 <sup>16</sup>   |
| IOS 12.2(33)SRE   | 3.7 <sup>17</sup>   |
| IOS 12.2(33)SXH2a | 3.6.5 <sup>18</sup> |

<sup>1, 2, 3, 4, 7, 8, 10, 11, 12, 13, 15, 16, 18</sup>ANA models pluggable ports for this IOS version.

<sup>5</sup>12.2(33)SRB is not supported on Cisco 7603-S and Cisco 7609-S, as both devices provide incorrect sysoids. ANA models pluggable ports for this IOS version.

<sup>6</sup>12.2(33)SRB1 is not supported on Cisco 7603-S and Cisco 7609-S, as both devices provide incorrect sysoids.

<sup>9, 14, 17</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco 7600 Series—Supported Topologies

**Table 5-59** Supported Topologies for Cisco 7600 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco 7600 Series—Supported Modules

**Table 5-60** Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description                           |
|-----------------|-------------|----------------------------------------------|
| 4000W-DC        | 3.6.2       | 4000W DC PS for 7609/7613Chassis             |
| 6000W-DC        | 3.6.2       | 6000W DC PS                                  |
| 7600-ES+20C3C   | 3.7         | 20G Combo Link Daughter Card (not a FRU)     |
| 7600-ES+20G     | 3.6.6       | 7600 ES+ 20x1G Link DC                       |
| 7600-ES+20G3C   | 3.6.6       | 7600 ES+ Line Card, 20xGE SFP with DFC 3C    |
| 7600-ES+20G3CXL | 3.6.6       | 7600 ES+ Line Card, 20xGE SFP with DFC 3CXL  |
| 7600-ES+2TG     | 3.6.6       | 7600 ES+ 2x10G Link DC                       |
| 7600-ES+2TG3C   | 3.6.6       | 7600 ES+ Line Card, 2x10GE XFP with DFC 3C   |
| 7600-ES+2TG3CXL | 3.6.6       | 7600 ES+ Line Card, 2x10GE XFP with DFC 3CXL |
| 7600-ES+3C      | 3.6.6       | 7600 ES+ Policy Forwarding 3C DC             |
| 7600-ES+3CXL    | 3.6.6       | 7600 ES+ Policy Forwarding 3CXL DC           |
| 7600-ES+40C3C   | 3.7         | 40G Combo Link Daughter Card (not a FRU)     |
| 7600-ES+40G     | 3.6.6       | 7600 ES+ 40x1G Link DC                       |
| 7600-ES+40G3C   | 3.6.6       | 7600 ES+ Line Card, 40xGE SFP with DFC 3C    |
| 7600-ES+40G3CXL | 3.6.4       | 7600 ES+ Line Card, 40xGE SFP with DFC 3CXL  |
| 7600-ES+4TG     | 3.6.6       | 7600 ES+ 4x10G Link DC                       |
| 7600-ES+4TG3C   | 3.6.6       | 7600 ES+ Line Card, 4x10GE XFP with DFC 3C   |
| 7600-ES+4TG3CXL | 3.6.6       | 7600 ES+ Line Card, 4x10GE XFP with DFC 3CXL |
| 7600-ES20       | 3.6.1       | Cisco 7600 Series Ethernet Services Card     |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                |
|-------------------|-------------|-------------------------------------------------------------------|
| 7600-ES20-10G3C   | 3.6.1       | Cisco 7600 ES20 line card, 2x10GE XFP with DFC 3C                 |
| 7600-ES20-10G3CXL | 3.6.1       | Cisco 7600 ES20 line card, 2x10GE XFP with DFC 3CXL               |
| 7600-ES20-GE3C    | 3.6.1       | Cisco 7600 ES20 line card, 20xGE SFP with DFC 3C                  |
| 7600-ES20-GE3CXL  | 3.6.1       | Cisco 7600 ES20 line card, 20xGE SFP with DFC 3CXL                |
| 7600-ES20-PROC    | 3.6.1       | 7600 ES20 PROC FRU                                                |
| 7600-MSFC4        | 3.6.1       | c7600 MSFC4 Daughterboard                                         |
| 7600-PFC3C        | 3.6.5       | RSP720 Policy Feature Card 3C                                     |
| 7600-SIP-200      | 3.6.0       | SPA Interface Processor-200                                       |
| 7600-SIP-400      | 3.6.0       | SPA Interface Processor-400                                       |
| 7600-SIP-600      | 3.6.0       | SPA Interface Processor-600                                       |
| 7600-SSC-400      | 3.6.3       | Cisco 7600 / Catalyst 6500 Services SPA Carrier Card-400 Rev. 2.0 |
| 76-ES+XC-20G3C    | 3.7         | 7600 ES+XC Combo 10x1GE/ 1x10GE, DFC3CXL                          |
| 76-ES+XC-20G3CXL  | 3.7         | 7600 ES+XC Combo 10x1GE/ 1x10GE, DFC3CXL                          |
| 76-ES+XC-40G3C    | 3.7         | Combo 20x1GE/2x10GE - 3C                                          |
| 76-ES+XC-40G3CXL  | 3.7         | Combo 20x1GE/2x10GE - 3CXL                                        |
| 76-ES+XT-2TG3C    | 3.7         | 7600 ES+XT, LAN/WAN PHY, OTN/G.709, 2x10GE, XFP, DFC3C            |
| 76-ES+XT-2TG3CXL  | 3.7         | 7600 ES+XT, LAN/WAN PHY, OTN/G.709, 2x10GE, XFP, DFC3CXL          |
| 76-ES+XT-4TG3C    | 3.7         | 7600 ES+XT, LAN/WAN PHY, OTN/G.709, 4x10GE, XFP, DFC3C            |
| 76-ES+XT-4TG3CXL  | 3.7         | 7600 ES+XT, LAN/WAN PHY, OTN/G.709, 4x10GE, XFP, DFC3CXL          |
| ACE10-6500-K9     | 3.7         | Cisco Application Control Engine Service Module                   |
| ACE20-MOD-K9      | 3.6.3       | Application Control Engine 20 Hardware                            |
| CEVFAN            | 3.6.1       | Fan                                                               |
| CLK-7600          | 3.7         | Cisco 7600 Clock Module                                           |
| CWDM-SFP-1470     | 3.7         | CWDM SFP 1470 nm, Gigabit Ethernet and 1G/2G FC                   |
| CWDM-SFP-1490     | 3.7         | CWDM SFP 1490 nm, Gigabit Ethernet and 1G/2G FC                   |
| CWDM-SFP-1510     | 3.7         | CWDM SFP 1510 nm, Gigabit Ethernet and 1G/2G FC                   |
| CWDM-SFP-1530     | 3.7         | CWDM SFP 1530 nm, Gigabit Ethernet and 1G/2G FC                   |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name   | ANA Version | Module Description                              |
|---------------|-------------|-------------------------------------------------|
| CWDM-SFP-1550 | 3.7         | CWDM SFP 1550 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1570 | 3.7         | CWDM SFP 1570 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1590 | 3.7         | CWDM SFP 1590 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1610 | 3.7         | CWDM SFP 1610 nm, Gigabit Ethernet and 1G/2G FC |
| DFC-3C        | 3.6.1       | Distributed Forwarding Card 3C                  |
| DWDM-SFP-3033 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1530.33 nm              |
| DWDM-SFP-3112 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1531.12 nm              |
| DWDM-SFP-3190 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1531.90 nm              |
| DWDM-SFP-3268 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1532.68 nm              |
| DWDM-SFP-3425 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1534.25 nm              |
| DWDM-SFP-3504 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1535.04 nm              |
| DWDM-SFP-3582 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1535.82 nm              |
| DWDM-SFP-3661 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1536.61 nm              |
| DWDM-SFP-3819 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1538.19 nm              |
| DWDM-SFP-3898 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1539.98 nm              |
| DWDM-SFP-3977 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1539.77 nm              |
| DWDM-SFP-4056 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1540.56 nm              |
| DWDM-SFP-4214 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1542.14 nm              |
| DWDM-SFP-4294 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1542.94 nm              |
| DWDM-SFP-4373 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1543.73 nm              |
| DWDM-SFP-4453 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1544.53 nm              |
| DWDM-SFP-4612 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1546.12 nm              |
| DWDM-SFP-4692 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1546.92 nm              |
| DWDM-SFP-4772 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1547.72 nm              |
| DWDM-SFP-4851 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1548.51 nm              |
| DWDM-SFP-5012 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1550.12 nm              |
| DWDM-SFP-5092 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1550.92 nm              |
| DWDM-SFP-5172 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1551.72 nm              |
| DWDM-SFP-5252 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1552.52 nm              |
| DWDM-SFP-5413 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1554.13 nm              |
| DWDM-SFP-5494 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1554.94 nm              |
| DWDM-SFP-5575 | 3.6.7       | Cisco 1000BASE-DWDM SFP 1555.75 nm              |

**Table 5-60 Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                |
|-------------------|-------------|---------------------------------------------------|
| DWDM-SFP-5655     | 3.6.7       | Cisco 1000BASE-DWDM SFP 1556.55 nm                |
| DWDM-SFP-5817     | 3.6.7       | Cisco 1000BASE-DWDM SFP 1558.17 nm                |
| DWDM-SFP-5898     | 3.6.7       | Cisco 1000BASE-DWDM SFP 1558.98 nm                |
| DWDM-SFP-5979     | 3.6.7       | Cisco 1000BASE-DWDM SFP 1559.79 nm                |
| DWDM-SFP-6061     | 3.6.7       | Cisco 1000BASE-DWDM SFP 1560.61 nm                |
| DWDM-XENPAK-30.33 | 3.6.7       | 10GBASE-DWDM 1530.33 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-31.12 | 3.6.7       | 10GBASE-DWDM 1531.12 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-31.90 | 3.6.7       | 10GBASE-DWDM 1531.90 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-32.68 | 3.6.7       | 10GBASE-DWDM 1532.68 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-34.25 | 3.6.7       | 10GBASE-DWDM 1534.25 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-35.04 | 3.6.7       | 10GBASE-DWDM 1535.04 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-35.82 | 3.6.7       | 10GBASE-DWDM 1535.82 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-36.61 | 3.6.7       | 10GBASE-DWDM 1536.61 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-38.19 | 3.6.7       | 10GBASE-DWDM 1538.19 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-38.98 | 3.6.7       | 10GBASE-DWDM 1538.98 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-39.77 | 3.6.7       | 10GBASE-DWDM 1539.77 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-40.56 | 3.6.7       | 10GBASE-DWDM 1540.56 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-42.14 | 3.6.7       | 10GBASE-DWDM 1542.14 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-42.94 | 3.6.7       | 10GBASE-DWDM 1542.94 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-43.73 | 3.6.7       | 10GBASE-DWDM 1543.73 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-44.53 | 3.6.7       | 10GBASE-DWDM 1544.53 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-46.12 | 3.6.7       | 10GBASE-DWDM 1546.12 nm XENPAK (100-GHz ITU grid) |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version        | Module Description                                |
|-------------------|--------------------|---------------------------------------------------|
| DWDM-XENPAK-46.92 | 3.6.7              | 10GBASE-DWDM 1546.92 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-47.72 | 3.6.7              | 10GBASE-DWDM 1547.72 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-48.51 | 3.6.7              | 10GBASE-DWDM 1548.51 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-50.12 | 3.6.7              | 10GBASE-DWDM 1550.12 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-50.92 | 3.6.7              | 10GBASE-DWDM 1550.92 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-51.72 | 3.6.7              | 10GBASE-DWDM 1551.72 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-52.52 | 3.6.7              | 10GBASE-DWDM 1552.52 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-54.13 | 3.6.7              | 10GBASE-DWDM 1554.13 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-54.94 | 3.6.7              | 10GBASE-DWDM 1554.94 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-55.75 | 3.6.7              | 10GBASE-DWDM 1555.75 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-56.55 | 3.6.7              | 10GBASE-DWDM 1556.55 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-58.17 | 3.6.7              | 10GBASE-DWDM 1558.17 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-58.98 | 3.6.7              | 10GBASE-DWDM 1558.98 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-59.79 | 3.6.7              | 10GBASE-DWDM 1559.79 nm XENPAK (100-GHz ITU grid) |
| DWDM-XENPAK-60.61 | 3.6.7              | 10GBASE-DWDM 1560.61 nm XENPAK (100-GHz ITU grid) |
| DWDM-XFP-30.33    | 3.6.7 <sup>1</sup> | 10GBASE-DWDM 1530.33 nm XFP (100-GHz ITU grid)    |
| DWDM-XFP-31.12    | 3.6.7 <sup>2</sup> | 10GBASE-DWDM 1531.12 nm XFP (100-GHz ITU grid)    |
| DWDM-XFP-31.90    | 3.6.7 <sup>3</sup> | 10GBASE-DWDM 1531.90 nm XFP (100-GHz ITU grid)    |
| DWDM-XFP-32.68    | 3.6.7 <sup>4</sup> | 10GBASE-DWDM 1532.68 nm XFP (100-GHz ITU grid)    |
| DWDM-XFP-34.25    | 3.6.7 <sup>5</sup> | 10GBASE-DWDM 1534.25 nm XFP (100-GHz ITU grid)    |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name    | ANA Version         | Module Description                             |
|----------------|---------------------|------------------------------------------------|
| DWDM-XFP-35.04 | 3.6.7 <sup>6</sup>  | 10GBASE-DWDM 1535.04 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-35.82 | 3.6.7 <sup>7</sup>  | 10GBASE-DWDM 1535.82 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-36.61 | 3.6.7 <sup>8</sup>  | 10GBASE-DWDM 1536.61 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-38.19 | 3.6.7 <sup>9</sup>  | 10GBASE-DWDM 1538.19 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-38.98 | 3.6.7 <sup>10</sup> | 10GBASE-DWDM 1538.98 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-39.77 | 3.6.7 <sup>11</sup> | 10GBASE-DWDM 1539.77 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-40.56 | 3.6.7 <sup>12</sup> | 10GBASE-DWDM 1540.56 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-42.14 | 3.6.7 <sup>13</sup> | 10GBASE-DWDM 1542.14 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-42.94 | 3.6.7 <sup>14</sup> | 10GBASE-DWDM 1542.94 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-43.73 | 3.6.7 <sup>15</sup> | 10GBASE-DWDM 1543.73 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-44.53 | 3.6.7 <sup>16</sup> | 10GBASE-DWDM 1544.53 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-46.12 | 3.6.7 <sup>17</sup> | 10GBASE-DWDM 1546.12 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-46.92 | 3.6.7 <sup>18</sup> | 10GBASE-DWDM 1546.92 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-47.72 | 3.6.7 <sup>19</sup> | 10GBASE-DWDM 1547.72 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-48.51 | 3.6.7 <sup>20</sup> | 10GBASE-DWDM 1548.51 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-50.12 | 3.6.7 <sup>21</sup> | 10GBASE-DWDM 1550.12 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-50.92 | 3.6.7 <sup>22</sup> | 10GBASE-DWDM 1550.92 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-51.72 | 3.6.7 <sup>23</sup> | 10GBASE-DWDM 1551.72 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-52.52 | 3.6.7 <sup>24</sup> | 10GBASE-DWDM 1552.52 nm XFP (100-GHz ITU grid) |
| DWDM-XFP-54.13 | 3.6.7 <sup>25</sup> | 10GBASE-DWDM 1554.13 nm XFP (100-GHz ITU grid) |



**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version         | Module Description                                                               |
|-------------------|---------------------|----------------------------------------------------------------------------------|
| DWDM-XFP-54.94    | 3.6.7 <sup>26</sup> | 10GBASE-DWDM 1554.94 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-55.75    | 3.6.7 <sup>27</sup> | 10GBASE-DWDM 1555.75 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-56.55    | 3.6.7 <sup>28</sup> | 10GBASE-DWDM 1556.55 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-58.17    | 3.6.7 <sup>29</sup> | 10GBASE-DWDM 1558.17 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-58.98    | 3.6.7 <sup>30</sup> | 10GBASE-DWDM 1558.98 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-59.79    | 3.6.7 <sup>31</sup> | 10GBASE-DWDM 1559.79 nm XFP (100-GHz ITU grid)                                   |
| DWDM-XFP-60.61    | 3.6.7 <sup>32</sup> | 10GBASE-DWDM 1560.61 nm XFP (100-GHz ITU grid)                                   |
| FAN-MOD-4HS       | 3.7                 | High-speed fan module                                                            |
| FAN-MOD-6HS       | 3.7                 | High Speed Fan Module for CISCO7606 Chassis                                      |
| FAN-MOD-9SHS      | 3.6.4               | High-speed fan module                                                            |
| GLC-BX-D          | 3.6.6               | 1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength |
| GLC-BX-U          | 3.6.6               | 1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength |
| GLC-LH-SM         | 3.6.4               | Short Wave fiber Gigabit Ethernet                                                |
| GLC-SX-MM         | 3.7                 | 1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength                    |
| GLC-T             | 3.6.7               | 1000Base-T SFP Transceiver module for Category 5 copper wire                     |
| GLC-ZX-SM         | 3.6.7               | 1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength                   |
| MSFC4             | 3.6.2               | Multilayer Switch Feature Card                                                   |
| OSM-12CT3T1       | 3.6.0               | 12-port channelized/unchannelized CT3-T1                                         |
| OSM-1CHOC12T3-SI  | 3.6.0               | 1-port channelized OC-12, SM-IR                                                  |
| OSM-1OC48-POS-SI+ | 3.6.0               | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-IR                                |
| OSM-1OC48-POS-SL+ | 3.6.0               | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-LR                                |
| OSM-1OC48-POS-SS+ | 3.6.0               | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-SR                                |
| OSM-2+4GE-WAN+    | 3.6.0               | 4-port Gigabit Ethernet WAN (GBIC) with two Layer 2 LAN ports; CEF256            |
| OSM-2OC12-ATM-MM+ | 3.6.0               | Enhanced 2-port OC-12/STM-4 ATM OSM, MM                                          |

**Table 5-60 Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                                                                                      |
|-------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| OSM-2OC12-ATM-SI+ | 3.6.0       | Enhanced 2-port OC-12/STM-4 ATM OSM, SM-IR                                                                                              |
| OSM-2OC12-POS-SI+ | 3.6.0       | Enhanced 2-port OC-12c/STM-4c POS, SM-IR;<br>CEF256                                                                                     |
| OSM-4OC12-POS-SI+ | 3.6.0       | Enhanced 4-port OC-12c/STM-4c POS, SM-IR;<br>CEF256                                                                                     |
| OSM-4OC3-POS-SI+  | 3.6.0       | Enhanced 4-port OC-3c/STM-1c POS, SM-IR;                                                                                                |
| PA-1FE-TX, -FX    | 3.6.0       | 1-port Fast Ethernet port adapter                                                                                                       |
| PA-2CE/PRI        | 3.6.1       | Not Found                                                                                                                               |
| PA-2FE-TX, -FX    | 3.6.0       | 2-port Fast Ethernet port adapter                                                                                                       |
| PA-4T+            | 3.6.0       | T1/E1 port adapters                                                                                                                     |
| PA-A3-E3          | 3.6.0       | ATM with traffic shaping port adapters                                                                                                  |
| PA-A3-T3          | 3.6.0       | ATM with traffic shaping port adapters                                                                                                  |
| PA-MC-2E1/120     | 3.6.1       | 2 port multichannel E1 port adapter with G.703<br>120ohm interf                                                                         |
| PA-MC-4T1         | 3.6.0       | T1/E1 port adapters                                                                                                                     |
| PA-MC-8T1         | 3.6.0       | T1/E1 port adapters                                                                                                                     |
| PA-MC-8TE1        | 3.6.1       | 8 port multichannel T1/E1 8PRI port adapter                                                                                             |
| PA-MC-STM-1       | 3.6.0       | Multichannel STM-1 port adapters                                                                                                        |
| PA-POS-2OC3       | 3.6.0       | 2-port POS OC3c/STM1 port adapter                                                                                                       |
| PFC-3C            | 3.6.2       | Policy Feature Card 3C                                                                                                                  |
| PFC-3CXL          | 3.6.1       | Policy Feature Card 3Cxl (PFC3CXL)                                                                                                      |
| PWR-1900-DC       | 3.7         | 1900W DC power supply for CISCO7606                                                                                                     |
| PWR-2700-AC       | 3.6.3       | 2700W DC power supply                                                                                                                   |
| PWR-2700-DC       | 3.6.2       | 2700W DC power supply for CISCO7606                                                                                                     |
| PWR-2700-DC/4     | 3.6.2       | 2700W DC Power Supply for Cisco 7604                                                                                                    |
| PWR-4500-DC       | 3.7         | 7606-S 4500W DC power supply                                                                                                            |
| PWR-6000-DC       | 3.6.4       | 6000W DC Power Supply                                                                                                                   |
| RSP720-3C-10GE    | 3.7         | Cisco 7600 Series RSP 720-10GE with 10 Gigabit<br>Ethernet Uplinks that includes PFC-3C and<br>Multilayer Switch Feature Card (MSFC4)   |
| RSP720-3C-GE      | 3.6.1       | Route Switch Processor 720 with PFC3C                                                                                                   |
| RSP720-3CXL       | 3.6.4       | Catalyst 6500 Supervisor Module 720 base board                                                                                          |
| RSP720-3CXL-10GE  | 3.7         | Cisco 7600 Series RSP 720-10GE with 10 Gigabit<br>Ethernet Uplinks that includes PFC-3CXL and<br>Multilayer Switch Feature Card (MSFC4) |
| RSP720-3CXL-GE    | 3.6.1       | Cisco 7600 Route Switch Processor 72Gbps fabric,<br>PFC3CXL, GE                                                                         |
| SFP-GE-L          | 3.6.4       | 1000BASE-LH/LX pluggable transceiver                                                                                                    |

**Table 5-60 Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                                                 |
|-------------------|-------------|----------------------------------------------------------------------------------------------------|
| SFP-GE-S          | 3.6.6       | 1000BASE-Sx Short wavelength gigabit ethernet SFP.                                                 |
| SFP-GE-T          | 3.6.6       | 1000BASE-T copper gigabit ethernet SFP.                                                            |
| SFP-GE-Z          | 3.6.6       | 1000BASE-Zx Extended reach gigabit ethernet SFP.                                                   |
| SFP-OC12-IR1      | 3.6.6       | OC-12/STM-4 pluggable intermediate-reach (15 km) transceiver module, 1310-nm wavelength            |
| SFP-OC12-LR1      | 3.6.6       | OC-12/STM-4 pluggable long-reach (40 km) transceiver module, 1310-nm wavelength, LC connector      |
| SFP-OC12-LR2      | 3.6.6       | OC-12/STM-4 pluggable long-reach (80 km) transceiver module, 1550-nm wavelength, LC connector      |
| SFP-OC12-MM       | 3.6.6       | OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, MMF, LC connector |
| SFP-OC12-SR       | 3.6.6       | OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, LC connector      |
| SFP-OC3-IR1       | 3.6.0       | Intermediate range, single-mode fiber                                                              |
| SFP-OC3-LR1       | 3.6.0       | Long range, single-mode fiber                                                                      |
| SFP-OC3-LR2       | 3.6.7       | OC-3/STM-1 pluggable long-reach (80 km) transceiver module, 1550-nm wavelength, LC connector       |
| SFP-OC3-MM        | 3.6.0       | Short range, multimode fiber                                                                       |
| SFP-OC3-SR        | 3.6.1       | OC3/STM1 SFP, Single-mode fiber, Short Reach                                                       |
| SFP-OC48-IR1      | 3.6.7       | OC-48c/STM-16c                                                                                     |
| SPA-10X1GE        | 3.6.0       | 10-port Gigabit Ethernet SPA, SFP Optics                                                           |
| SPA-10X1GE-V2     | 3.6.0       | 10-port Gigabit Ethernet SPA, SFP Optics                                                           |
| SPA-1CHOC3-CE-ATM | 3.6.2       | 1-Port Channelized STM-1/OC-3 Shared Port Adapters                                                 |
| SPA-1XCHOC12/DS0  | 3.6.6       | 1-Port Channelized OC-12/STM-4 Shared Port Adapter                                                 |
| SPA-1XCHSTM1/OC3  | 3.6.0       | 1-port Channelized STM1/OC3 to DS0 SPA                                                             |
| SPA-1XOC12-ATM    | 3.6.0       | 1-Port OC-12c/STM-4c ATM SPA                                                                       |
| SPA-1XOC12-POS    | 3.6.0       | 1-port OC-12c/STM-4c POS SPA                                                                       |
| SPA-1XOC48-ATM    | 3.6.0       | 1 port OC-48c/STM-16 ATM SPA                                                                       |
| SPA-1XOC48POS/RPR | 3.6.7       | 1 port OC-48c/STM-16 POS/RPR SPA                                                                   |
| SPA-1XTENGE-XFP   | 3.6.0       | 1-port 10 Gigabit Ethernet SPA, LANPHY XFP Optics                                                  |

**Table 5-60 Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                       |
|-------------------|-------------|----------------------------------------------------------|
| SPA-24CHT1-CE-ATM | 3.6.0       | 24-Port Channelized T1/E1/J1 ATM CEoP SPA                |
| SPA-2X1GE         | 3.6.0       | 2-port Gigabit Ethernet SPA, SFP Optics                  |
| SPA-2X1GE-SYNCE   | 3.7         | 2-port Synchronous Gigabit Ethernet Shared Port Adapter  |
| SPA-2X1GE-V2      | 3.6.0       | 2-port Gigabit Ethernet SPA, SFP Optics                  |
| SPA-2XCT3/DS0     | 3.6.0       | 2-port Channelized T3 to DS0 SPA                         |
| SPA-2XOC3-ATM     | 3.6.0       | 2-port OC-3c/STM-1c ATM SPA                              |
| SPA-2XOC3-POS     | 3.6.0       | 2-port OC-3c/STM-1c POS SPA                              |
| SPA-2XOC48POS/RPR | 3.6.1       | 1-port 10 Gigabit Ethernet Shared Port Adapter XFP based |
| SPA-2XOC48POS/RPR | 3.6.0       | 2 port OC-48 POS/RPR SPA with SFP Optics                 |
| SPA-2XT3/E3       | 3.6.0       | 2-port Clear Channel T3/E3 SPA                           |
| SPA-4X1FE-TX-V2   | 3.6.0       | 4-port 10/100 Ethernet SPA TX                            |
| SPA-4XCT3/DS0     | 3.6.0       | 4-port Channelized T3 to DS0 SPA                         |
| SPA-4XOC3-ATM     | 3.6.0       | 4-port OC-3c/STM-1c ATM SPA                              |
| SPA-4XOC3-POS     | 3.6.0       | 4-port OC-3c/STM-1c POS SPA                              |
| SPA-4XOC48POS/RPR | 3.6.0       | 4-port OC-48c/STM-16 POS/DPT/RPR SPA                     |
| SPA-4XT3/E3       | 3.6.0       | 4-port Clear Channel T3/E3 SPA                           |
| SPA-5X1GE         | 3.6.0       | 5-port Gigabit Ethernet SPA, SFP Optics                  |
| SPA-5X1GE-V2      | 3.6.2       | 5-Port Gigabit Ethernet Shared Port Adapter              |
| SPA-8X1FE-TX-V2   | 3.6.0       | 8-port 10/100 Ethernet SPA TX                            |
| SPA-8XCHT1/E1     | 3.6.0       | 8-Port Channelized T1/E1 SPA                             |
| SPA-IPSEC-2G      | 3.6.7       | IpSec SPA with 2Gbps DES/3DES/AES                        |
| SPA-OC192POS-LR   | 3.6.0       | 1-port OC-192c/STM-64 POS/RPR SPA, SM-LR                 |
| SPA-OC192POS-XFP  | 3.6.0       | 1-port OC-192c/STM-64 POS/RPR SPA, XFP Optics            |
| WS-C6509-E-FAN    | 3.6.0       | High-capacity fan tray                                   |
| WS-C6509-NEB-A    | 3.6.1       | Enhanced 9-slot vertically oriented chassis              |
| WS-C6K-VTT-E      | 3.7         | Cisco 6500 VTT Module                                    |
| WS-CAC-3000W      | 3.6.4       | Catalyst 6500 3000W AC power supply                      |
| WS-CAC-4000W-INT  | 3.6.4       | 4000W AC PowerSupply, International (cable included)     |
| WS-CAC-4000W-US   | 3.6.4       | 4000Watt AC Power Supply for US (cable attached)         |
| WS-CAC-6000W      | 3.6.0       | Cat6500 6000W AC Power Supply                            |
| WS-CDC-2500W      | 3.6.4       | Catalyst 6000 2500W DC Power Supply                      |
| WS-F6700-CFC      | 3.6.0       | Catalyst 6500 Central Fwd Card for WS-X67xx modules      |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                                                                              |
|--------------------|-------------|-----------------------------------------------------------------------------------------------------------------|
| WS-F6700-DFC3A     | 3.6.1       | Distributed Forwarding Card 3                                                                                   |
| WS-F6700-DFC3B     | 3.6.1       | Catalyst 6500 Distributed forwarding card 3B                                                                    |
| WS-F6700-DFC3BXL   | 3.6.0       | Distributed Forwarding Card 3BXL (DFC3BXL) for use on CEF720 modules                                            |
| WS-F6700-DFC3C     | 3.6.0       | Distributed Forwarding Card 3C (DFC3C) for use on CEF720 modules                                                |
| WS-F6700-DFC3CXL   | 3.6.0       | Distributed Forwarding Card 3CXL (DFC3CXL) for use on CEF720 modules                                            |
| WS-F6K-FE48X2-AF   | 3.6.0       | IEEE 802.3af PoE daughtercard                                                                                   |
| WS-F6K-GE48-AF     | 3.6.0       | IEEE 802.3af PoE daughtercard                                                                                   |
| WS-F6K-MSFC2       | 3.6.1       | Multilevel Switching Feature Card Version 2 for Catalyst 6000 that is treated as a standalone system by the NMS |
| WS-F6K-PFC2        | 3.6.1       | Catalyst 6500 L3 switching engine II                                                                            |
| WS-F6K-PFC3B       | 3.7         | Policy Feature Card-3B                                                                                          |
| WS-F6K-PFC3BXL     | 3.6.0       | Policy Feature Card 3BXL (PFC3BXL)                                                                              |
| WS-F6K-PFC3CXL     | 3.6.0       | Policy Feature Card 3CXL (PFC3CXL)                                                                              |
| WS-F6K-VPWR        | 3.6.0       | PoE Daughtercard                                                                                                |
| WS-F6K-VPWR-GE     | 3.6.0       | PoE Daughtercard                                                                                                |
| WS-G6483           | 3.6.0       | 10GBASE-ER serial 1550 nm extended-reach OIM                                                                    |
| WS-G6488           | 3.6.0       | 10GBASE-LR serial 1310 nm long-reach OIM                                                                        |
| WS-SUP32-10GE-3B   | 3.6.0       | Supervisor Engine 32                                                                                            |
| WS-SUP32-GE-3B     | 3.6.0       | Supervisor Engine 32                                                                                            |
| WS-SUP720-3B       | 3.6.0       | Supervisor Engine 720 with PFC3B                                                                                |
| WS-SUP720-3BXL     | 3.6.0       | Supervisor Engine 720 with PFC3BXL                                                                              |
| WS-SVC-ADM-1-K9    | 3.6.3       | Catalyst 6500 Cisco Anomaly Detection Module                                                                    |
| WS-SVC-AGM-1-K9    | 3.6.3       | Catalyst 6500 Cisco Anomaly Guard Module                                                                        |
| WS-SVC-FWM-1-K9    | 3.6.0       | Firewall blade for 6500 and 7600, VFW License Separate                                                          |
| WS-SVC-IDS2-BUN-K9 | 3.6.1       | Cisco Catalyst 6500 Series Intrusion Detection System (IDSM-2) Service Module                                   |
| WS-SVC-IDSUPG      | 3.7         | IDS 2 accelerator board                                                                                         |
| WS-SVC-MWAM-1      | 3.6.0       | Multi-Processor WAN Application Module                                                                          |
| WS-SVC-NAM-1       | 3.6.0       | Network Analysis module 1                                                                                       |
| WS-SVC-NAM-2       | 3.6.0       | Network Analysis module 2                                                                                       |
| WS-X6148A-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                                                             |

**Table 5-60**      **Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                      |
|-------------------|-------------|-------------------------------------------------------------------------|
| WS-X6148A-RJ-45   | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148FE-SFP    | 3.6.1       | Catalyst 6500 48 port 100Base-X SFP module                              |
| WS-X6148-FE-SFP   | 3.6.0       | 48 port 100BASE-FX Fast Ethernet Switching Module                       |
| WS-X6148-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                     |
| WS-X6148-RJ-21    | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148X2-RJ-45  | 3.6.0       | 96 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6196-RJ-21    | 3.6.0       | 96 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6248A-TEL     | 3.6.0       | 48 port 10/100TX RJ-21 Enhanced Ethernet/Fast Ethernet Switching Module |
| WS-X6248-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6248-TEL      | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6316-GE-TX    | 3.6.0       | 16-port Gigabit Ethernet RJ-45                                          |
| WS-X6324-100FX-SM | 3.6.0       | 24 port 100FX SingleMode Fast Ethernet Switching Module                 |
| WS-X6348-RJ-21    | 3.6.0       | 6500 48 port 10/100BaseTX (RJ-21)                                       |
| WS-X6348-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6408A-GBIC    | 3.6.0       | 8-port Gigabit Ethernet GBIC Enhanced QoS Module                        |
| WS-X6408-GBIC     | 3.6.0       | 8-port Gigabit Ethernet GBIC                                            |
| WS-X6416-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6502-10GE     | 3.6.0       | 1-port 10-Gigabit Ethernet                                              |
| WS-X6516A-GBIC    | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6516-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6516-GE-TX    | 3.6.0       | 16 port 10/100/1000 Base-T Ethernet Switching Module                    |
| WS-X6548-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                     |
| WS-X6548-RJ-21    | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |

**Table 5-60 Supported Modules for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                                                                                                                          |
|-------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WS-X6548-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module                                                                                                              |
| WS-X6582-2PA      | 3.6.0       | Enhanced FlexWAN Module;                                                                                                                                                    |
| WS-X6700-CFC      | 3.6.0       | Centralized Forwarding Card                                                                                                                                                 |
| WS-X6704-10GE     | 3.6.0       | 4-port 10-Gigabit Ethernet                                                                                                                                                  |
| WS-X6708-10GE     | 3.6.7       | CEF720 8 port 10GE with DFC Rev. 1.4                                                                                                                                        |
| WS-X6724-SFP      | 3.6.0       | 24-port Gigabit Ethernet SFP                                                                                                                                                |
| WS-X6748-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                                                                                                                         |
| WS-X6748-SFP      | 3.6.0       | 48-port Gigabit Ethernet SFP                                                                                                                                                |
| WS-X6816-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                                                                                                                               |
| WS-X6K-S1A-MSFC2  | 3.6.1       | Catalyst 6000 Supervisor Engine 1A, 2 Gigabit Ethernet, plus MSFC2 and policy feature card (PFC)                                                                            |
| WS-X6K-S2-MSFC2   | 3.6.1       | Catalyst 6500 Supervisor Engine-2, 2GE, plus MSFC-2 / PFC-2                                                                                                                 |
| WS-X6K-SUP2-2GE   | 3.6.1       | Supervisor 2 with 2 Gigabit Ethernet ports                                                                                                                                  |
| XENPAK-10GB-CX4   | 3.7         | 10GBASE-CX4 XENPAK transceiver module for CX4 cable, copper, InfiniBand 4X connector                                                                                        |
| XENPAK-10GB-ER    | 3.6.0       | 10GBASE-ER Serial 1550-nm extended-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)                                                                           |
| XENPAK-10GB-ER+   | 3.6.7       | 10GBase-ER transceiver module for SMF, 1550-nm wavelength ,duplex connector                                                                                                 |
| XENPAK-10GB-LR    | 3.6.7       | 10GBase-LR-XENPAK Module                                                                                                                                                    |
| XENPAK-10GB-LR+   | 3.6.1       | 10GBASE-LR XENPAK Module                                                                                                                                                    |
| XENPAK-10GB-LW    | 3.7         | Cisco 10GBASE-LW XENPAK Module for SMF                                                                                                                                      |
| XENPAK-10GB-SR    | 3.6.0       | 10GBASE-SR Serial 850-nm short-reach multimode fiber (MMF)                                                                                                                  |
| XFP-10GER-192IR+  | 3.6.6       | Cisco multirate XFP transceiver module for 10GBASE-ER Ethernet and OC-192/STM-64 intermediate-reach (IR-2) Packet-over-SONET/SDH (POS) applications, SMF, dual LC connector |
| XFP-10GLR-OC192SR | 3.6.4       | OC192 XFP Single Mode Long Reach 2 (80km)                                                                                                                                   |
| XFP-10GZR-OC192LR | 3.6.6       | Cisco multirate XFP transceiver module for 10GBASE-LR Ethernet and OC-192/STM-64 long-reach Packet-over-SONET/SDH (POS) applications, SMF, dual LC connector                |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 Support verified against XC Combo Cards in ANA 3.7.

## Cisco 7600 Series—Supported Technologies

The following technologies are supported by the Cisco 7600 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [ATM Cross Connect, page 5-155](#)
- [Additional Technologies, page 5-155](#)
- [DWDM, page 5-156](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [Clocking, page 5-158](#)
- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [VTP, page 5-162](#)
- [L2Channel, page 5-162](#)
- [MLPPP, page 5-163](#)
- [REP, page 5-164](#)
- [CFM, page 5-165](#)
- [SONET/SDH/T3 Path Channelization, page 5-166](#)
- [SyncE, page 5-167](#)



## Cisco 7600 Series—Supported Service Events

**Table 5-61**      *Supported Service Events for Cisco 7600 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | N         |
| Cloud Problem                                       | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| MPLS Black Hole                                     | 3.6.0       | N         |
| Layer 2 Tunnel Down                                 | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Adaptive Polling                                    | 3.6.0       | N         |
| BGP link down                                       | 3.6.0       | Y         |
| LDP neighbor loss                                   | 3.6.0       | Y         |
| MPLS interface removed                              | 3.6.0       | Y         |
| VSI Up/Down                                         | 3.6.7       | N         |
| VSI Admin Down                                      | 3.6.7       | N         |

**Table 5-61**      **Supported Service Events for Cisco 7600 Series—Cisco ANA Version 3.7 (continued)**

| <b>Event Name</b>                      | <b>ANA<br/>Version</b> | <b>Expedited</b> |
|----------------------------------------|------------------------|------------------|
| EFP Up/Down                            | 3.6.7                  | N                |
| EFP Admin Down                         | 3.6.7                  | N                |
| EFP down due to error disabled         | 3.6.7                  | N                |
| Vlan Tagged Interface Up/Down          | 3.6.7                  | N                |
| Vlan Tagged Interface AdminDown        | 3.6.7                  | N                |
| DS1 Path Port Down                     | 3.7                    | N                |
| DS1 Path Port Up                       | 3.7                    | N                |
| DS1 Path link down due to Admin down   | 3.7                    | N                |
| DS1 Path link down due to Oper down    | 3.7                    | N                |
| DS1 Path link Up                       | 3.7                    | N                |
| Sonet Path Port Down                   | 3.7                    | N                |
| Sonet Path Port Up                     | 3.7                    | N                |
| Sonet Path link down due to Admin down | 3.7                    | N                |
| Sonet Path link down due to Oper down  | 3.7                    | N                |
| Sonet Path link Up                     | 3.7                    | N                |
| MLPPP down due to Admin down           | 3.7                    | N                |
| MLPPP down due to Oper down            | 3.7                    | N                |
| MLPPP Up                               | 3.7                    | N                |
| Low priority IMA Down                  | 3.7                    | N                |
| Medium priority IMA Down               | 3.7                    | N                |
| High priority IMA Down                 | 3.7                    | N                |
| IMA Oper down                          | 3.7                    | N                |
| IMA Admin down                         | 3.7                    | N                |
| IMA Up                                 | 3.7                    | N                |
| Keepalive set                          | 3.7                    | N                |
| Keepalive not set                      | 3.7                    | N                |
| DS0 Bundle Admin down                  | 3.7                    | N                |
| DS0 Bundle Oper down                   | 3.7                    | N                |
| DS0 Bundle Up                          | 3.7                    | N                |
| CFM Domain Fault                       | 3.7                    | N                |

## Cisco 7600 Series—Supported Commands

**Table 5-62**      *Supported Commands for Cisco 7600 Series—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

## Cisco 10000 Series Routers

This section includes the following information about Cisco 10000 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 10000 Series Routers](#)):

- [Cisco 10000 Series—Supported Software Versions, page 5-74](#)
- [Cisco 10000 Series—Supported Topologies, page 5-74](#)
- [Cisco 10000 Series—Supported Modules, page 5-75](#)
- [Cisco 10000 Series—Supported Technologies, page 5-76](#)
- [Cisco 10000 Series—Supported Service Events, page 5-77](#)

## Cisco 10000 Series—Supported Software Versions

**Table 5-63** Supported Software Versions for Cisco 10000 Series—Cisco ANA Version 3.7

| Software Version | ANA Version         |
|------------------|---------------------|
| IOS 12.0(20)     | 3.6.1 <sup>1</sup>  |
| IOS 12.0(22)S5   | 3.5.2 <sup>2</sup>  |
| IOS 12.0(23)S    | 3.5.2 <sup>3</sup>  |
| IOS 12.0(23)S2   | 3.6.1 <sup>4</sup>  |
| IOS 12.1(10)E    | 3.5.2 <sup>5</sup>  |
| IOS 12.2(18.2)   | 3.5.2 <sup>6</sup>  |
| IOS 12.2(24)S    | 3.6.1 <sup>7</sup>  |
| IOS 12.2(24)S4   | 3.6.1 <sup>8</sup>  |
| IOS 12.2(28)SB3  | 3.6.2 <sup>9</sup>  |
| IOS 12.2(31)SB   | 3.6.1 <sup>10</sup> |
| IOS 12.2(33)SB1  | 3.6.7 <sup>11</sup> |
| IOS 12.3(7)XI7   | 3.6.1 <sup>12</sup> |

<sup>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12</sup>ANA models pluggable ports for this IOS version.

## Cisco 10000 Series—Supported Topologies

**Table 5-64** Supported Topologies for Cisco 10000 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |

## Cisco 10000 Series—Supported Modules

**Table 5-65**      *Supported Modules for Cisco 10000 Series—Cisco ANA Version 3.7*

| Module Name      | ANA Version | Module Description                                                 |
|------------------|-------------|--------------------------------------------------------------------|
| ESR-1COC12-SMI   | 3.6.1       | Cisco 10K 1 port channelized OC12                                  |
| ESR-1GE          | 3.6.0       | 1-port Gigabit Ethernet                                            |
| ESR-1OC-12/P-SMI | 3.6.0       | 1-port OC-12/STS-12c/STM-4 OS/SDH, single mode, intermediate reach |
| ESR-1OC-12-ATM   | 3.6.0       | 1-port OC-12 ATM                                                   |
| ESR-24CT1/E1     | 3.6.0       | 24-port channelized E1/T1                                          |
| ESR-4OC3-ATM-SM  | 3.6.0       | 4-port OC-3/STM-1 ATM, single mode                                 |
| ESR-4OC3-CHSTM1  | 3.6.7       | Four-port channelized STM-1/OC-3 SDH single mode line card         |
| ESR-6CT3         | 3.6.0       | 6-port channelized T3                                              |
| ESR-6OC3/P-SMI   | 3.6.0       | 6-port OC-3c/STS-3c/STM-1 POS/SDH, single mode, intermediate reach |
| ESR-8E3/DS3      | 3.6.2       | 8 port clear channel E3/DS3 Line Card                              |
| ESR-8E3DS3-ATM   | 3.6.7       | 8 Port Channelized E3/DS3 ATM line card                            |
| ESR-HH-1GE       | 3.6.0       | 1-port Gigabit Ethernet half-height                                |
| ESR-HH-4CT3      | 3.6.7       | 4 Port Channelized T3 Half-Height Line Card                        |
| ESR-HH-8FE-TX    | 3.6.0       | 8-port Fast Ethernet half-height                                   |
| ESR-PRE1         | 3.6.1       | Cisco 10K Performance Routing Engine-1                             |
| ESR-PRE2         | 3.6.1       | Cisco 10K Performance Routing Engine-2                             |
| ESR-PRE3         | 3.6.1       | Cisco 10K Performance Routing Engine-3                             |
| SPA-1XCHOC12/DSO | 3.7         | 1 port channelized OC12 to DS0 Shared Port Adapter                 |
| SPA-2XCHOC12/DSO | 3.7         | 2 port channelized OC12 to DS0 Shared Port Adapter                 |

## Cisco 10000 Series—Supported Technologies

The following technologies are supported by the Cisco 10000 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
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- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [MLPPP, page 5-163](#)
- [SONET/SDH/T3 Path Channelization, page 5-166](#)

## Cisco 10000 Series—Supported Service Events

**Table 5-66**      *Supported Service Events for Cisco 10000 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | N         |
| Cloud Problem                                       | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| MPLS Black Hole                                     | 3.6.0       | N         |
| Layer 2 Tunnel Down                                 | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |
| DS1 Path Port Down                                  | 3.7         | N         |
| DS1 Path Port Up                                    | 3.7         | N         |
| DS1 Path link down due to Admin down                | 3.7         | N         |

**Table 5-66** *Supported Service Events for Cisco 10000 Series—Cisco ANA Version 3.7 (continued)*

| Event Name                             | ANA Version | Expedited |
|----------------------------------------|-------------|-----------|
| DS1 Path link down due to Oper down    | 3.7         | N         |
| DS1 Path link Up                       | 3.7         | N         |
| Sonet Path Port Down                   | 3.7         | N         |
| Sonet Path Port Up                     | 3.7         | N         |
| Sonet Path link down due to Admin down | 3.7         | N         |
| Sonet Path link down due to Oper down  | 3.7         | N         |
| Sonet Path link Up                     | 3.7         | N         |
| MLPPP down due to Admin down           | 3.7         | N         |
| MLPPP down due to Oper down            | 3.7         | N         |
| MLPPP Up                               | 3.7         | N         |
| DS0 Bundle Admin down                  | 3.7         | N         |
| DS0 Bundle Oper down                   | 3.7         | N         |
| DS0 Bundle Up                          | 3.7         | N         |

## Cisco 12000 Series Routers

This section includes the following information about Cisco 12000 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco 12000 Series Routers](#)):

- [Cisco 12000 Series—Supported Software Versions](#), page 5-79
- [Cisco 12000 Series—Supported Topologies](#), page 5-80
- [Cisco 12000 Series—Supported Modules](#), page 5-80
- [Cisco 12000 Series—Supported Technologies](#), page 5-86
- [Cisco 12000 Series—Supported Service Events](#), page 5-87



## Cisco 12000 Series—Supported Software Versions

**Table 5-67**      *Supported Software Versions for Cisco 12000 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version         |
|------------------|---------------------|
| IOS 12.0(23)S3   | 3.6.0 <sup>1</sup>  |
| IOS 12.0(26)S    | 3.6.0 <sup>2</sup>  |
| IOS 12.0(26)S1   | 3.6.0 <sup>3</sup>  |
| IOS 12.0(26)S2   | 3.6.0 <sup>4</sup>  |
| IOS 12.0(26)S3   | 3.6.0 <sup>5</sup>  |
| IOS 12.0(26)S4   | 3.6.0 <sup>6</sup>  |
| IOS 12.0(26)S5   | 3.6.0 <sup>7</sup>  |
| IOS 12.0(26)S6   | 3.6.0 <sup>8</sup>  |
| IOS 12.0(27)     | 3.6.0 <sup>9</sup>  |
| IOS 12.0(28)     | 3.6.0 <sup>10</sup> |
| IOS 12.0(30)     | 3.6.0 <sup>11</sup> |
| IOS 12.0(31)S    | 3.6.0 <sup>12</sup> |
| IOS 12.0(31)S3   | 3.6.0 <sup>13</sup> |
| IOS 12.0(31)     | 3.6.0 <sup>14</sup> |
| IOS 12.0(32)     | 3.6.0 <sup>15</sup> |
| IOS 12.0(32)S10  | 3.6.3 <sup>16</sup> |
| IOS 12.0(32)SY   | 3.6.0 <sup>17</sup> |
| IOS 12.0(32)SY2  | 3.6.0 <sup>18</sup> |
| IOS 12.0(32)SY3  | 3.6.2 <sup>19</sup> |
| IOS 12.0(32)SY4  | 3.6.7 <sup>20</sup> |
| IOS 12.0(32)SY5  | 3.6.3 <sup>21</sup> |
| IOS 12.0(32)SY9  | 3.7 <sup>22</sup>   |
| IOS 12.0(33)S    | 3.6.3 <sup>23</sup> |
| IOS 12.0(33)S1   | 3.6.7 <sup>24</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 15, 18, 19, 20, 21, 22, 24<sup>1</sup>ANA models pluggable ports for this IOS version.

9, 10, 11, 14, 16, 17, 23<sup>2</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco 12000 Series—Supported Topologies

**Table 5-68** Supported Topologies for Cisco 12000 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| VPN (VRF)      | VPN            | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco 12000 Series—Supported Modules

**Table 5-69** Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description                                     |
|-----------------|-------------|--------------------------------------------------------|
| 12000/16-AC-PEM | 3.6.3       | Cisco 12000 16-slot Enhanced AC PEM                    |
| 12000/16-AC-PEM | 3.6.4       | GSR16 AC POWER SUPPLY                                  |
| 12000/16-AC-PEM | 3.6.4       | Cisco 12000 16-slot Enhanced AC PEM                    |
| 12000/16-AC-PEM | 3.6.4       | Cisco 12000 16-slot Enhanced DC PEM                    |
| 12000/16-DC-PEM | 3.6.3       | Cisco 12000 16-slot Enhanced DC PEM                    |
| 12000/4-BLOWER  | 3.6.2       | GSR 12404 Fan tray - cevFan12404FanTray7               |
| 12000/4-DC-PEM  | 3.6.4       | Cisco 12000 4-slot DC PEM                              |
| 12000/6-AC-PEM  | 3.6.4       | Cisco 12000 6-slot Enhanced AC PEM                     |
| 12000/6-DC-PEM  | 3.6.4       | Cisco 12000 6-slot Enhanced DC PEM                     |
| 12000-SIP-401   | 3.6.0       | Cisco 12000 Series SPA Interface Processor-401         |
| 12000-SIP-501   | 3.6.1       | Cisco 12000 Series SPA Interface Processor-501         |
| 12000-SIP-600   | 3.6.1       | Cisco 12000 Series SPA Interface Processor-600         |
| 12000-SIP-601   | 3.6.1       | Cisco 12000 Series SPA Interface Processor-601         |
| 12004E/20       | 3.6.3       | Cisco 12004/12404 Enhanced Collapsed Fabric/Alarm card |
| 12404E/80       | 3.6.3       | GSR 12404 Enhanced Clock Scheduler Card                |
| 12810-CSC       | 3.6.7       | 12810 Clock Scheduler Card                             |

**Table 5-69 Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name         | ANA Version | Module Description                                                                      |
|---------------------|-------------|-----------------------------------------------------------------------------------------|
| 12DS3-SMB           | 3.6.0       | 24 Port Copper DS3 Interface Line Card                                                  |
| 16OC3X/POS-M-MJ-B   | 3.6.1       | GSR16-Port OC3/POS MM/I Eng3 Release B                                                  |
| 16-OC3X/POS-IR-LC   | 3.6.0       | 16-Port Packet-Over-SONET OC-3/STM-1 with Extended Feature Set Line Card (concatenated) |
| 16OC3X/POS-IR-LC-B. | 3.6.1       | GSR 16-Port OC3/POS MM/I Eng3 Release B                                                 |
| 1X10GE-ER-SC        | 3.6.1       | 1 Port 10Giga Ethernet Line Card                                                        |
| 1X10GE-LR-SC        | 3.6.1       | 1 Port 10Giga Ethernet Line Card                                                        |
| 3GE-GBIC-SC         | 3.6.0       | 4 Port Gigabit Ethernet Line Card (trident)                                             |
| 4GE-SFP-LC          | 3.6.1       | 4 port-GE line card for Cisco 12000                                                     |
| 4OC12/POS-IR-SC-B   | 3.6.0       | Enhanced 4 port OC-12 Intermediate Reach Line Card                                      |
| 4OC12X/ATM-IR-SC    | 3.6.0       | GSR Edge Engine 48, ATM, 4 ports OC12/STM4 Single Mode Intermediate Reach Line Card     |
| 4OC12X/POS-I-SC-B   | 3.6.0       | 4 Port OC12 SM Intermediate Reach POS                                                   |
| 4OC12X/POS-M-SC-B   | 3.6.0       | 5 port (Quad) OC-12 POS Card, Single Mode, Short Reach                                  |
| 4OC3/ATM-IR-SC      | 3.6.1       | 4 port OC3/STM1 ATM line MM/IR card                                                     |
| 4OC3/ATM-MM-SC      | 3.6.1       | 4 port OC3/STM1 ATM line MM/IR card                                                     |
| 4OC3X/ATM-IR-SC     | 3.6.1       | 4-port OC3/STM1 ATM Single Mode, intermediate reach ISE Line Card with SC connector     |
| 4OC3X/POS-IR-LC-B   | 3.6.1       | GSR 4-port OC3/POS IR Eng3 release B                                                    |
| 4OC3X/POS-LR-LC-B   | 3.6.1       | GSR 4-port OC3/POS IR Eng3 release B                                                    |
| 4OC3X/POS-MM-MJ-B   | 3.6.1       | GSR 4-port OC3/POS IR Eng3 release B                                                    |
| 4OC48E/POS-LR-SC    | 3.6.0       | 5 Port (Quad) Enhanced OC-48 Long Reach FC Connector Line Card                          |
| 4OC48E/POS-SR-SC    | 3.6.0       | 5 Port (Quad) Enhanced OC-48 Short Reach SC Connector Line Card                         |
| 4XOC48POS/RPR       | 3.6.1       | 4-port OC48/STM16 POS/RPR Shared Port Adapter = SPA-4XOC48POS/RPR                       |
| 6CT3-SMB            | 3.6.0       | 18 Port Copper DS3 Interface Line Card                                                  |
| 8FE-FX-SC           | 3.6.0       | 8-Port Fast Ethernet Line Card                                                          |
| 8FE-TX-RJ45         | 3.6.0       | 8-Port Fast Ethernet Line Card                                                          |
| 8FE-TX-RJ45-B       | 3.6.1       | 8-port 100baseTX, RJ45 connector type, version B                                        |
| 8OC3X/POS-IR-LC-B   | 3.6.1       | GSR 8-Port OC3/POS MM/IR Eng3 Release B                                                 |
| 8OC3X/POS-MM-MJ-B   | 3.6.1       | GSR 8-Port OC3/POS MM/IR Eng3 Release B                                                 |
| 8X1FE-V2            | 3.6.1       | 8-port Fast Ethernet Shared Port Adapter V2 = SPA-8X1FE-V2                              |
| BUS_BOARD           | 3.6.1       | GSR16 BUS BOARD (16) =                                                                  |

**Table 5-69 Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name      | ANA Version | Module Description                                     |
|------------------|-------------|--------------------------------------------------------|
| CHOC12/DS1-IR-SC | 3.6.0       | Cisco 12000 Series 1-Port Channelized OC-12c/STM-4     |
| COPPER-12DS3     | 3.6.0       | 12 Port Copper DS3 Interface Line Card                 |
| COPPER-6DS3      | 3.6.0       | 6 Port Copper DS3 Interface Line Card                  |
| CRS-16-ALARM     | 3.6.1       | Cisco CRS-1 Series 16 Slots Alarm Board = CRS-16-ALARM |
| GSR10-AC-PDU     | 3.6.0       | Cisco 12410 AC Power Distribution Unit (spare)         |
| GSR10-ADVNCDCSC  | 3.6.1       | 12010 Advanced Clock Scheduler Card                    |
| GSR10-ADVNCDSFC  | 3.6.1       | 12010 Advanced Switch Fabric Card                      |
| GSR10-ALRM       | 3.6.1       | 12410, 12010 Alarm Card                                |
| GSR10-CSC        | 3.6.1       | 12410 Clock Scheduler Card                             |
| GSR10-SFC        | 3.6.1       | Cisco 12410 Switch Fabric Card                         |
| GSR16/320-CSC    | 3.6.1       | 12416 Clock Scheduler Card                             |
| GSR16/320-SFC    | 3.6.1       | 12416 Switch Fabric Card                               |
| GSR16/80-CSC     | 3.6.1       | Cisco 12016 80 Gbps GSR Scheduler/Fabric               |
| GSR16/80-SFC     | 3.6.1       | Cisco 12016 80 GbpsGSR Switch Fabric                   |
| GSR16-ALRM       | 3.6.0       | Cisco 12016 GSR Alarm Card                             |
| GSR16-BLOWER     | 3.6.1       | Cisco 12016, 12416 Blower                              |
| GSR-3GE          | 3.6.0       | 3 Port Gigabit Ethernet Line Card (trident)            |
| GSR4/80-AC       | 3.6.2       | GSR 12404 AC Power Supply - cevPowerSupply12404AC      |
| GSR6-ADVNCDCSC   | 3.6.1       | 12006 Advanced Clock Scheduler Card                    |
| GSR6-ALRM        | 3.6.1       | 12406, 12006 Alarm Card                                |
| GSR6-BLOWER      | 3.6.1       | 12406, 12006 Blower                                    |
| GSR6-CSC         | 3.6.1       | Cisco 12406 Clock Scheduler Card                       |
| GSR6-SFC         | 3.6.1       | Cisco 12406 Switch Fabric Card                         |
| GSR8-CSC/ALRM    | 3.6.1       | Cisco 12008 GSR Scheduler/Fabric/Alarm                 |
| GSR-8FE-FX       | 3.6.0       | 8 port Fast Ethernet card with Fiber Interface         |
| GSR8-SFC         | 3.6.1       | Switch Fabric                                          |
| GSR-ALARM10      | 3.6.0       | GSR Alarm module                                       |
| GSR-ALARM16      | 3.6.0       | GSR-Alarm                                              |
| GSR-ALARM6       | 3.6.0       | GSR Alarm module                                       |
| GSR-BUS-BOARD16  | 3.6.0       | GSR Bus Board for Power distribution                   |
| GSR-CLOCK-OC192  | 3.6.0       | GSR Clock Scheduler                                    |
| GSR-CSC          | 3.6.0       | GSR Clock Scheduler Card                               |
| GSR-CSC12410     | 3.6.0       | GSR 12410 Clock scheduler                              |

**Table 5-69**      **Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name                | ANA Version | Module Description                                                          |
|----------------------------|-------------|-----------------------------------------------------------------------------|
| GSR-CSC16                  | 3.6.0       | Scheduler/Fabric Card                                                       |
| GSR-CSC16-OC192            | 3.6.0       | GSR 12406 Clock Scheduler Card                                              |
| GSR-CSC16-OC192            | 3.6.0       | GSR 12016 OC192 Clock Scheduler Card                                        |
| GSR-CSC6                   | 3.6.0       | GSR Clock Scheduler                                                         |
| GSR-E48-ATM-4OC12-MM-SR-SC | 3.6.0       | GSR Edge Engine 48, ATM, 4 port OC12/STM4 Multi Mode Short Reach Line Card  |
| GSR-E48-POS-16OC3-SM-IR-LC | 3.6.0       | 16 Port OC3 SM Intermediate Reach POS                                       |
| GSR-E48-POS-OC48-SM-LR-SC  | 3.6.0       | GSR 12406 Switch Fabric Card                                                |
| GSR-E48-POS-OC48-SM-SR-SC  | 3.6.0       | GSR, Edge Engine 48 Port OC-48 SRP Single Mode Long Reach Line Card         |
| GSR-E48-POS-QOC12-SM-IR-SC | 3.6.0       | 4 Port OC12 SM Intermediate Reach POS                                       |
| GSR-E-OC192-SM-SR-SC       | 3.6.0       | Enhanced 1 Port OC 192 Short Reach 2 FC Connector Line Card.                |
| GSR-E-QOC48-SM-LR-SC       | 3.6.0       | 4 Port Enhanced OC 48 Short Reach SC Connector Line Card                    |
| GSR-E-QOC48-SM-SR-SC       | 3.6.0       | 4 Port Enhanced OC 48 Short Reach SC Connector Line Card                    |
| GSR-GEFE                   | 3.6.0       | GSR General Fan                                                             |
| GSR-PA-3GE                 | 3.6.0       | GSR 3 port Port Adapter                                                     |
| GSR-RP                     | 3.6.0       | GSR RoMman Recovery                                                         |
| GSR-SFC                    | 3.6.0       | GSR Switch Fabric Card                                                      |
| GSR-SFC12410               | 3.6.0       | GSR 12410 Switch Fabric Card                                                |
| GSR-SFC16                  | 3.6.0       | Switch Fabric Card                                                          |
| GSR-SFC16-OC192            | 3.6.0       | GSR 12406 Switch Fabric Card                                                |
| GSR-SFC6                   | 3.6.0       | GSR Switch Fabric Card                                                      |
| OC12/SRP-IR-SC-B           | 3.6.0       | 2 Port OC-12 Single Mode SRP Intermediate Reach Line Card                   |
| OC12/SRP-MM-SC-B           | 3.6.0       | 2 Port OC-12 Multi Mode SRP Line Card                                       |
| OC-48E/POS-SR-SC-B         | 3.6.0       | 2 Port Packet Over Sonet OC-48, Single Mode, Short Reach, SC Connector Card |
| OC48X/POS-LR-SC            | 3.6.0       | One-Port OC-48c/STM-16c POS/SDH ISE Line Card, Long Reach                   |
| OC48X/POS-SR-SC            | 3.6.0       | One-Port OC-48c/STM-16c POS/SDH ISE Line Card, Short Reach                  |
| POS-EN-OC48-LR-SC          | 3.6.0       | Enhanced OC-48 Long Reach SC Connector Line Card                            |

**Table 5-69 Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name           | ANA Version | Module Description                                                          |
|-----------------------|-------------|-----------------------------------------------------------------------------|
| POS-EN-OC48-SR-SC     | 3.6.0       | Enhanced OC-48 Short Reach SC Connector Line Card                           |
| POS-EN-QOC12-IR       | 3.6.0       | Enhanced 4 port OC-12 Intermediate Reach Line Card                          |
| POS-EN-QOC48-SM-LR-FC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Long Reach FC Connector Line Card              |
| POS-EN-QOC48-SM-LR-SC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Long Reach SC Connector Line Card              |
| POS-EN-QOC48-SM-SR-SC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Short Reach SC Connector Line Card             |
| POS-OC48-SM-SR-SC     | 3.6.0       | 1 Port Packet Over Sonet OC-48, Single Mode, Short Reach, SC Connector Card |
| POS-QOC12-MM-SR       | 3.6.0       | 4 port (Quad) OC-12 POS Card, Single Mode, Short Reach                      |
| PRP-1                 | 3.6.0       | Performance Route Processor-1                                               |
| PRP-2                 | 3.6.0       | Cisco XR 12000 and 12000 Series Performance Router Processor-2              |
| PRP-3                 | 3.6.0       | Performance Route Processor-3                                               |
| PRP-4                 | 3.6.0       | Cisco XR 12000 and 12000 Series Performance Router Processor-4              |
| SFP-GE-L              | 3.7         | 1000BASE-LH/LX pluggable transceiver                                        |
| SFP-GE-S              | 3.7         | 1000BASE-Sx Short wavelength gigabit ethernet SFP.                          |
| SFP-GE-T              | 3.7         | 1000BASE-T copper gigabit ethernet SFP.                                     |
| SFP-OC3-IR1           | 3.7         | Intermediate range, single-mode fiber                                       |
| SFP-OC48-IR1          | 3.6.1       | OC-48c/STM-16c                                                              |
| SFP-OC48-LR2          | 3.6.1       | OC-48c/STM-16c SFP, Long Reach (80km)                                       |
| SPA-10X1GE            | 3.6.1       | 10-port 1 GbE Shared Port Adapter                                           |
| SPA-1X10GE-L-V2       | 3.6.0       | Cisco 1-Port 10GE LAN-PHY Shared Port Adapter                               |
| SPA-1XCHOC48/DS3      | 3.6.2       | 1-Port Channelized STM-16/OC-48 SPA.                                        |
| SPA-1XCHSTM1/OC3      | 3.6.1       | 1-port Channelized STM-1/OC-3c to DS0 Shared Port Adapter.                  |
| SPA-1XOC12-ATM-V2     | 3.6.2       | 1-port OC12c SFP Optics ATM Shared Port Adapter                             |
| SPA-1XOC192POS-VSR    | 3.6.1       | 1-port OC192/STM64 POS VSR Optics Shared Port Adapter                       |
| SPA-1XOC3-ATM-V2      | 3.6.2       | 1-port OC3c SFP Optics ATM Shared Port Adapter                              |
| SPA-1XOC48POS/RPR     | 3.6.0       | Port OC-48c/STM-16c POS/RPR Shared Port Adapter                             |

**Table 5-69 Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                                               |
|--------------------|-------------|----------------------------------------------------------------------------------|
| SPA-1XTENGE-XFP    | 3.6.0       | 1-port 10Gigabit Ethernet Shared Port Adapter XFP based                          |
| SPA-1XTENGE-XFP-V2 | 3.6.0       | 1-port 10GbE Shared Port Adapter XFP based V2                                    |
| SPA-24CHT1-CE-ATM  | 3.6.1       | 24-Port Channelized T1/E1/J1 ATM CEoP SPA                                        |
| SPA-2CHT3-CE-ATM   | 3.6.2       | 2-port Channelized T3/E3 ATM + Circuit Emulation Shared Port Adapter             |
| SPA-2X1GE          | 3.6.0       | 2 ports Gigabit Ethernet Shared Port Adapters                                    |
| SPA-2X1GE-V2       | 3.6.1       | 2 ports Gigabit Ethernet Shared Port Adapters                                    |
| SPA-2XCT3/DS0      | 3.6.1       | 2-port Channelized T3 to DS0 Shared Port Adapter                                 |
| SPA-2XOC12-POS     | 3.6.0       | 2-Port OC-3c/STM-1 and OC-12c/STM-4 POS SPA                                      |
| SPA-2XOC48POS/RPR  | 3.6.0       | 2-port OC48/STM16 POS/RPR Shared Port Adapters                                   |
| SPA-2XT3/E3        | 3.6.1       | 2-port Clear Channel T3/E3 Shared Port Adapter                                   |
| SPA-3XOC3-ATM-V2   | 3.6.2       | 1-port OC3c SFP Optics ATM Shared Port Adapter                                   |
| SPA-4XCT3/DS0      | 3.6.0       | 4-port Channelized T3 to DS0 Shared Port Adapter                                 |
| SPA-4XOC12-POS     | 3.6.0       | 4-port OC-12/STM-4 POS Shared Port Adapters                                      |
| SPA-4XOC3-POS-V2   | 3.6.0       | 4-port OC-3c/STM1c POS Shared Port Adapter                                       |
| SPA-4XT3/E3        | 3.6.1       | 4-port Clear Channel T3/E3 Shared Port Adapter                                   |
| SPA-5X1GE          | 3.6.0       | 5-Port Gigabit Ethernet SPA                                                      |
| SPA-5X1GE-V2       | 3.6.0       | 5-Port Gigabit Ethernet SPA                                                      |
| SPA-8X1FE-TX-V2    | 3.6.0       | 8-port 10/100 Ethernet SPA TX (Fugu ASIC)                                        |
| SPA-8X1GE          | 3.6.0       | 8-port Gigabit Ethernet Shared Port Adapter_V2                                   |
| SPA-8X1GE-V2       | 3.6.2       | 8-port 1GbE SPA (Fugu ASIC)                                                      |
| SPA-8XCHT1/E1      | 3.6.1       | 8-port Channelized T1/E1 to DS0 Shared Port Adapter                              |
| SPA-8XFE-TX        | 3.6.0       | 8-port 10/100 Ethernet SPA with RJ-45                                            |
| SPA-8XOC12-POS     | 3.6.0       | 8-Port OC-12c/STM-4 Multirate POS SPA                                            |
| SPA-OC192POS-LR    | 3.6.0       | 1-port OC192/STM64 POS/RPR SMLR Optics                                           |
| SPA-OC192POS-VSR   | 3.6.1       | 1-port OC192/STM64 POS/RPR VSR Optics                                            |
| SPA-OC192POS-XFP   | 3.6.0       | 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter with XFP-10GLR-OC192SR |
| SPA-OC192RPR-XFP   | 3.6.0       | 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter = SPA-OC192RPR-XFP     |
| SRP-OC12-MM        | 3.6.0       | 1 Port OC-12 Multi Mode SRP Line Card                                            |
| SRP-OC12-SM-IR     | 3.6.0       | 1 Port OC-12 Single Mode SRP Intermediate Reach Line Card                        |
| SSRP-OC48-SM-LR    | 3.6.0       | 1 Port OC-48 SRP Single Mode Long Reach Line Card                                |

**Table 5-69**      **Supported Modules for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name     | ANA Version | Module Description                                             |
|-----------------|-------------|----------------------------------------------------------------|
| SSRP-OC48-SM-SR | 3.6.0       | 1 Port OC-48 SRP Single Mode Short Reach Line Card             |
| XR-PRP-2        | 3.6.1       | Cisco XR 12000 and 12000 Series Performance Router Processor-2 |

## Cisco 12000 Series—Supported Technologies

The following technologies are supported by the Cisco 12000 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
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- [Local Switching, page 5-157](#)
- [Carrier Ethernet, page 5-160](#)
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- [Discovery Protocol, page 5-161](#)
- [MLPPP, page 5-163](#)
- [SONET/SDH/T3 Path Channelization, page 5-166](#)



## Cisco 12000 Series—Supported Service Events

**Table 5-70**      *Supported Service Events for Cisco 12000 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | N         |
| Cloud Problem                                       | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| MPLS Black Hole                                     | 3.6.0       | N         |
| Layer 2 Tunnel Down                                 | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |
| DS1 Path Port Down                                  | 3.7         | N         |
| DS1 Path Port Up                                    | 3.7         | N         |
| DS1 Path link down due to Admin down                | 3.7         | N         |

**Table 5-70**      **Supported Service Events for Cisco 12000 Series—Cisco ANA Version 3.7 (continued)**

| Event Name                             | ANA Version | Expedited |
|----------------------------------------|-------------|-----------|
| DS1 Path link down due to Oper down    | 3.7         | N         |
| DS1 Path link Up                       | 3.7         | N         |
| Sonet Path Port Down                   | 3.7         | N         |
| Sonet Path Port Up                     | 3.7         | N         |
| Sonet Path link down due to Admin down | 3.7         | N         |
| Sonet Path link down due to Oper down  | 3.7         | N         |
| Sonet Path link Up                     | 3.7         | N         |
| MLPPP down due to Admin down           | 3.7         | N         |
| MLPPP down due to Oper down            | 3.7         | N         |
| MLPPP Up                               | 3.7         | N         |

## Cisco XR 12000 Series Routers

This section includes the following information about Cisco XR 12000 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco XR 12000 Series Routers](#)):

- [Cisco XR 12000 Series—Supported Software Versions, page 5-89](#)
- [Cisco XR 12000 Series—Supported Topologies, page 5-89](#)
- [Cisco XR 12000 Series—Supported Modules, page 5-90](#)
- [Cisco XR 12000 Series—Supported Technologies, page 5-96](#)
- [Cisco XR 12000 Series—Supported Service Events, page 5-97](#)
- [Cisco XR 12000 Series—Additional Information, page 5-99](#)

## Cisco XR 12000 Series—Supported Software Versions

**Table 5-71**      *Supported Software Versions for Cisco XR 12000 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version         |
|------------------|---------------------|
| IOX 3.4.0        | 3.6.0 <sup>1</sup>  |
| IOX 3.4.1        | 3.6.0 <sup>2</sup>  |
| IOX 3.4.3        | 3.6.3 <sup>3</sup>  |
| IOX 3.5.0        | 3.6.1 <sup>4</sup>  |
| IOX 3.5.1        | 3.6.1 <sup>5</sup>  |
| IOX 3.6.0        | 3.6.3 <sup>6</sup>  |
| IOX 3.6.1        | 3.6.3 <sup>7</sup>  |
| IOX 3.6.2        | 3.6.5 <sup>8</sup>  |
| IOX 3.6.3        | 3.6.7 <sup>9</sup>  |
| IOX 3.7.0        | 3.6.4 <sup>10</sup> |
| IOX 3.7.1        | 3.6.4 <sup>11</sup> |
| IOX 3.8.0        | 3.6.6 <sup>12</sup> |
| IOX 3.8.1        | 3.6.7 <sup>13</sup> |
| IOX 3.8.2        | 3.7 <sup>14</sup>   |
| IOX 3.9.0        | 3.7 <sup>15</sup>   |

<sup>1, 2, 3, 4, 5, 8, 9, 10, 11, 13, 14, 15</sup> ANA models pluggable ports for this IOS version.

<sup>6, 7, 12</sup> ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco XR 12000 Series—Supported Topologies

**Table 5-72**      *Supported Topologies for Cisco XR 12000 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PWE3 (Martini) | Tunnel         | 3.6.0       |
| VPN (VRF)      | VPN            | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco XR 12000 Series—Supported Modules

**Table 5-73**      *Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7*

| Module Name        | ANA Version | Module Description                                                                      |
|--------------------|-------------|-----------------------------------------------------------------------------------------|
| 12000/16-AC-PEM    | 3.6.4       | Cisco 12000 16-slot Enhanced AC PEM                                                     |
| 12000/16-DC-PEM    | 3.6.4       | Cisco 12000 16-slot Enhanced DC PEM                                                     |
| 12000/4-BLOWER     | 3.6.2       | GSR 12404 Fan tray - cevFan12404FanTray7                                                |
| 12000/4-DC-PEM     | 3.6.4       | Cisco 12000 4-slot DC PEM                                                               |
| 12000/6-AC-PEM     | 3.6.4       | Cisco 12000 6-slot Enhanced AC PEM                                                      |
| 12000/6-DC-PEM     | 3.6.4       | Cisco 12000 6-slot Enhanced DC PEM                                                      |
| 12000-SIP-401      | 3.6.0       | Cisco 12000 Series SPA Interface Processor-401                                          |
| 12000-SIP-501      | 3.6.0       | Cisco 12000 Series SPA Interface Processor-501                                          |
| 12000-SIP-600      | 3.6.0       | Cisco 12000 Series SPA Interface Processor-600                                          |
| 12000-SIP-601      | 3.6.0       | Cisco 12000 Series SPA Interface Processor-601                                          |
| 12810-CSC          | 3.6.7       | 12810 Clock Scheduler Card                                                              |
| 12810-SFC          | 3.6.5       | GSR 12810 Switch Fabric Card                                                            |
| 12816-SFC          | 3.6.4       | GSR 12816 Switch Fabric Card                                                            |
| 12DS3-SMB          | 3.6.0       | 24 Port Copper DS3 Interface Line Card                                                  |
| 16OC3X/POS-I-LC-B  | 3.6.0       | GSR16-Port OC3/POS MM/I Eng3 Release B                                                  |
| 16-OC3X/POS-IR-LC  | 3.6.0       | 16-Port Packet-Over-SONET OC-3/STM-1 with Extended Feature Set Line Card (concatenated) |
| 16OC3X/POS-IR-LC-B | 3.6.0       | GSR 16-Port OC3/POS MM/I Eng3 Release B = 16OC3X/POS-IR-LC-B                            |
| 16OC3X/POS-M-MJ-B  | 3.6.0       | GSR16-Port OC3/POS MM/I Eng3 Release B                                                  |
| 1X10GE-ER-SC       | 3.6.1       | 1 Port 10Giga Ethernet Line Card                                                        |
| 1X10GE-LR-SC       | 3.6.1       | 1 Port 10Giga Ethernet Line Card                                                        |
| 3GE-GBIC-SC        | 3.6.0       | 4 Port Gigabit Ethernet Line Card (trident)                                             |
| 4GE-SFP-LC         | 3.6.0       | 4 port-GE line card for Cisco 12000                                                     |
| 4OC12/POS-IR-SC-B  | 3.6.0       | Enhanced 4 port OC-12 Intermediate Reach Line Card                                      |
| 4OC12X/ATM-IR-SC   | 3.6.0       | 4-port OC12/STM4 ATM SM-IR ISE LC with SC connector                                     |
| 4OC12X/ATM-MM-SC   | 3.6.0       | 4-port OC12/STM4 ATM MM ISE LC with SC connector                                        |
| 4OC12X/POS-I-SC-B  | 3.6.0       | 4 Port OC12 SM Intermediate Reach POS                                                   |
| 4OC12X/POS-M-SC-B  | 3.6.0       | 5 port (Quad) OC-12 POS Card, Single Mode, Short Reach                                  |
| 4OC3/ATM-IR-SC     | 3.6.0       | 4 port OC3/STM1 ATM line MM/IR card                                                     |
| 4OC3/ATM-MM-SC     | 3.6.0       | 4 port OC3/STM1 ATM line MM/IR card                                                     |

**Table 5-73**      **Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                                  |
|-------------------|-------------|-------------------------------------------------------------------------------------|
| 4OC3X/ATM-IR-SC   | 3.6.1       | 4-port OC3/STM1 ATM Single Mode, intermediate reach ISE Line Card with SC connector |
| 4OC3X/POS-IR-LC-B | 3.6.0       | GSR 4-port OC3/POS IR Eng3 release B                                                |
| 4OC3X/POS-LR-LC-B | 3.6.0       | GSR 4-port OC3/POS IR Eng3 release B                                                |
| 4OC3X/POS-MM-MJ-B | 3.6.0       | GSR 4-port OC3/POS IR Eng3 release B                                                |
| 4OC48E/POS-LR-SC  | 3.6.0       | 5 Port (Quad) Enhanced OC-48 Long Reach FC Connector Line Card                      |
| 4OC48E/POS-SR-SC  | 3.6.0       | 5 Port (Quad) Enhanced OC-48 Short Reach SC Connector Line Card                     |
| 4XOC48POS/RPR     | 3.6.0       | 4-port OC48/STM16 POS/RPR Shared Port Adapter = SPA-4XOC48POS/RPR                   |
| 6CT3-SMB          | 3.6.0       | 18 Port Copper DS3 Interface Line Card                                              |
| 8FE-FX-SC         | 3.6.0       | 8-Port Fast Ethernet Line Card                                                      |
| 8FE-TX-RJ45       | 3.6.0       | 8-Port Fast Ethernet Line Card                                                      |
| 8FE-TX-RJ45-B     | 3.6.1       | 8-port 100baseTX, RJ45 connector type, version B                                    |
| 8OC3X/POS-IR-LC-B | 3.6.0       | GSR 8-Port OC3/POS MM/IR Eng3 Release B                                             |
| 8OC3X/POS-MM-MJ-B | 3.6.0       | GSR 8-Port OC3/POS MM/IR Eng3 Release B                                             |
| 8X1FE-V2          | 3.6.0       | 8-port Fast Ethernet Shared Port Adapter V2 = SPA-8X1FE-V2                          |
| BUS_BOARD         | 3.6.0       | GSR16 BUS BOARD (16) =                                                              |
| CHOC12/DS1-IR-SC  | 3.6.0       | Cisco 12000 Series 1-Port Channelized OC-12c/STM-4                                  |
| COPPER-12DS3      | 3.6.0       | 12 Port Copper DS3 Interface Line Card                                              |
| COPPER-6DS3       | 3.6.0       | 6 Port Copper DS3 Interface Line Card                                               |
| CRS-16-ALARM      | 3.6.0       | Cisco CRS-1 Series 16 Slots Alarm Board = CRS-16-ALARM                              |
| EPA-GE/FE         | 3.6.0       | GSR General Fan                                                                     |
| GSR10-AC-PDU      | 3.6.0       | Cisco 12410 AC Power Distribution Unit (spare)                                      |
| GSR10-ADVNCDCSC   | 3.6.0       | 12010 Advanced Clock Scheduler Card                                                 |
| GSR10-ADVNCDSFC   | 3.6.0       | 12010 Advanced Switch Fabric Card                                                   |
| GSR10-ALRM        | 3.6.0       | 12410, 12010 Alarm Card                                                             |
| GSR10-CSC         | 3.6.0       | 12410 Clock Scheduler Card                                                          |
| GSR10-SFC         | 3.6.0       | Cisco 12410 Switch Fabric Card                                                      |
| GSR16/320-CSC     | 3.6.0       | 12416 Clock Scheduler Card                                                          |
| GSR16/320-SFC     | 3.6.0       | 12416 Switch Fabric Card                                                            |
| GSR16/80-CSC      | 3.6.0       | Cisco 12016 80 Gbps GSR Scheduler/Fabric                                            |
| GSR16/80-SFC      | 3.6.0       | Cisco 12016 80 GbpsGSR Switch Fabric                                                |

**Table 5-73 Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name                | ANA Version | Module Description                                                                  |
|----------------------------|-------------|-------------------------------------------------------------------------------------|
| GSR16-ALRM                 | 3.6.0       | Cisco 12016 GSR Alarm Card                                                          |
| GSR16-BLOWER               | 3.6.0       | Cisco 12016, 12416 Blower                                                           |
| GSR-3GE                    | 3.6.0       | 3 Port Gigabit Ethernet Line Card (trident)                                         |
| GSR4/80-AC                 | 3.6.2       | GSR 12404 AC Power Supply - cevPowerSupply12404AC                                   |
| GSR6-ADVNCDCSC             | 3.6.0       | 12006 Advanced Clock Scheduler Card                                                 |
| GSR6-ALRM                  | 3.6.0       | 12406, 12006 Alarm Card                                                             |
| GSR6-BLOWER                | 3.6.0       | 12406, 12006 Blower                                                                 |
| GSR6-CSC                   | 3.6.0       | Cisco 12406 Clock Scheduler Card                                                    |
| GSR6-SFC                   | 3.6.0       | Cisco 12406 Switch Fabric Card                                                      |
| GSR8-CSC/ALRM              | 3.6.0       | Cisco 12008 GSR Scheduler/Fabric/Alarm                                              |
| GSR-8FE-FX                 | 3.6.0       | 8 port Fast Ethernet card with Fiber Interface                                      |
| GSR8-SFC                   | 3.6.0       | Switch Fabric                                                                       |
| GSR-ALARM10                | 3.6.0       | GSR Alarm module                                                                    |
| GSR-ALARM16                | 3.6.0       | GSR-Alarm                                                                           |
| GSR-BUS-BOARD16            | 3.6.0       | GSR Bus Board for Power distribution                                                |
| GSR-CLOCK-OC192            | 3.6.0       | GSR Clock Scheduler                                                                 |
| GSR-CSC                    | 3.6.0       | GSR Clock Scheduler Card                                                            |
| GSR-CSC12410               | 3.6.0       | GSR 12410 Clock scheduler                                                           |
| GSR-CSC16                  | 3.6.0       | GSR Clock Scheduler                                                                 |
| GSR-CSC16-OC192            | 3.6.0       | GSR 12406 Clock Scheduler Card                                                      |
| GSR-E48-ATM-4OC12-MM-SR-SC | 3.6.0       | GSR Edge Engine 48, ATM, 4 port OC12/STM4Multi Mode Short Reach Line Card           |
| GSR-E48-ATM-4OC12-SM-IR-SC | 3.6.0       | GSR Edge Engine 48, ATM, 4 ports OC12/STM4 Single Mode Intermediate Reach Line Card |
| GSR-E48-POS-16OC3-SM-IR-LC | 3.6.0       | 16 Port OC3 SM Intermediate Reach POS                                               |
| GSR-E48-POS-OC48-SM-LR-SC  | 3.6.0       | GSR 12406 Switch Fabric Card                                                        |
| GSR-E48-POS-OC48-SM-SR-SC  | 3.6.0       | GSR, Edge Engine 48 Port OC-48 SRP Single Mode Long Reach Line Card                 |
| GSR-E48-POS-QOC12-SM-IR-SC | 3.6.0       | 4 Port OC12 SM Intermediate Reach POS                                               |
| GSR-E-OC192-SM-SR-SC       | 3.6.0       | Enhanced 1 Port OC 192 Short Reach 2 FC Connector Line Card.                        |
| GSR-E-QOC48-SM-LR-SC       | 3.6.0       | 4 Port Enhanced OC 48 Short Reach SC Connector Line Card                            |

**Table 5-73**      **Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name           | ANA Version | Module Description                                                          |
|-----------------------|-------------|-----------------------------------------------------------------------------|
| GSR-E-QOC48-SM-SR-SC  | 3.6.0       | 4 Port Enhanced OC 48 Short Reach SC Connector Line Card                    |
| GSR-PA-3GE            | 3.6.0       | GSR 3 port Port Adapter                                                     |
| GSR-RP                | 3.6.0       | GSR RoMman Recovery                                                         |
| GSR-SFC               | 3.6.0       | GSR Switch Fabric Card                                                      |
| GSR-SFC12410          | 3.6.0       | GSR 12410 Switch Fabric Card                                                |
| GSR-SFC16             | 3.6.0       | Switch Fabric Card                                                          |
| GSR-SFC16-OC192       | 3.6.0       | GSR 12406 Switch Fabric Card                                                |
| OC12/SRP-IR-SC-B      | 3.6.0       | 2 Port OC-12 Single Mode SRP Intermediate Reach Line Card                   |
| OC12/SRP-MM-SC-B      | 3.6.0       | 2 Port OC-12 Multi Mode SRP Line Card                                       |
| OC-48E/POS-SR-SC-B    | 3.6.0       | 2 Port Packet Over Sonet OC-48, Single Mode, Short Reach, SC Connector Card |
| OC48X/POS-LR-SC       | 3.6.0       | One-Port OC-48c/STM-16c POS/SDH ISE Line Card, Long Reach                   |
| OC48X/POS-SR-SC       | 3.6.0       | One-Port OC-48c/STM-16c POS/SDH ISE Line Card, Short Reach                  |
| POS-EN-OC48-LR-SC     | 3.6.0       | Enhanced OC-48 Long Reach SC Connector Line Card                            |
| POS-EN-OC48-SR-SC     | 3.6.0       | Enhanced OC-48 Short Reach SC Connector Line Card                           |
| POS-EN-QOC12-IR       | 3.6.0       | Enhanced 4 port OC-12 Intermediate Reach Line Card                          |
| POS-EN-QOC48-SM-LR-FC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Long Reach FC Connector Line Card              |
| POS-EN-QOC48-SM-LR-SC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Long Reach SC Connector Line Card              |
| POS-EN-QOC48-SM-SR-SC | 3.6.0       | 4 Port (Quad) Enhanced OC-48 Short Reach SC Connector Line Card             |
| POS-OC48-SM-SR-SC     | 3.6.0       | 1 Port Packet Over Sonet OC-48, Single Mode, Short Reach, SC Connector Card |
| POS-QOC12-MM-SR       | 3.6.0       | 4 port (Quad) OC-12 POS Card, Single Mode, Short Reach                      |
| PRP-1                 | 3.6.0       | Performance Route Processor-1                                               |
| PRP-2                 | 3.6.0       | Cisco XR 12000 and 12000 Series Performance Router Processor-2              |
| PRP-3                 | 3.6.6       | Cisco XR 12000 and 12000 Series Performance Router Processor-3              |
| PRP-4                 | 3.6.0       | Cisco XR 12000 and 12000 Series Performance Router Processor-4              |

**Table 5-73 Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                                   |
|--------------------|-------------|----------------------------------------------------------------------|
| SFP-GE-L           | 3.6.7       | 1000BASE-LH/LX pluggable transceiver                                 |
| SFP-GE-S           | 3.6.7       | 1000BASE-Sx Short wavelength gigabit ethernet SFP.                   |
| SFP-GE-Z           | 3.6.7       | 1000BASE-Zx Extended reach gigabit ethernet SFP.                     |
| SFP-OC48-IR1       | 3.6.1       | OC-48c/STM-16c                                                       |
| SFP-OC48-LR2       | 3.6.1       | OC-48c/STM-16c SFP, Long Reach (80km)                                |
| SPA-10X1GE         | 3.6.0       | 10-port 1 GbE Shared Port Adapter                                    |
| SPA-10X1GE-V2      | 3.6.2       | 10-port 1GbE SPA (Fugu ASIC)                                         |
| SPA-1X10GE-L-V2    | 3.6.0       | Cisco 1-Port 10GE LAN-PHY Shared Port Adapter                        |
| SPA-1XCHOC12/DS0   | 3.6.7       | 1-port OC12 Channelized DS0 line card                                |
| SPA-1XCHOC48/DS3   | 3.6.2       | 1-Port Channelized STM-16/OC-48 SPA.                                 |
| SPA-1XCHSTM1/OC3   | 3.6.1       | 1-port Channelized STM-1/OC-3c to DS0 Shared Port Adapter.           |
| SPA-1XOC12-ATM-V2  | 3.6.2       | 1-port OC12c SFP Optics ATM Shared Port Adapter                      |
| SPA-1XOC192POS-VSR | 3.6.0       | 1-port OC192/STM64 POS VSR Optics Shared Port Adapter                |
| SPA-1XOC3-ATM-V2   | 3.6.2       | 1-port OC3c SFP Optics ATM Shared Port Adapter                       |
| SPA-1XOC48POS/RPR  | 3.6.0       | Port OC-48c/STM-16c POS/RPR Shared Port Adapter                      |
| SPA-1XTENGE-XFP    | 3.6.0       | 1-port 10Gigabit Ethernet Shared Port Adapter XFP based              |
| SPA-1XTENGE-XFP-V2 | 3.6.0       | 1-port 10GbE Shared Port Adapter XFP based V2                        |
| SPA-2CHT3-CE-ATM   | 3.6.2       | 2-port Channelized T3/E3 ATM + Circuit Emulation Shared Port Adapter |
| SPA-2X1GE          | 3.6.0       | 2 ports Gigabit Ethernet Shared Port Adapters                        |
| SPA-2X1GE-V2       | 3.6.1       | 2 ports Gigabit Ethernet Shared Port Adapters                        |
| SPA-2XCT3/DS0      | 3.6.1       | 2-port Channelized T3 to DS0 Shared Port Adapter                     |
| SPA-2XOC12-POS     | 3.6.0       | 2-Port OC-3c/STM-1 and OC-12c/STM-4 POS SPA                          |
| SPA-2XOC48POS/RPR  | 3.6.0       | 2-port OC48/STM16 POS/RPR Shared Port Adapters                       |
| SPA-2XT3/E3        | 3.6.1       | 2-port Clear Channel T3/E3 Shared Port Adapter                       |
| SPA-3XOC3-ATM-V2   | 3.6.4       | 3-port OC3c SFP Optics ATM Shared Port Adapter                       |
| SPA-4XCT3/DS0      | 3.6.0       | 4-port Channelized T3 to DS0 Shared Port Adapter                     |
| SPA-4XOC12-POS     | 3.6.0       | 4-port OC-12/STM-4 POS Shared Port Adapters                          |
| SPA-4XOC3-POS-V2   | 3.6.3       | 4-Port OC-3c/STM-1 POS SPA                                           |
| SPA-4XT3/E3        | 3.6.1       | 4-port Clear Channel T3/E3 Shared Port Adapter                       |
| SPA-5X1GE          | 3.6.0       | 5-Port Gigabit Ethernet SPA                                          |
| SPA-5X1GE-V2       | 3.6.0       | 5-Port Gigabit Ethernet SPA                                          |



**Table 5-73**      **Supported Modules for Cisco XR 12000 Series—Cisco ANA Version 3.7 (continued)**

| <b>Module Name</b> | <b>ANA Version</b> | <b>Module Description</b>                                                        |
|--------------------|--------------------|----------------------------------------------------------------------------------|
| SPA-8X1FE-TX-V2    | 3.6.0              | 8-port 10/100 Ethernet SPA TX (Fugu ASIC)                                        |
| SPA-8X1GE          | 3.6.0              | 8-port Gigabit Ethernet Shared Port Adapter_V2                                   |
| SPA-8XCHT1/E1      | 3.6.1              | 8-port Channelized T1/E1 to DS0 Shared Port Adapter                              |
| SPA-8XFE-TX        | 3.6.0              | 8-port 10/100 Ethernet SPA with RJ-45                                            |
| SPA-8XOC12-POS     | 3.6.0              | 8-Port OC-12c/STM-4 Multirate POS SPA                                            |
| SPA-IPSEC-2G-2     | 3.6.1              | Cisco XR 12000 Series IPsec VPN Shared Port Adapter                              |
| SPA-OC192POS-LR    | 3.6.0              | 1-port OC192/STM64 POS/RPR SMLR Optics                                           |
| SPA-OC192POS-VSR   | 3.6.0              | 1-port OC192/STM64 POS/RPR VSR Optics                                            |
| SPA-OC192POS-XFP   | 3.6.0              | 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter with XFP-10GLR-OC192SR |
| SPA-OC192RPR-XFP   | 3.6.0              | 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter = SPA-OC192RPR-XFP     |
| SRP-OC12-MM        | 3.6.0              | 1 Port OC-12 Multi Mode SRP Line Card                                            |
| SRP-OC12-SM-IR     | 3.6.0              | 1 Port OC-12 Single Mode SRP Intermediate Reach Line Card                        |
| SSRP-OC48-SM-LR    | 3.6.0              | 1 Port OC-48 SRP Single Mode Long Reach Line Card                                |
| SSRP-OC48-SM-SR    | 3.6.0              | 1 Port OC-48 SRP Single Mode Short Reach Line Card                               |
| XR-PRP-2           | 3.6.1              | Cisco XR 12000 and 12000 Series Performance Router Processor-2                   |

## Cisco XR 12000 Series—Supported Technologies

The following technologies are supported by the Cisco XR 12000 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [ATM Cross Connect, page 5-155](#)
- [Additional Technologies, page 5-155](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [MLPPP, page 5-163](#)
- [SONET/SDH/T3 Path Channelization, page 5-166](#)

## Cisco XR 12000 Series—Supported Service Events

**Table 5-74**      *Supported Service Events for Cisco XR 12000 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited      |
|-----------------------------------------------------|-------------|----------------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y              |
| Interface Status Down/Up                            | 3.6.0       | Y              |
| Card In/Out                                         | 3.6.0       | Y              |
| Link Down/Up                                        | 3.6.0       | Y              |
| Device Unreachable                                  | 3.6.0       | N              |
| CPU Over Utilized                                   | 3.6.0       | N              |
| Memory Over Utilized                                | 3.6.0       | N              |
| Device Unsupported                                  | 3.6.0       | N              |
| Discard Packets                                     | 3.6.0       | N              |
| Dropped Packets                                     | 3.6.0       | N              |
| Module Unsupported                                  | 3.6.0       | N              |
| Port Flapping                                       | 3.6.0       | N              |
| Port Down                                           | 3.6.0       | Y              |
| Rx Over Utilized                                    | 3.6.0       | N              |
| Tx Over Utilized                                    | 3.6.0       | N              |
| VPN Leak                                            | 3.6.0       | N              |
| Cloud Problem                                       | 3.6.0       | N              |
| Broken LSP Discovered                               | 3.6.0       | N              |
| MPLS Black Hole                                     | 3.6.0       | N              |
| Layer 2 Tunnel Down                                 | 3.6.0       | N              |
| BGP Neighbor Down                                   | 3.6.0       | N              |
| BGP Process Down/Up                                 | 3.6.3       | N <sup>1</sup> |
| Card Up/Down                                        | 3.6.0       | Y              |
| Adaptive Polling                                    | 3.6.0       | N              |
| BGP link down                                       | 3.6.1       | Y              |
| LDP neighbor loss                                   | 3.6.3       | Y              |
| MPLS interface removed                              | 3.6.1       | Y              |
| Layer 2 cross connect down                          | 3.6.0       | N <sup>2</sup> |
| VSI Up/Down                                         | 3.6.7       | N              |
| VSI Admin Down                                      | 3.6.7       | N              |
| EFP Up/Down                                         | 3.6.7       | N              |
| EFP Admin Down                                      | 3.6.7       | N              |

**Table 5-74**      **Supported Service Events for Cisco XR 12000 Series—Cisco ANA Version 3.7**

| <b>Event Name</b>                      | <b>ANA<br/>Version</b> | <b>Expedited</b> |
|----------------------------------------|------------------------|------------------|
| EFP down due to error disabled         | 3.6.7                  | N                |
| Vlan Tagged Interface Up/Down          | 3.6.7                  | N                |
| Vlan Tagged Interface AdminDown        | 3.6.7                  | N                |
| DS1 Path Port Down                     | 3.7                    | N                |
| DS1 Path Port Up                       | 3.7                    | N                |
| DS1 Path link down due to Admin down   | 3.7                    | N                |
| DS1 Path link down due to Oper down    | 3.7                    | N                |
| DS1 Path link Up                       | 3.7                    | N                |
| Sonet Path Port Down                   | 3.7                    | N                |
| Sonet Path Port Up                     | 3.7                    | N                |
| Sonet Path link down due to Admin down | 3.7                    | N                |
| Sonet Path link down due to Oper down  | 3.7                    | N                |
| Sonet Path link Up                     | 3.7                    | N                |
| MLPPP down due to Admin down           | 3.7                    | N                |
| MLPPP down due to Oper down            | 3.7                    | N                |
| MLPPP Up                               | 3.7                    | N                |
| DS0 Bundle Admin down                  | 3.7                    | N                |

<sup>1</sup>Indicates removal of the BGP configuration, not that the BGP process has crashed.<sup>2</sup>Expedited indirectly through port, link, and card events.

## Cisco XR 12000 Series—Additional Information

This section contains additional information about the Cisco Carrier Routing System (CRS-1) and includes the following topics:

- [Cisco XR 12000 Series Prerequisite](#), page 5-99
- [SDR Support for XR 12000 Series](#), page 5-99

### Cisco XR 12000 Series Prerequisite

As a prerequisite for the Cisco XR 12000 Series VNE, install the Cisco IOS XR Manageability Package on top of the IOS-XR version. In addition, the device configuration must contain the command, **xml agent tty**.

When creating the SNMP community, the SystemOwner should be specified.

### SDR Support for XR 12000 Series

Secure Domain Router (SDR) is supported as a separate, independent VNE, with its own IP and login sequence. When adding an SDR to Cisco ANA, it is treated like any other network element, that is, it is added as a new VNE using Cisco ANA Manage. The SDR IP address is attached to the active RP of the SDR (or to its virtual IP, if it exists).

As a prerequisite for the XR 12000 Series VNE:

1. Install the Cisco IOS XR Manageability Package on top of the IOS-XR version.
2. Add the command `xml agent tty` to the device configuration.
3. Define the IP address, `snmp read community` and telnet login sequence. When adding the telnet login sequence, add the user as an admin user (`username@admin`).

Cisco ANA uses the management network (if available) to manage the devices. The XR 12000 Series platform assigns specific management interfaces on the RP modules. In order to retrieve the IP address of these management interfaces, login to the device and run the command `show ipv4 interface brief | include Mgmt` as shown in the following example:

```
RP/0/4/CPU0:12kXR#show ipv4 interface brief | include Mgmt
MgmtEth0/RP1/CPU0/0 1.60.34.104 Up Up
MgmtEth0/4/CPU0/0 unassigned Shutdown Down
MgmtEth0/4/CPU1/0 unassigned Shutdown Down
```

In multiple RP environments, there is an option to configure a virtual management interface and assign an IP address to it, so that the device is reachable via the same IP address no matter which RP is active. In this environment, each RP has its own IP address but it is not used in order to access the device. In order to get the virtual IP address, login to the device and run the command `show running-config ipv4 virtual address` as shown in the example:

```
RP/0/4/CPU0:12kXR#show running-config ipv4 virtual address
ipv4 virtual address 10.52.123.11 255.255.255.0
```

If the SDR is managed in-band the management IP address should be supplied by the customer. The owner SDR (namely, the main router) presents all the modules that are installed on the chassis, excluding the ports that belong to other SDRs. The VNE of the SDR displays the modules that are associated with both the owner SDR and itself. However, it does not display the ports under the modules of the owner SDR in the Inventory window of Cisco ANA NetworkVision.

# Cisco CRS-1 Carrier Routing System

This section includes the following information about Cisco CRS-1 routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco CRS-1 Carrier Routing System](#)):

- [Cisco CRS-1—Supported Software Versions](#), page 5-100
- [Cisco CRS-1—Supported Topologies](#), page 5-101
- [Cisco CRS-1—Supported Modules](#), page 5-101
- [Cisco CRS-1—Supported Technologies](#), page 5-106
- [Cisco CRS-1—Supported Service Events](#), page 5-107
- [Cisco CRS-1—Additional Information](#), page 5-108

## Cisco CRS-1—Supported Software Versions

**Table 5-75**      *Supported Software Versions for Cisco CRS-1—Cisco ANA Version 3.7*

| Software Version | ANA Version         |
|------------------|---------------------|
| IOX 3.4.0        | 3.6.0 <sup>1</sup>  |
| IOX 3.4.1        | 3.6.0 <sup>2</sup>  |
| IOX 3.4.3        | 3.6.3 <sup>3</sup>  |
| IOX 3.5.1        | 3.6.1 <sup>4</sup>  |
| IOX 3.6.0        | 3.6.3 <sup>5</sup>  |
| IOX 3.6.1        | 3.6.3 <sup>6</sup>  |
| IOX 3.6.2        | 3.6.4 <sup>7</sup>  |
| IOX 3.6.3        | 3.6.7 <sup>8</sup>  |
| IOX 3.7.0        | 3.6.4 <sup>9</sup>  |
| IOX 3.7.1        | 3.6.4 <sup>10</sup> |
| IOX 3.8.0        | 3.6.6 <sup>11</sup> |
| IOX 3.8.1        | 3.6.7 <sup>12</sup> |
| IOX 3.8.2        | 3.7 <sup>13</sup>   |
| IOX 3.9.0        | 3.7 <sup>14</sup>   |

<sup>1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14</sup> ANA models pluggable ports for this IOS version.

<sup>5, 11</sup> ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco CRS-1—Supported Topologies

**Table 5-76** Supported Topologies for Cisco CRS-1—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PPP/HDLC       | PPP or HDLC    | 3.6.0       |
| PWE3 (Martini) | Tunnel         | 3.6.2       |
| VPN (VRF)      | VPN            | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco CRS-1—Supported Modules

**Table 5-77** Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description                                          |
|-----------------|-------------|-------------------------------------------------------------|
| 16OC48-POS/DPT  | 3.6.0       | Cisco CRS-1 Series 16xOC48/STM16 POS/DPT Interface Module   |
| 1OC768-DPSK/C   | 3.6.6       | Cisco CRS-1 1xOC768 DPSK+ (C-band) DWDM PLIM                |
| 1OC768-DPSK/C-E | 3.6.2       | 1-Port OC-768/STM-256c (C-band) DPSK DWDM PLIM              |
| 1OC768-DPSK/C-O | 3.6.2       | 1-Port OC-768/STM-256c (C-band) DPSK DWDM PLIM              |
| 1OC768-ITU/C    | 3.6.0       | 1 port OC768-POS-DWDM Plim                                  |
| 1OC768-POS-SR   | 3.6.1       | 1-port OC-768c/STM-256c PLIM, with short-reach optics (POS) |
| 20-1GE-FLEX     | 3.6.7       | Cisco CRS-1 Series 20x1GE Flexible Interface Module         |
| 2-10GE-WL-FLEX  | 3.6.7       | Cisco CRS-1 Series 2x10GE WAN/LAN Flexible Interface Module |
| 4-10GE          | 3.6.7       | Cisco-CRS1 series 4x10GE interface module                   |
| 4-10GE-ITU/C    | 3.6.0       | Module Crs1 4x10 Ge CDwdm Plim                              |
| 42-1GE          | 3.6.7       | Cisco CRS-1 Series 42x1GE Interface Module                  |
| 4OC192-ITU/C    | 3.6.1       | Module Crs 1 4 ports OC192 C Dwdm Plim                      |
| 4OC192-POS/DPT  | 3.6.0       | Cisco CRS-1 Series 4xOC192/STM64 POS/DPT Interface Module   |

**Table 5-77 Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                           |
|--------------------|-------------|--------------------------------------------------------------|
| 4OC192-POS/DPT-IR  | 3.6.0       | Cisco CRS-1 Series 4xOC192/STM64 POS/DPT Interface Module/IR |
| 4OC192-POS/DPT-LR  | 3.6.0       | 4OC192-POS DPT                                               |
| 4OC192-POS/DPT-SR  | 3.6.0       | Cisco CRS-1 Series 4xOC192/STM64 POS/DPT Interface Module/SR |
| 4OC192-POS/DPT-VS  | 3.6.0       | 4OC192-POS DPT                                               |
| 8-10GBE            | 3.6.0       | 8x10 Gigabite Ethernet port                                  |
| 8XOC3-OC12-PO      | 3.6.0       | SPA POS 8XOC12 Card                                          |
| CRS-16-AC-RECT     | 3.6.1       | Cisco CRS-1 Series AC Pwr Rectifier for 16 slot LCC and FCC  |
| CRS-16-ALARM       | 3.6.0       | Cisco CRS-1 Series 16 Slots Alarm                            |
| CRS-16-ALARM-C     | 3.7         | Cisco CRS-1 Series 16 Slots Modular Power System Alarm Board |
| CRS-16-DC-PEM      | 3.6.1       | DC power entry module for line card chassis                  |
| CRS-16-DC-PEM=     | 3.6.4       | Cisco CRS-1 Series DC PEM for 16 slot LCC and FCC            |
| CRS-16-FC/D        | 3.6.1       | Cisco CRS-1 Series 16 Slots Fabric Card/Dual                 |
| CRS-16-FC/M        | 3.6.0       | Cisco CRS-1 Series 16 Slots Fabric Card / Multi              |
| CRS-16-FC/S        | 3.6.0       | Cisco CRS-1 Series 16 Slots Fabric Card Single               |
| CRS-16FCC-PSH-AC   | 3.7         | Cisco CRS-1 Series Modular AC Power Shelf for FCC            |
| CRS-16FCC-PSH-DC   | 3.7         | Cisco CRS-1 Series Modular DC Power Shelf for FCC            |
| CRS-16-LCC         | 3.6.0       | 16 slots Line Card Chassis                                   |
| CRS-16-LCC-FAN-CT  | 3.6.0       | Cisco CRS-1 Series LC Chassis Fan Controlder                 |
| CRS-16-LCC-FAN-TR  | 3.6.1       | Cisco CRS-1 16 Slots FCC fan tray with fans                  |
| CRS-16-LCC-PS-ACD  | 3.6.1       | AC Delta power shelf for line card chassis                   |
| CRS-16-LCC-PS-ACD= | 3.6.4       | Cisco CRS-1 Series AC Delta Power Shelf for 16 Slots LCC     |
| CRS-16-LCC-PS-ACW  | 3.6.1       | AC Wye power shelf for line card chassis                     |
| CRS-16-LCC-PS-ACW= | 3.6.4       | Cisco CRS-1 Series AC Wye Power Shelf for 16 Slots LCC       |
| CRS-16-LCC-PS-DC   | 3.6.1       | DC power shelf for line card chassis                         |
| CRS-16-LCC-PS-DC=  | 3.6.4       | Cisco CRS-1 Series DC Power Shelf for 16 Slots LCC           |
| CRS-16LCC-PSH-AC   | 3.7         | Cisco CRS-1 Series Modular AC Power Shelf for 16 Slots LCC   |
| CRS-16LCC-PSH-DC   | 3.7         | Cisco CRS-1 Series Modular DC Power Shelf for 16 Slots LCC   |



**Table 5-77 Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                          |
|-------------------|-------------|-------------------------------------------------------------|
| CRS-16-RP         | 3.6.0       | Module Crs1 16 slots RP                                     |
| CRS-16-RP-B       | 3.6.0       | Module Crs1 16 slots RP - B                                 |
| CRS1-SIP-800      | 3.6.0       | Module Crs1 SPA Interface Card                              |
| CRS-4-AC-SHELF    | 3.6.1       | Cisco CRS-1 Series AC Power Shelf for CRS-4                 |
| CRS-4-AC-SUPPLY   | 3.6.1       | AC power supplies                                           |
| CRS-4-CH          | 3.6.0       | 4 slots Chassis                                             |
| CRS-4-DC-INPUT    | 3.6.1       | Cisco CRS-1 Series 4 Slot DC Input Shelf                    |
| CRS-4-DC-PIM      | 3.6.4       | Cisco CRS-1 Series 4 Slot DC Power Input Module             |
| CRS-4-DC-SUPPLY   | 3.6.1       | DC power supplies                                           |
| CRS-4-FAN-TR      | 3.6.1       | Cisco CRS-1 4 Slots FCC fan tray with fans                  |
| CRS-4-FC          | 3.6.1       | CRS-1 4-Slot Fabric Card                                    |
| CRS-4-LCC         | 3.6.0       | Cisco CRS-1 Series 4 Slots Line Card Chassis                |
| CRS-8-AC-RECT     | 3.6.1       | Cisco CRS-1 Series AC Pwr Rectifier for 8 slot LCC          |
| CRS-8-DC-PEM      | 3.6.1       | Cisco CRS-1 Series DC Power Entry Module for 8 slot LCC     |
| CRS-8-FC/M        | 3.6.1       | Cisco CRS-1 Series 8 Slots Fabric Card/Multi                |
| CRS-8-FC/S        | 3.6.0       | Cisco CRS-1 Series 8 Slots Fabric Card Single               |
| CRS-8-LCC         | 3.6.0       | 8 slots Line Card Chassis                                   |
| CRS-8-LCC-ACD     | 3.6.1       | Power Supply Crs 1 8 Slots AC Delta                         |
| CRS-8-LCC-ACW     | 3.6.1       | Power Supply Crs 1 8 Slots ACW                              |
| CRS-8-LCC-DC      | 3.6.1       | Cisco CRS-1 Series 8 slots with redundant DC power          |
| CRS-8-LCC-FAN-TR  | 3.6.1       | Cisco CRS-1 8 Slots FCC fan tray with fans                  |
| CRS-8-LCC-PDU-ACD | 3.6.1       | Cisco CRS-1 Series AC Delta PDU for CRS-8 LCC               |
| CRS-8-LCC-PDU-ACW | 3.6.1       | AC Wye PDU                                                  |
| CRS-8-LCC-PDU-DC  | 3.6.1       | Cisco CRS-1 Series DC PDU for CRS-8 LCC                     |
| CRS-8-PSH-AC      | 3.7         | Cisco CRS-1 Series Modular AC Power Shelf for 8 Slots LCC   |
| CRS-8-PSH-DC      | 3.7         | Cisco CRS-1 Series Modular DC Power Shelf for 8 Slots LCC   |
| CRS-8-RP          | 3.6.0       | Module Crs1 8 slots RP                                      |
| CRS-DRP           | 3.6.0       | Cisco CRS-1 Series Distributed Route Processor              |
| CRS-DRP-B-CPU     | 3.6.0       | Cisco CRS-1 Series Distributed Route Processor              |
| CRS-DRP-B-PLIM    | 3.6.0       | Cisco CRS-1 Series Distributed Route Processor Front Accsry |
| CRS-DRP-CPU       | 3.6.0       | Cisco CRS-1 Series Distributed Route Processor              |
| CRS-DRP-PLIM      | 3.6.0       | Cisco CRS-1 Series Distributed Route Processor Front Accsry |

**Table 5-77 Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                                                                                  |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------------------|
| CRS-FCC            | 3.6.0       | Cisco CRS-1 Series Fabric Card Chassis Only                                                                         |
| CRS-FCC-FAN-TR     | 3.6.1       | Cisco CRS-1 FCC fan tray with fans                                                                                  |
| CRS-FCC-LED        | 3.6.1       | Fiber module LED card                                                                                               |
| CRS-FCC-OIM-1S     | 3.6.1       | Optical single interface module (OIM)                                                                               |
| CRS-FCC-OIM-2S     | 3.6.1       | Optical dual interface module (OIM)                                                                                 |
| CRS-FCC-PS-ACD     | 3.6.1       | CRS-1 Fabric Chassis AC Delta Power Supply                                                                          |
| CRS-FCC-PS-ACW     | 3.6.1       | CRS-1 Fabric Chassis AC Wye Option                                                                                  |
| CRS-FCC-PS-DC      | 3.6.1       | DC power shelf                                                                                                      |
| CRS-FCC-SC/GEW     | 3.6.1       | Module Crs 1 Fcc SC Ge                                                                                              |
| CRS-FCC-SC-22GE    | 3.6.1       | CRS-1 fan controllers                                                                                               |
| CRS-FCC-SC-GE      | 3.6.1       | 2-port Shelf controller Gigabit Ethernet                                                                            |
| CRS-FCC-SFC        | 3.6.1       | Switch fabric card (fabric card chassis) S2 switch fabric cards                                                     |
| CRS-FP40           | 3.6.7       | Cisco CRS-1 Series Forwarding Processor 40G                                                                         |
| CRS-MSC            | 3.6.0       | Cisco CRS-1 Series Modular Service Card                                                                             |
| CRS-MSC-20G-B      | 3.6.0       | Cisco CRS-1 Series Modular Service Card B - 20G licenses                                                            |
| CRS-MSC-40G-B      | 3.6.0       | Cisco CRS-1 Series Modular Service Card B - 40G licenses                                                            |
| CRS-MSC-B          | 3.6.0       | Cisco CRS-1 Series Modular Service Card                                                                             |
| CRS-PM-AC          | 3.7         | Cisco CRS-1 Series AC Power Module 2100W                                                                            |
| CRS-PM-DC          | 3.7         | Cisco CRS-1 Series DC Power Module 2100W                                                                            |
| CRS-XENPAK-10GB-LR | 3.6.0       | Cisco CRS-1 Series 8x10GbE Interface Module                                                                         |
| OC192/POS-IR-SC    | 3.6.2       | GSR 1 port Packet Over SONET OC-48c/STM-16 Single Mode Intermediate Reach with SC connector                         |
| SFP-GE-S           | 3.6.7       | 1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, extended operating temperature range and DOM support |
| SFP-GE-T           | 3.6.7       | 1000BASE-TX SFP (DOM), MMF, 550/220m                                                                                |
| SFP-GE-Z           | 3.6.7       | 1000BASE-ZX SFP transceiver module SMF, 1550-nm wavelength, extended operating temperature range and DOM support    |
| SPA-10X1GE         | 3.6.1       | 10-Port Gigabit Ethernet SPA                                                                                        |
| SPA-10X1GE-V2      | 3.6.1       | 10-Port Gigabit Ethernet SPA                                                                                        |
| SPA-1X10GE-L-V2    | 3.6.1       | Cisco 1-Port 10GE LAN-PHY Shared Port Adapter                                                                       |
| SPA-1X10GE-WL-V2   | 3.6.7       | 1-port 10 Gigabit Ethernet Wanphy Shared Port Adapter V2                                                            |
| SPA-1XCHOC12/DS0   | 3.6.2       | 1 port channelized OC12 to DS0 Shared Port Adapter                                                                  |

**Table 5-77 Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7 (continued)**

| Module Name        | ANA Version | Module Description                                                 |
|--------------------|-------------|--------------------------------------------------------------------|
| SPA-1XOC12-ATM-V2  | 3.6.4       | 1-port OC12c SFP Optics ATM Shared Port Adapter                    |
| SPA-1XOC192POS-VSR | 3.6.0       | 1-port OC192/STM64 POS VSR Optics Shared Port Adapter              |
| SPA-1XOC192POS-XFP | 3.6.0       | 1-port OC192/STM64 POS XFP Optics Shared Port Adapter              |
| SPA-1XOC3-ATM-V2   | 3.6.7       | Cisco 1-Port OC3c/STM1c ATM Shared Port Adapter                    |
| SPA-1XOC48POS/RPR  | 3.6.1       | Port OC-48c/STM-16c POS/RPR Shared Port Adapter                    |
| SPA-1XTENGE-XFP    | 3.6.1       | 1-port 10 Gigabit Ethernet Shared Port Adapter XFP based           |
| SPA-1XTENGE-XFP-V2 | 3.6.0       | 1-port 10GbE Shared Port Adapter XFP based V2 = SPA-1XTENGE-XFP-V2 |
| SPA-2X1GE          | 3.6.1       | 2 ports Gigabit Ethernet Shared Port Adapters                      |
| SPA-2X1GE-V2       | 3.6.1       | 2 ports Gigabit Ethernet Shared Port Adapters                      |
| SPA-2XCT3/DS0      | 3.6.1       | 2-Port Channelized T3 SPA                                          |
| SPA-2XOC12-POS     | 3.6.1       | 2-Port OC-3c/STM-1 and OC-12c/STM-4 POS SPA                        |
| SPA-2XOC48POS/RPR  | 3.6.1       | 3 Ports OC-48c/STM-16c POS/RPR Shared Port Adapter                 |
| SPA-2XT3/E3        | 3.6.1       | 2-Port T3/E3 Serial SPA                                            |
| SPA-3XOC3-ATM-V2   | 3.6.4       | 3-port OC3c SFP Optics ATM Shared Port Adapter                     |
| SPA-4XOC12-POS     | 3.6.1       | 4-Port OC-3c/STM-1 and OC-12c/STM-4 POS SPA                        |
| SPA-4XOC3-POS      | 3.6.0       | 4-Port OC-3c/STM-1 POS SPA                                         |
| SPA-4XOC3-POS-V2   | 3.6.0       | 4-Port OC-3c/STM-1 POS SPA                                         |
| SPA-4XOC48POS/RPR  | 3.6.1       | Port OC-48c/STM-16c POS/RPR Shared Port Adapter                    |
| SPA-4XT3/E3        | 3.6.1       | 4-Port T3/E3 Serial SPA                                            |
| SPA-5X1GE          | 3.6.1       | 5-Port Gigabit Ethernet SPA                                        |
| SPA-5X1GE-V2       | 3.6.1       | 5-Port Gigabit Ethernet SPA                                        |
| SPA-8X1GE          | 3.6.0       | 8-port Gigabit Ethernet Shared Port Adapter                        |
| SPA-8X1GE-V2       | 3.6.1       | 8-port Gigabit Ethernet Shared Port Adapter                        |
| SPA-8XCHT1/E1      | 3.6.1       | 8-Port Channelized T1/E1 SPA                                       |
| SPA-8XOC12-POS     | 3.6.1       | 8-Port OC-12c/STM-4 Multirate POS SPA                              |
| SPA-8XOC3-POS      | 3.6.0       | 8-Port OC-3c/STM-1 POS SPA                                         |
| SPA-OC192POS-LR    | 3.6.1       | 1-PORT OC-192C/STM-64C POS/RPR SHARED PORT ADAPTER                 |
| SPA-OC192POS-VSR   | 3.6.1       | 1-PORT OC-192C/STM-64C POS/RPR SHARED PORT ADAPTER                 |
| SPA-OC192POS-XFP   | 3.6.0       | 1-port OC192/STM64 POS/RPR XFP Optics                              |

**Table 5-77**      **Supported Modules for Cisco CRS-1—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                               |
|-------------------|-------------|--------------------------------------------------|
| XFP-10GER-192IR+  | 3.6.7       | Multirate XFP module for 10GBASE-IR and OC192 IR |
| XFP-10GER-OC192IR | 3.6.7       | Multirate XFP module for 10GBASE-IR and OC192 IR |
| XFP-10GZR-OC192LR | 3.6.7       | Multirate XFP module for 10GBASE-LR and OC192 LR |

## Cisco CRS-1—Supported Technologies

The following technologies are supported by the Cisco CRS-1 in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Additional Technologies, page 5-155](#)
- [DWDM, page 5-156](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)

## Cisco CRS-1—Supported Service Events

**Table 5-78**      *Supported Service Events for Cisco CRS-1—Cisco ANA Version 3.7*

| Event Name                                          | ANA<br>Version | Expedited      |
|-----------------------------------------------------|----------------|----------------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0          | Y              |
| Interface Status Down/Up                            | 3.6.0          | Y              |
| Card In/Out                                         | 3.6.0          | Y              |
| Link Down/Up                                        | 3.6.0          | Y              |
| Device Unreachable                                  | 3.6.0          | N              |
| CPU Over Utilized                                   | 3.6.0          | N              |
| Memory Over Utilized                                | 3.6.0          | N              |
| Device Unsupported                                  | 3.6.0          | N              |
| Discard Packets                                     | 3.6.0          | N              |
| Dropped Packets                                     | 3.6.0          | N              |
| Module Unsupported                                  | 3.6.0          | N              |
| Port Flapping                                       | 3.6.0          | N              |
| Port Down                                           | 3.6.0          | Y              |
| Rx Over Utilized                                    | 3.6.0          | N              |
| Tx Over Utilized                                    | 3.6.0          | N              |
| VPN Leak                                            | 3.6.0          | N              |
| Cloud Problem                                       | 3.6.0          | N              |
| Broken LSP Discovered                               | 3.6.0          | N              |
| MPLS Black Hole                                     | 3.6.0          | N              |
| Layer 2 Tunnel Down                                 | 3.6.0          | N              |
| BGP Neighbor Down                                   | 3.6.0          | N              |
| BGP Process Down/Up                                 | 3.6.3          | N <sup>1</sup> |
| Card Up/Down                                        | 3.6.0          | Y              |
| BGP link down                                       | 3.6.1          | Y              |
| LDP neighbor loss                                   | 3.6.3          | Y              |
| MPLS interface removed                              | 3.6.0          | Y              |
| Layer 2 cross connect down                          | 3.6.0          | N <sup>2</sup> |
| EFP Up/Down                                         | 3.6.7          | N              |
| EFP Admin Down                                      | 3.6.7          | N              |
| EFP down due to error disabled                      | 3.6.7          | N              |
| Vlan Tagged Interface Up/Down                       | 3.6.7          | N              |
| Vlan Tagged Interface AdminDown                     | 3.6.7          | N              |

<sup>1</sup>Indicates removal of the BGP configuration, not that the BGP process has crashed.

<sup>2</sup>Expedited indirectly, though port, link and card events.

## Cisco CRS-1—Additional Information

This section contains additional information about the Cisco Carrier Routing System (CRS-1) and includes the following topics:

- [Cisco Carrier Routing System \(CRS-1\) Prerequisite, page 5-108](#)
- [SDR Support for CRS-1, page 5-108](#)
- [Multichassis Support for CRS-1, page 5-109](#)

### Cisco Carrier Routing System (CRS-1) Prerequisite

As a prerequisite for the CRS-1 VNE, install the Cisco IOS XR Manageability Package on top of the IOS-XR version. In addition, the device configuration must contain the command, **xml agent tty**.

When creating the SNMP community, the SystemOwner should be specified.

### SDR Support for CRS-1

Secure Domain Router (SDR) is supported as a separate, independent VNE, with its own IP and login sequence. When adding an SDR to Cisco ANA, it is treated like any other network element, that is, it is added as a new VNE using Cisco ANA Manage. The SDR IP address is attached to the active DRP of the SDR (or to its virtual IP, if it exists).

As a prerequisite for the CRS-1 VNE:

1. Install the Cisco IOS XR Manageability Package on top of the IOS-XR version (XR 3.4 and 3.4.1).
2. Add the command `xml agent tty` to the device configuration
3. When creating the SNMP community string, specify the SystemOwner (for SDRs, specify the SDROwner; LROwner on XR 3.5.x and below).
4. Define the IP address, snmp read community and telnet login sequence. When adding the telnet login sequence, add the user as an admin user (`username@admin`, e.g. `cisco@admin`).

Cisco ANA uses the management network (if available) to manage the devices. The CRS platform assigns specific management interfaces on the RP modules (DRP for an SDR). In order to retrieve the IP address of these management interfaces, login to the device and run the command `show ipv4 interface brief | include Mgmt` as shown in the following example:

```
RP/0/RP1/CPU0:P1_CRS8#show ipv4 interface brief | include Mgmt
MgmtEth0/RP1/CPU0/0      1.60.34.104      Up                Up
MgmtEth0/4/CPU0/0        unassigned       Shutdown         Down
MgmtEth0/4/CPU1/0        unassigned       Shutdown         Down
```

In multiple (D)RP environments, there is an option to configure a virtual management interface and assign an IP address to it, so that the device is reachable via the same IP address no matter which (D)RP is active. In this environment, each (D)RP has its own IP address but it is not used in order to access the device. In order to get the virtual IP address, login to the device and run the command `show running-config ipv4 virtual address` as shown in the example:

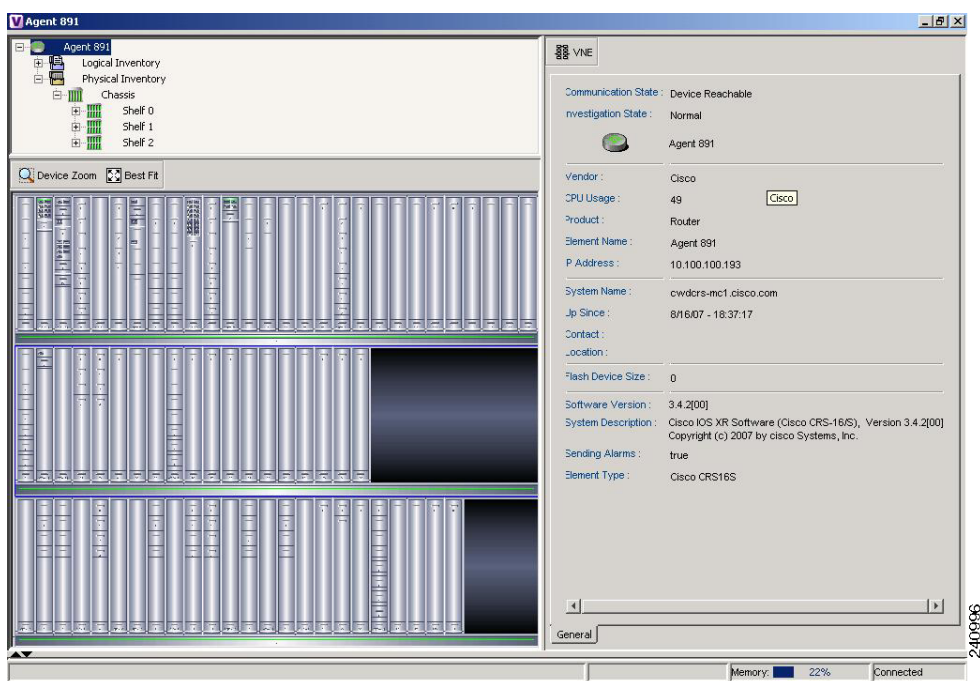
```
DRP/0/3/CPU0:CRS-PE1#show running-config ipv4 virtual address
ipv4 virtual address 10.52.123.11 255.255.255.0
```

If the SDR is managed in-band the management IP address should be supplied by the customer. The owner SDR (namely, the main router) presents all the modules that are installed on the chassis, excluding the ports that belong to other SDRs. The VNE of the SDR only displays the modules that are associated with the SDR in the Inventory window of Cisco ANA NetworkVision. It does not display the fabric, fan and power supply (namely, the shared modules).

## Multichassis Support for CRS-1

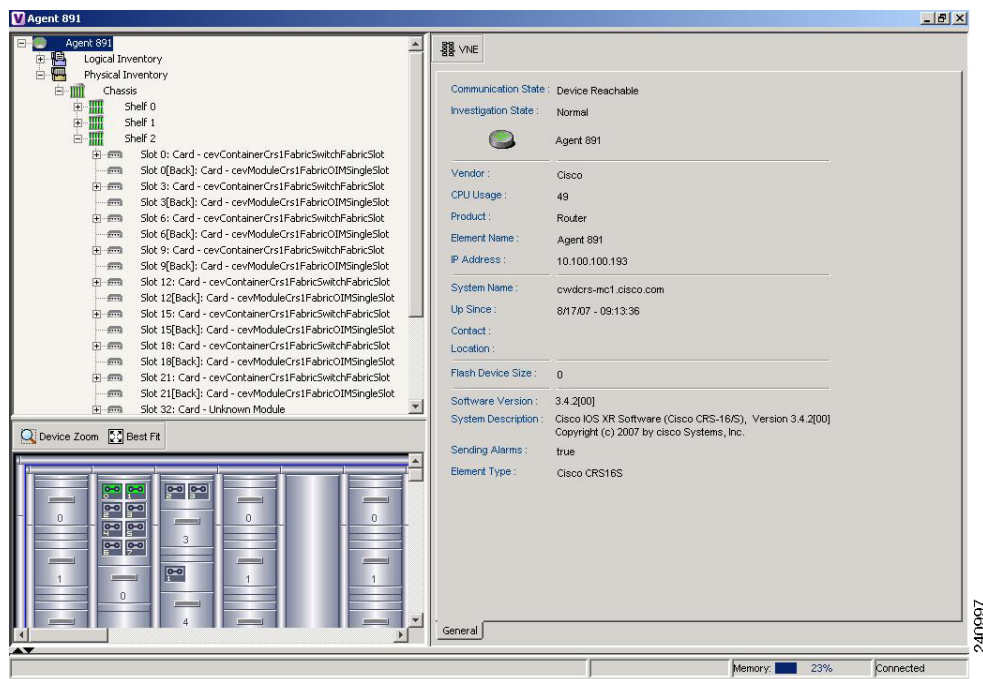
Multichassis support is available in Cisco ANA for 16-slot CRS-1 devices. As shown in [Figure 1](#), the chassis functions purely as a container for the shelves, which are treated as individual chassis and are numbered incrementally starting with 0.

**Figure 1** CRS-1 Multichassis Support



As shown in Figure 2, expanding a shelf displays the modules that are installed on that shelf.

**Figure 2** CRS-1 Multichassis Support—Expanded View

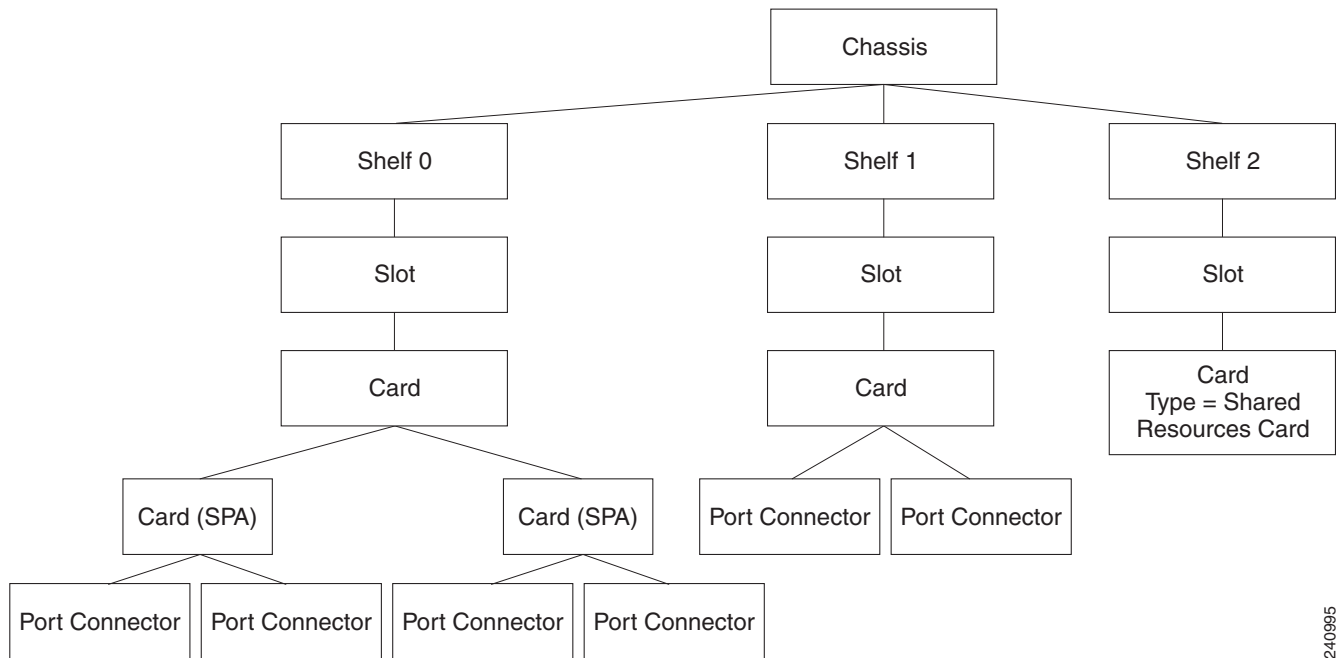


Because each shelf is treated as a chassis, chassis parameters such as description, serial number, status, and type are displayed for each shelf, not for the actual chassis in which the shelves are installed.



Figure 3 describes the physical model for the CRS-1 multichassis.

**Figure 3** *CRS-1 Multichassis Physical Model*



When adding a multichassis device to Cisco ANA, it is treated like any other network element, namely, it is added as a new VNE using Cisco ANA Manage.

# Cisco ASR 1000 Series Routers

This section includes the following information about Cisco ASR 1000 Series routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco ASR 1000 Series Routers](#)):

- [Cisco ASR 1000 Series—Supported Software Versions, page 5-112](#)
- [Cisco ASR 1000 Series—Supported Topologies, page 5-112](#)
- [Cisco ASR 1000 Series—Supported Modules, page 5-113](#)
- [Cisco ASR 1000 Series—Supported Technologies, page 5-116](#)
- [Cisco ASR 1000 Series—Supported Service Events, page 5-117](#)

## Cisco ASR 1000 Series—Supported Software Versions

**Table 5-79**      *Supported Software Versions for Cisco ASR 1000 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| XE 2.2.3         | 3.6.6 <sup>1</sup> |
| XE 2.3.0         | 3.6.6 <sup>2</sup> |
| XE 2.3.1         | 3.6.6 <sup>3</sup> |
| XE 2.3.2         | 3.6.7 <sup>4</sup> |
| XE 2.4.0         | 3.6.7 <sup>5</sup> |
| XE 2.4.1         | 3.7 <sup>6</sup>   |
| XE 2.5.0         | 3.7 <sup>7</sup>   |
| XE 2.2.1         | 3.6.5 <sup>8</sup> |
| XE 2.2.2         | 3.6.5 <sup>9</sup> |

<sup>1, 2, 4, 6, 9</sup>ANA models pluggable ports for this IOS version.

<sup>3, 7, 8</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

<sup>5</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco ASR 1000 Series—Supported Topologies

**Table 5-80**      *Supported Topologies for Cisco ASR 1000 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.6       |
| Ethernet       | Ethernet       | 3.6.5       |
| MPLS           | MPLS           | 3.6.6       |
| Physical Layer | Physical Layer | 3.6.5       |

## Cisco ASR 1000 Series—Supported Modules

**Table 5-81**      *Supported Modules for Cisco ASR 1000 Series—Cisco ANA Version 3.7*

| Module Name    | ANA Version        | Module Description                                                               |
|----------------|--------------------|----------------------------------------------------------------------------------|
| 4XGE-BUILT-IN  | 3.6.6              | Cisco ASR1002 4 Port, Gigabit Ethernet SPA Card                                  |
| ASR1000-ESP10  | 3.6.6              | Cisco ASR 1000 10Gbps Embedded Services Processor                                |
| ASR1000-ESP20  | 3.6.6              | Cisco ASR1000 Embedded Services Processor, 20G,Crypto                            |
| ASR1000-ESP5   | 3.6.5 <sup>1</sup> | ASR1K Embedded Services Processor,5Gbps,Crypto,ASR1002 only                      |
| ASR1000-RP1    | 3.6.5 <sup>2</sup> | Cisco ASR1000 Route Processor 1, 2GB DRAM                                        |
| ASR1000-RP2    | 3.6.6              | Cisco ASR1000 Route Processor 2                                                  |
| ASR1000-SIP10  | 3.6.5 <sup>3</sup> | Cisco ASR1000 SPA Interface Processor 10                                         |
| ASR1002-PWR-AC | 3.6.6              | Cisco ASR 1002 AC Power Supply                                                   |
| ASR1002-PWR-DC | 3.6.6              | Cisco ASR1002 DC Power Supply                                                    |
| ASR1002-RP1    | 3.6.6              | Cisco ASR1002 Route Processor 1                                                  |
| ASR1002-SIP10  | 3.6.6              | Cisco ASR1002 SIP 10                                                             |
| ASR1004-PWR-AC | 3.6.6              | Cisco ASR 1004 AC Power Supply                                                   |
| ASR1004-PWR-DC | 3.6.6              | Cisco ASR 1004 DC Power Supply                                                   |
| ASR1006-PWR-AC | 3.6.5              | Cisco ASR1006 AC Power Supply                                                    |
| ASR1006-PWR-DC | 3.6.6              | Cisco ASR 1006 DC Power Supply                                                   |
| CWDM-SFP-1470  | 3.6.7              | Cisco CWDM SFP 1470 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1490  | 3.6.7              | Cisco CWDM SFP 1490 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1510  | 3.6.7              | Cisco CWDM SFP 1510 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1530  | 3.6.7              | Cisco CWDM SFP 1530 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1550  | 3.6.7              | Cisco CWDM SFP 1550 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1570  | 3.6.7              | Cisco CWDM SFP 1570 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1590  | 3.6.7              | Cisco CWDM SFP 1590 nm;Gigabit Ethernet and 1G/2G FC                             |
| CWDM-SFP-1610  | 3.6.7              | Cisco CWDM SFP 1610 nm;Gigabit Ethernet and 1G/2G FC                             |
| GLC-BX-D       | 3.7                | 1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength |

**Table 5-81**      **Supported Modules for Cisco ASR 1000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version        | Module Description                                                                  |
|-------------------|--------------------|-------------------------------------------------------------------------------------|
| GLC-BX-U          | 3.7                | 1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength    |
| GLC-GE-100FX      | 3.6.7              | 100BASE-FX SFP module for Gigabit Ethernet ports, 1310 nm wavelength, 2 km over MMF |
| SFP-GE-L          | 3.6.6              | Cisco SFP Gigabit Ethernet 1000Base LX                                              |
| SFP-GE-S          | 3.6.6              | SFP Gigabit Ethernet 1000Base SX                                                    |
| SFP-GE-T          | 3.6.6              | SFP Gigabit Ethernet 1000Base Tx                                                    |
| SFP-GE-Z          | 3.6.6              | SFP Gigabit Ethernet 1000Base Zx                                                    |
| SFP-OC12-IR1      | 3.6.6              | SFP OC12 Intermaediate Reach                                                        |
| SFP-OC12-LR1      | 3.6.6              | SFP OC12 Long reach 1                                                               |
| SFP-OC12-LR2      | 3.6.6              | Cisco OC 12 SFP Long Reach 2                                                        |
| SFP-OC12-MM       | 3.6.6              | Cisco OC12 STM1 SFP Multimode                                                       |
| SFP-OC12-SR       | 3.6.6              | Cisco OC12 STM1 SFP Short Reach                                                     |
| SFP-OC3-IR1       | 3.6.6              | Cisco OC3 SFP Intermediate Reach                                                    |
| SFP-OC3-LR1       | 3.6.6              | Cisco OC3 STM1 SFP Single Mode Fibre Long ReACH                                     |
| SFP-OC3-LR2       | 3.6.6              | Cisco OC3 STM1 SFP Single Mode Fibre Long Reach                                     |
| SFP-OC3-MM        | 3.6.6              | Cisco OC3 SFP Multimode                                                             |
| SFP-OC3-SR        | 3.6.6              | Cisco OC 3 SFP Short Reach                                                          |
| SFP-OC48-IR1      | 3.6.6              | Cisco OC 48 SFP Intermediate Reach 1                                                |
| SFP-OC48-LR2      | 3.6.6              | Cisco OC 48 SFP Long Reach 2                                                        |
| SFP-OC48-SR       | 3.6.6              | SFP OC48 Short Reach                                                                |
| SPA-10XGE-V2      | 3.6.6              | Cisco SPA 10 Port GE Version2                                                       |
| SPA-1X10GE-L-V2   | 3.6.5 <sup>4</sup> | Cisco 1-Port 10GE LAN-PHY Shared Port Adapter                                       |
| SPA-1XCHSTM1/OC3  | 3.6.6              | Cisco SPA 1 Port Channelized OC 3 STM 1                                             |
| SPA-1XOC12-POS    | 3.6.6              | Cisco 1 Port OC 12 POS                                                              |
| SPA-1XOC3-ATM-V2  | 3.6.6              | Cisco SPA 1 Port OC3 ATM Version3                                                   |
| SPA-1XOC48POS     | 3.6.7              | 1-port OC48c/STM16c POS/RPR SFP Optics                                              |
| SPA-1XOC48POS/RPR | 3.6.6              | Cisco SPA 1 Port Oc 48 POS RPR                                                      |
| SPA-2X1GE-V2      | 3.6.5 <sup>5</sup> | Cisco 2-Port Gigabit Ethernet Shared Port Adapter, Version 2                        |
| SPA-2XCT3/DS0     | 3.6.6              | Cisco SPA 2 Port Channelised T3/DS0                                                 |
| SPA-2XOC12-POS    | 3.6.7              | 2-Port OC-3c/STM-1 and OC-12c/STM-4 POS SPA                                         |
| SPA-2XOC3-POS     | 3.6.6              | Cisco SPA 2 Port OC3 POS                                                            |
| SPA-2XOC48POS/RPR | 3.6.6              | Cisco SPA 2 Port OC48 POS                                                           |
| SPA-2XT3/E3       | 3.6.6              | Cisco SPA 2 Port T3/E3 Serial                                                       |

**Table 5-81**      **Supported Modules for Cisco ASR 1000 Series—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version        | Module Description                                                                                                                                           |
|-------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPA-3XOC3-ATM-V2  | 3.6.6              | Cisco SPA 3 Port OC3 ATM Version 2                                                                                                                           |
| SPA-4X1FE-TX-V2   | 3.6.6              | Cisco 4x 1 Port Fast Ethernet Tx V2                                                                                                                          |
| SPA-4XCT3/DS0     | 3.6.6              | Cisco SPA 4 Port Channelised T3/DS0                                                                                                                          |
| SPA-4XOC12-POS    | 3.6.7              | 4-port OC-12/STM-4 POS Shared Port Adapters                                                                                                                  |
| SPA-4XOC3-POS     | 3.6.6              | Cisco SPA 4 Port OC3 POS                                                                                                                                     |
| SPA-4XOC48POS/RPR | 3.6.6              | Cisco SPA 4 Port Oc 48 POS RPR                                                                                                                               |
| SPA-4XT3/E3       | 3.6.6              | Cisco SPA 4Port T3/E3                                                                                                                                        |
| SPA-4XT-SERIAL    | 3.6.6              | Cisco 4 Port Serial SPA                                                                                                                                      |
| SPA-5X1GE-V2      | 3.6.6              | Cisco SPA 5 x 1 Port Gigabit Ethernet V2                                                                                                                     |
| SPA-8X1FE-TX-V2   | 3.6.5 <sup>6</sup> | Cisco 8-Port 10BASE-T/100BASE Fast Ethernet Shared Port Adapter, V-2                                                                                         |
| SPA-8X1GE-V2      | 3.6.6              | Cisco SPA 8 x 1 Port Gigabit Ethernet V2                                                                                                                     |
| SPA-8XCHT1/E1     | 3.6.6              | Cisco SPA 8 Port Channelized T1/E1                                                                                                                           |
| SPA-8XOC12-POS    | 3.6.7              | 8-Port OC-12c/STM-4 Multirate POS SPA                                                                                                                        |
| SPA-8XOC3-POS     | 3.6.7              | 8-Port OC-3c/STM-1 POS SPA                                                                                                                                   |
| SPA-OC192POS-XFP  | 3.6.7              | 1-port OC192/STM64 POS/RPR XFP Optics                                                                                                                        |
| XFP-10GER-OC192IR | 3.6.6              | Multirate XFP module for 10GBASE-IR and OC192 IR                                                                                                             |
| XFP-10GLR-OC192LR | 3.6.7              | Cisco multirate XFP transceiver module for 10GBASE-LR Ethernet and OC-192/STM-64 long-reach Packet-over-SONET/SDH (POS) applications, SMF, dual LC connector |
| XFP-10GLR-OC192SR | 3.6.5 <sup>7</sup> | Multirate XFP module for 10GBASE-LR and OC192 SR-1                                                                                                           |
| XFP-10G-MM-SR     | 3.7                | Cisco 10GBASE-SR XFP transceiver module for MMF, 850-nm wavelength, dual LC connector                                                                        |
| XFP-10GZR-OC192LR | 3.6.6              | Multirate XFP module for 10GBASE-LR and OC192 LR                                                                                                             |

<sup>1, 2, 3, 4, 5, 6, 7</sup>Also tested on ASR1004.

## Cisco ASR 1000 Series—Supported Technologies

The following technologies are supported by the Cisco ASR 1000 Series in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
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- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [L2Channel, page 5-162](#)
- [SBC, page 5-168](#)

## Cisco ASR 1000 Series—Supported Service Events

**Table 5-82**      *Supported Service Events for Cisco ASR 1000 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.5       | Y         |
| Interface Status Down/Up                            | 3.6.5       | Y         |
| Card In/Out                                         | 3.6.5       | Y         |
| Link Down/Up                                        | 3.6.5       | Y         |
| Device Unreachable                                  | 3.6.5       | N         |
| CPU Over Utilized                                   | 3.6.5       | N         |
| Memory Over Utilized                                | 3.6.5       | N         |
| Device Unsupported                                  | 3.6.5       | N         |
| Discard Packets                                     | 3.6.5       | N         |
| Dropped Packets                                     | 3.6.5       | N         |
| Module Unsupported                                  | 3.6.5       | N         |
| Port Flapping                                       | 3.6.5       | N         |
| Port Down                                           | 3.6.5       | Y         |
| Rx Over Utilized                                    | 3.6.5       | N         |
| Tx Over Utilized                                    | 3.6.5       | N         |
| Cloud Problem                                       | 3.6.5       | N         |
| BGP Neighbor Down                                   | 3.6.5       | Y         |
| Card Up/Down                                        | 3.6.5       | Y         |
| VSI Up/Down                                         | 3.6.7       | N         |
| VSI Admin Down                                      | 3.6.7       | N         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |

# Cisco ASR 9000 Series Aggregation Services Routers

This section includes the following information about Cisco ASR 9000 routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco ASR 9000 Series Aggregation Services Routers](#)):

- [Cisco ASR 9000—Supported Software Versions](#), page 5-118
- [Cisco ASR 9000—Supported Topologies](#), page 5-118
- [Cisco ASR 9000—Supported Modules](#), page 5-118
- [Cisco ASR 9000—Supported Technologies](#), page 5-120
- [Cisco ASR 9000—Supported Service Events](#), page 5-121
- [Cisco ASR 9000—Supported Commands](#), page 5-122

## Cisco ASR 9000—Supported Software Versions

**Table 5-83**      *Supported Software Versions for Cisco ASR 9000—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| IOX 3.7.2        | 3.6.5 <sup>1</sup> |
| IOX 3.7.3        | 3.6.7 <sup>2</sup> |
| IOX 3.9.0        | 3.7 <sup>3</sup>   |

<sup>1, 2, 3</sup>ANA models pluggable ports for this IOS version.

## Cisco ASR 9000—Supported Topologies

**Table 5-84**      *Supported Topologies for Cisco ASR 9000—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.5       |
| Ethernet       | Ethernet       | 3.6.5       |
| Physical Layer | Physical Layer | 3.6.5       |
| LAG            | LAG            | 3.6.5       |

## Cisco ASR 9000—Supported Modules

**Table 5-85**      *Supported Modules for Cisco ASR 9000—Cisco ANA Version 3.7*

| Module Name  | ANA Version | Module Description           |
|--------------|-------------|------------------------------|
| A9K-1.5KW-DC | 3.6.6       | ASR-9K 1.5kW DC Power Module |



**Table 5-85**      **Supported Modules for Cisco ASR 9000—Cisco ANA Version 3.7 (continued)**

| Module Name  | ANA Version | Module Description                                                                            |
|--------------|-------------|-----------------------------------------------------------------------------------------------|
| A9K-2KW-DC   | 3.6.6       | ASR-9K 2kW DC Power Module                                                                    |
| A9K-2T20GE-B | 3.7         | 2-Port 10GE, 20-Port GE Line Card, Requires XFPs and SFPs                                     |
| A9K-2T20GE-E | 3.7         | 2-Port 10GE, 20-Port GE Extended LC, Req. XFPs and SFPs                                       |
| A9K-3KW-AC   | 3.6.5       | ASR-9K 3kW AC Power Module                                                                    |
| A9K-40GE-B   | 3.6.5       | 40-Port, GE Line Card, Requires SFPs                                                          |
| A9K-40GE-E   | 3.6.5       | 40-Port, GE Line Card, Extended Memory, Requires SFPs                                         |
| A9K-40GE-L   | 3.7         | 40-Port GE Low Queue Line Card, Requires SFPs                                                 |
| A9K-4T-B     | 3.6.5       | 4-Port, 10GE Line Card, Requires XFPs                                                         |
| A9K-4T-E     | 3.6.6       | Cisco ASR 9000 Series 4-Port Ten Gigabit Ethernet, extended memory                            |
| A9K-4T-L     | 3.7         | 4-Port 10GE Low Queue Line Card, Requires XFPs                                                |
| A9K-8T/4-B   | 3.6.6       | Cisco ASR 9000 Series 8-Port Ten Gigabit Ethernet DX                                          |
| A9K-8T/4-E   | 3.6.6       | Cisco ASR 9000 Series 8-Port Ten Gigabit Ethernet DX, extended memory                         |
| A9K-8T/4-L   | 3.7         | 8-Port 10GE DX Low Queue Line Card, Requires XFPs                                             |
| A9K-8T-B     | 3.7         | 8-Port 10GE Line Card, Requires XFPs                                                          |
| A9K-8T-E     | 3.7         | 8-Port 10GE Extended Line Card, Requires XFPs                                                 |
| A9K-RSP-4G   | 3.6.6       | Route Switch Processor 4G Memory Hard Disc Drive                                              |
| A9K-SIP-700  | 3.7         | QFP SIP 20G Line Card                                                                         |
| ASR-9006-FAN | 3.6.6       | ASR-9006 Fan Tray                                                                             |
| ASR-9010-FAN | 3.6.5       | ASR-9010 Fan Tray (Req 2)                                                                     |
| GLC-BX-D     | 3.7         | 1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength              |
| GLC-BX-U     | 3.7         | 1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength              |
| SFP-GE-L     | 3.6.6       | 1000BASE-LX SFP (DOM), MMF, 550/220m                                                          |
| SFP-GE-S     | 3.6.5       | 1000BASE-SX SFP (DOM), MMF, 550/220m                                                          |
| SFP-GE-Z     | 3.6.6       | 1000BASE-ZX SFP (DOM), MMF, 550/220m                                                          |
| SFP-OC12-IR1 | 3.7         | OC-12/STM-4 pluggable intermediate-reach (15 km) transceiver module, 1310-nm wavelength       |
| SFP-OC12-LR1 | 3.7         | OC-12/STM-4 pluggable long-reach (40 km) transceiver module, 1310-nm wavelength, LC connector |

**Table 5-85**      **Supported Modules for Cisco ASR 9000—Cisco ANA Version 3.7 (continued)**

| Module Name       | ANA Version | Module Description                                                                                                                                           |
|-------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SFP-OC12-LR2      | 3.7         | OC-12/STM-4 pluggable long-reach (80 km) transceiver module, 1550-nm wavelength, LC connector                                                                |
| SFP-OC12-MM       | 3.7         | OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, MMF, LC connector                                                           |
| SFP-OC12-SR       | 3.7         | OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, LC connector                                                                |
| SPA-2XCHOC12/DS0  | 3.7         | 2 port channelized OC12 to DS0 Shared Port Adapter                                                                                                           |
| XFP-10GER-192IR+  | 3.6.6       | Multirate XFP module for 10GBASE-IR and OC192 IR                                                                                                             |
| XFP-10GLR-OC192SR | 3.6.6       | Multirate XFP module for 10GBASE-LR and OC192 SR-1                                                                                                           |
| XFP-10G-MM-SR     | 3.7         | Cisco 10GBASE-SR XFP transceiver module for MMF, 850-nm wavelength, dual LC connector                                                                        |
| XFP-10GZR-OC192LR | 3.6.6       | Cisco multirate XFP transceiver module for 10GBASE-LR Ethernet and OC-192/STM-64 long-reach Packet-over-SONET/SDH (POS) applications, SMF, dual LC connector |

## Cisco ASR 9000—Supported Technologies

The following technologies are supported by the Cisco ASR 9000 in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
- [ACL, page 5-150](#)
- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)

- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [CFM, page 5-165](#)

## Cisco ASR 9000—Supported Service Events

**Table 5-86**      *Supported Service Events for Cisco ASR 9000—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.5       | Y         |
| Interface Status Down/Up                            | 3.6.5       | Y         |
| Card In/Out                                         | 3.6.5       | Y         |
| Link Down/Up                                        | 3.6.5       | Y         |
| Device Unreachable                                  | 3.6.5       | N         |
| CPU Over Utilized                                   | 3.6.5       | N         |
| Memory Over Utilized                                | 3.6.5       | N         |
| Device Unsupported                                  | 3.6.5       | N         |
| Discard Packets                                     | 3.6.5       | N         |
| Dropped Packets                                     | 3.6.5       | N         |
| Module Unsupported                                  | 3.6.5       | N         |
| Port Flapping                                       | 3.6.5       | N         |
| Port Down                                           | 3.6.5       | Y         |
| Rx Over Utilized                                    | 3.6.5       | N         |
| Tx Over Utilized                                    | 3.6.5       | N         |
| Cloud Problem                                       | 3.6.5       | N         |
| BGP Neighbor Down                                   | 3.6.5       | N         |
| BGP Process Down/Up                                 | 3.6.5       | N         |
| Card Up/Down                                        | 3.6.5       | Y         |
| BGP link down                                       | 3.6.5       | Y         |
| BGP process down                                    | 3.6.5       | Y         |
| VSI Up/Down                                         | 3.6.7       | N         |
| VSI Admin Down                                      | 3.6.7       | N         |
| EFP Up/Down                                         | 3.6.7       | N         |
| EFP Admin Down                                      | 3.6.7       | N         |
| EFP down due to error disabled                      | 3.6.7       | N         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |

**Table 5-86** *Supported Service Events for Cisco ASR 9000—Cisco ANA Version 3.7 (continued)*

| Event Name                      | ANA Version | Expedited |
|---------------------------------|-------------|-----------|
| Vlan Tagged Interface AdminDown | 3.6.7       | N         |

## Cisco ASR 9000—Supported Commands

**Table 5-87** *Supported Commands for Cisco ASR 9000—Cisco ANA Version 3.7*

| Command                                          | ANA Version |
|--------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                 | 3.7         |
| Configure CFM Global Parameters                  | 3.7         |
| Configure CFM Continuity Check                   | 3.7         |
| Configure CFM Service ID                         | 3.7         |
| Configure CFM MEP                                | 3.7         |
| Enable CFM Continuity Check                      | 3.7         |
| Enable CFM SNMP Server Traps                     | 3.7         |
| Diagnose CFM with Show MEP Status                | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status     | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC       | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC | 3.7         |

## Cisco MWR 2900 Series Mobile Wireless Routers

This section includes the following information about Cisco MWR 2941 routers (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco MWR 2900 Series Mobile Wireless Routers](#)):

- [Cisco MWR 2941—Supported Software Versions](#), page 5-122
- [Cisco MWR 2941—Supported Topologies](#), page 5-123
- [Cisco MWR 2941—Supported Modules](#), page 5-124
- [Cisco MWR 2941—Supported Technologies](#), page 5-125
- [Cisco MWR 2941—Supported Service Events](#), page 5-126
- [Cisco MWR 2941—Supported Commands](#), page 5-127

## Cisco MWR 2941—Supported Software Versions

**Table 5-88** *Supported Software Versions for Cisco MWR 2941—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.4(19)MR2      | 3.6.6 <sup>1</sup> |

**Table 5-88**      **Supported Software Versions for Cisco MWR 2941—Cisco ANA Version 3.7**

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.4(20)MR       | 3.6.7 <sup>2</sup> |
| 12.2(33)MRA      | 3.7 <sup>3</sup>   |

<sup>1,2</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

<sup>3</sup>12.2(33)MRA(a.k.a)CSR 3.2; ANA models pluggable ports for this IOS version.

## Cisco MWR 2941—Supported Topologies

**Table 5-89**      **Supported Topologies for Cisco MWR 2941—Cisco ANA Version 3.7**

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.6       |
| BGP            | BGP            | 3.6.6       |
| Ethernet       | Ethernet       | 3.6.6       |
| Framerelay     | Framerelay     | 3.6.6       |
| MPLS           | MPLS           | 3.6.6       |
| PPP/HDLC       | PPP or HDLC    | 3.6.6       |
| Physical Layer | Physical Layer | 3.6.6       |

## Cisco MWR 2941—Supported Modules

**Table 5-90**      *Supported Modules for Cisco MWR 2941—Cisco ANA Version 3.7*

| Module Name         | ANA Version        | Module Description                                                                                |
|---------------------|--------------------|---------------------------------------------------------------------------------------------------|
| ASM-M2900-TOP       | 3.6.6              | Timing over Packet Accessory Service Module for the Cisco MWR 2900 Series Mobile Wireless Routers |
| GLC-LH-SM           | 3.6.7              | 1000 Base LX/LH long reach SFP transceiver                                                        |
| GLC-SX-MM           | 3.6.7              | 1000 Base Sx short wavelength transceiver                                                         |
| GLC-T               | 3.6.7              | 1000 Base T Copper Gigabit ethernet SFP                                                           |
| GLC-ZX-SM           | 3.6.7              | 1000 Base Zx extended reach Gigabit ethernet SFP                                                  |
| HWIC-1ADSL          | 3.6.6 <sup>1</sup> | ADSL over POTS                                                                                    |
| HWIC-1ADSLI         | 3.6.6 <sup>2</sup> | ADSL over ISDN                                                                                    |
| HWIC-1GE-SFP        | 3.6.7              | HWIC with copper and optical Gigabit ethernet connectivity                                        |
| HWIC-2SHDSL         | 3.6.6              | HWIC G.SHDSL with annex F+G                                                                       |
| HWIC-4SHDSL         | 3.6.6              | HWIC G.SHDSL with annex F+G and IMA.                                                              |
| HWIC-4T1/E1         | 3.6.6              | 4 port T1/E1 clear channel HWIC                                                                   |
| HWIC-D-9ESW         | 3.6.7              | 9 Port FE Switch                                                                                  |
| MOTHEBOARD FOR 2941 | 3.6.6              | Cisco MWR-2941-DC Motherboard with MPC8347E CPU, Gigabit Ethernet, SFP, BITS and T1/E1 por        |
| SFP-GE-L            | 3.7 <sup>3</sup>   | 1000BASE-LH/LX pluggable transceiver                                                              |
| SFP-GE-S            | 3.7 <sup>4</sup>   | 1000BASE-Sx Short wavelength gigabit ethernet SFP.                                                |
| SFP-GE-Z            | 3.7 <sup>5</sup>   | 1000BASE-Zx Extended reach gigabit ethernet SFP.                                                  |

<sup>1,2</sup>Not Supported on 12.2(33)MRA (CSR3.2)

<sup>3,4,5</sup>Supported on 12.2(33)MRA (CSR3.2)

## Cisco MWR 2941—Supported Technologies

The following technologies are supported by the Cisco MWR 2941 in Cisco ANA Version 3.7:

- [IP, page 5-129](#)
- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
- [MPLS, page 5-144](#)
- [MPLS TE, page 5-146](#)
- [VPN, page 5-148](#)
- [PWE3, page 5-149](#)
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- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [ATM Cross Connect, page 5-155](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
- [Clocking, page 5-158](#)
- [Carrier Ethernet, page 5-160](#)
- [CDP, page 5-161](#)
- [Discovery Protocol, page 5-161](#)
- [L2Channel, page 5-162](#)
- [MLPPP, page 5-163](#)
- [REP, page 5-164](#)
- [CFM, page 5-165](#)

## Cisco MWR 2941—Supported Service Events

**Table 5-91**      *Supported Service Events for Cisco MWR 2941—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.6       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.6       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.6       | Y         |
| Interface Status Down/Up                            | 3.6.6       | Y         |
| Link Down/Up                                        | 3.6.6       | Y         |
| Device Unreachable                                  | 3.6.6       | N         |
| CPU Over Utilized                                   | 3.6.6       | N         |
| Memory Over Utilized                                | 3.6.6       | N         |
| Device Unsupported                                  | 3.6.6       | N         |
| Discard Packets                                     | 3.6.6       | N         |
| Dropped Packets                                     | 3.6.6       | N         |
| Module Unsupported                                  | 3.6.6       | N         |
| Port Flapping                                       | 3.6.6       | N         |
| Port Down                                           | 3.6.6       | Y         |
| Rx Over Utilized                                    | 3.6.6       | N         |
| Tx Over Utilized                                    | 3.6.6       | N         |
| VPN Leak                                            | 3.6.6       | N         |
| Cloud Problem                                       | 3.6.6       | N         |
| Broken LSP Discovered                               | 3.6.6       | N         |
| MPLS Black Hole                                     | 3.6.6       | N         |
| Layer 2 Tunnel Down                                 | 3.6.6       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.6       | N         |
| BGP Neighbor Down                                   | 3.6.6       | N         |
| Card Up/Down                                        | 3.6.7       | Y         |
| Adaptive Polling                                    | 3.6.6       | N         |
| BGP link down                                       | 3.6.6       | Y         |
| LDP neighbor loss                                   | 3.6.6       | Y         |
| MPLS interface removed                              | 3.6.6       | Y         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |
| MLPPP down due to Admin down                        | 3.7         | N         |



**Table 5-91**      *Supported Service Events for Cisco MWR 2941—Cisco ANA Version 3.7 (continued)*

| Event Name                  | ANA Version | Expedited |
|-----------------------------|-------------|-----------|
| MLPPP down due to Oper down | 3.7         | N         |
| MLPPP Up                    | 3.7         | N         |
| Low priority IMA Down       | 3.7         | N         |
| Medium priority IMA Down    | 3.7         | N         |
| High priority IMA Down      | 3.7         | N         |
| IMA Oper down               | 3.7         | N         |
| IMA Admin down              | 3.7         | N         |
| IMA Up                      | 3.7         | N         |

## Cisco MWR 2941—Supported Commands

**Table 5-92**      *Supported Commands for Cisco MWR 2941—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

## Supported Technologies on Cisco Routers

The following sections list the objects and attributes that are supported on Cisco routers in Cisco ANA Version 3.7 per technology:

- [IP, page 5-129](#)

- [Routing Protocols, page 5-132](#)
- [Ethernet \(IEEE 802.3\), page 5-133](#)
- [ATM, page 5-138](#)
- [Frame Relay, page 5-141](#)
- [Point to Point, page 5-142](#)
- [Physical Technologies, page 5-143](#)
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- [Physical Equipment, page 5-151](#)
- [Base Logical Components, page 5-152](#)
- [Common, page 5-154](#)
- [ATM Cross Connect, page 5-155](#)
- [Additional Technologies, page 5-155](#)
- [DWDM, page 5-156](#)
- [Local Switching, page 5-157](#)
- [BFD, page 5-158](#)
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- [Carrier Ethernet, page 5-160](#)
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- [Discovery Protocol, page 5-161](#)
- [VTP, page 5-162](#)
- [L2Channel, page 5-162](#)
- [MLPPP, page 5-163](#)
- [REP, page 5-164](#)
- [CFM, page 5-165](#)
- [SONET/SDH/T3 Path Channelization, page 5-166](#)
- [SyncE, page 5-167](#)
- [SBC, page 5-168](#)

# IP

**Table 5-93** IP Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IPIInterface</b>    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IP Address                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Subnetwork Mask                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| IP Interface Addresses Array    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Interface Name                  | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Interface Description           | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| IP Interface State              | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| OSPF Interface Cost             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Broadcast Address               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| MTU                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Lookup Method                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Address Resolution Type         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ARP Timeout                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Secured ARP                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ICMP Mask Reply                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IGMP Proxy                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| HSRP Groups                     |     | Y    |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       |          |          | Y        |
| IP Multiplexing Table           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IANA Type                       | Y   |      | Y    | Y    |      | Y    | Y    | Y    |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Containing CTPs                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IIPMuxEntry</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Termination Point               | Y   | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       |          |          | Y        |
| Destination IP Subnet           | Y   | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       |          |          | Y        |
| <b>IMO Name—IIRoutingEntity</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Routing Table                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| ARP Entity                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Routing Table Changes           |     |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      |       |       |          |       |          |          |          |
| Name                            | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Logical Sons                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

**Table 5-93** IP Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                                 | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941       |
|-------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------------|
| <b>IMO Name—IRoutingEntry</b>             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Destination IP Subnet                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Next Hop IP Address                       | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Type                                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Routing Protocol Type                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Outgoing Interface Name                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| <b>IMO Name—IARPEntity</b>                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| ARP Table                                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| <b>IMO Name—IARPEntity</b>                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| IP Address                                | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| MAC Address                               | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Port                                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y              |
| Entry Type                                | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y              |
| <b>IMO Name—IIPPool</b>                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| IP Address Pool Entries                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Name                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Index                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| <b>IMO Name—IIPRangeBasedIPPoolEntry</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Start IP Address                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| End IP Address                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Unused Addresses                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Used Addresses                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Reserved Addresses                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| <b>IMO Name—IIPSubnetBasedIPPoolEntry</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| IP Subnet                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Unused Addresses                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Used Addresses                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Reserved Addresses                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| <b>IMO Name—HSRPGroupEntry</b>            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Group Number                              |     |      | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>1</sup> |
| Port Description                          |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>2</sup> |
| Priority                                  |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>3</sup> |

**Table 5-93 IP Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941       |
|-------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------------|
| Coupled Router                |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>4</sup> |
| State                         |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>5</sup> |
| Tracking Interfaces           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Virtual IP Address            |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>6</sup> |
| Virtual MAC Address           |     |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>7</sup> |
| <b>IMO Name—I Tunnel GRE</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Name                          | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y              |
| Tunnel Destination and Source | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y              |
| IP Address                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y              |
| IP Interface State            |     |      |      |      |      |      |      | Y    |      |      | Y    | Y    |      |      |      |      | Y     | Y     |          |       |          |          |                |
| IANA Type                     |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Containing CTPs               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Contained CTPs                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Keep Alive Time               |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |                |
| Keep Alive Retry              |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |                |

<sup>1, 2, 3, 4, 5, 6, 7</sup>Not supported on IOS 12.2(33)MRA (CSR3.2).

# Routing Protocols

**Table 5-94** Routing Protocols Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                         | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IBgpNeighborEntry</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Remote Identifier                 | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Neighbor Type                     |     |      |      | Y    |      | Y    | Y    | Y    |      |      | Y    |      |      |      |      |      |       | Y     | Y        | Y     |          | Y        |          |
| Distributing Interfaces           |     |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |      |       |       |          |       |          |          |          |
| Remote Address                    | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Remote Autonomous System          | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Peer State                        | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Hold Time                         | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Keep Alive Time                   | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| VrfName                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          |          | Y        |
| Address family                    |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     |          | Y     |          |          | Y        |
| <b>IMO Name—IOspfEntry</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Area Identifier                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| IP Address                        | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Type                              | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Administrative Status             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Ospf Entry State                  | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

## Ethernet (IEEE 802.3)

**Table 5-95 Ethernet (IEEE 802.3) Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                                      | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400            | 7500 | 7600 | 10000 | 12000           | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|------|------|-------|-----------------|----------|-------|----------|----------|----------|
| <b>IM0 Name—ILinkAggregationGroup802dot3ad</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| dot3adAggMACAddresses                          |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>1</sup>  |      | Y    |       | Y <sup>2</sup>  | Y        | Y     |          | Y        |          |
| dot3adAggActorSystemPriority                   |     |      |      |      | Y    |      |      |      |      | Y    |      |      |      | Y <sup>3</sup>  |      | Y    |       | Y <sup>4</sup>  | Y        | Y     |          | Y        |          |
| dot3adAggActorSystemID                         |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>5</sup>  |      | Y    |       | Y <sup>6</sup>  | Y        | Y     |          | Y        |          |
| dot3adAggActorAdminKey                         |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>7</sup>  |      | Y    |       | Y <sup>8</sup>  | Y        | Y     |          | Y        |          |
| dot3adAggActorOperKey                          |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>9</sup>  |      | Y    |       | Y <sup>10</sup> | Y        | Y     |          | Y        |          |
| dot3adAggPartnerSystemID                       |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>11</sup> |      | Y    |       | Y <sup>12</sup> | Y        | Y     |          | Y        |          |
| dot3adAggPartnerSystemPriority                 |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>13</sup> |      | Y    |       | Y <sup>14</sup> | Y        | Y     |          | Y        |          |
| dot3adAggPartnerOperKey                        |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>15</sup> |      | Y    |       | Y <sup>16</sup> | Y        | Y     |          | Y        |          |
| dot3adAggCollectorMaxDelay                     |     |      |      |      |      |      |      | Y    |      | Y    |      |      |      | Y <sup>17</sup> |      | Y    |       | Y <sup>18</sup> | Y        | Y     |          | Y        |          |
| GroupNumber                                    |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>19</sup> |      | Y    |       | Y               | Y        | Y     |          | Y        |          |
| AggregationProtocolType                        |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>20</sup> |      | Y    |       | Y               | Y        | Y     |          | Y        |          |
| MacAddress                                     |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>21</sup> |      | Y    |       | Y               | Y        | Y     |          | Y        |          |
| ChannelAdminStatus                             |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>22</sup> |      | Y    |       | Y               | Y        | Y     |          | Y        |          |
| ChannelOperStatus                              |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y <sup>23</sup> |      | Y    |       | Y               | Y        | Y     |          | Y        |          |
| <b>IM0 Name—IEthernet</b>                      |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| MAC Address                                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y               | Y    | Y    | Y     | Y               | Y        | Y     | Y        | Y        | Y        |
| Duplex Mode                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| Output Flow Control                            |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| Input Flow Control                             |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| IANA Type                                      | Y   |      |      | Y    | Y    | Y    | Y    |      |      |      |      | Y    |      | Y               |      |      | Y     |                 | Y        | Y     |          | Y        |          |
| Containing CTPs                                |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| Contained CTPs                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |
| Port Type                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |                 |      |      |       |                 |          |       |          |          |          |

**Table 5-95 Ethernet (IEEE 802.3) Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                      | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000        | MWR 2941 |
|--------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|-----------------|----------|
| <b>IMO Name—IVlanInterface</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Mode                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 | Y        |
| Native VLAN Identification     |     |      |      | Y    | Y    |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 | Y        |
| Virtual LAN Table              |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| IANA Type                      |     |      |      | Y    | Y    |      |      |      |      |      | Y    |      |      |      |      |      |       |       |          |       |          |                 |          |
| Containing CTPs                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Contained CTPs                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| vlanAdminType                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       | Y     |          |       |          |                 |          |
| vlanencapType                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       | Y     |          |       |          |                 |          |
| getAccess                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Allowed Vlans                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       | Y     |          |       |          |                 |          |
| <b>IMO Name—IVlanEncapMux</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| IANA Type                      |     |      |      | Y    | Y    |      |      |      | Y    |      |      |      |      |      |      | Y    |       |       |          |       |          |                 | Y        |
| Containing CTPs                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Contained CTPs                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| <b>IMO Name—IVlanMapping</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| direction                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| vlanMatchCriteria              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| vlanRewriteDefinition          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| Drop                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| Vlan                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| innerVlan                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| translatedVlan                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| translatedInnerVlan            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |                 |          |
| <b>IMO Name—IIEEE802</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| VLAN Identification            | Y   |      |      |      | Y    |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y               | Y        |
| Binding Information            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Binding Status                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| IANA Type                      |     |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     |       | Y        | Y     | Y        | Y               | Y        |
| Containing CTPs                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Contained CTPs                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| <b>IMO Name—IStpService</b>    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| StpProtocol                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| StpMaxAge                      | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          | 24    |          | Y <sup>25</sup> | Y        |



**Table 5-95 Ethernet (IEEE 802.3) Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000        | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|-----------------|----------|
| StpHelloTime                       | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          | 26    |          | Y <sup>27</sup> | Y        |
| StpBridgeForwardDelay              | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          | 28    |          | Y <sup>29</sup> | Y        |
| StpInstanceInfoTable               | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          | 30    |          | Y <sup>31</sup> | Y        |
| Same as ISystemService             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| StpUplinkFastState                 | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| StpBackboneFastState               | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| StpForwardDelay                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| StpBridgeMaxAge                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| StpBridgeHelloTime                 | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| <b>IMO Name—IMstService</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| MstProperties                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Same as IStpService                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| <b>IMO Name—IPvstpService</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| UpLinkFast                         | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| BackboneFast                       | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| <b>IMO Name—IMstProperties</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| MstForceVersion                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| MstCfgIdFmtSel                     | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| MstExternalRootCost                | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| MstMaxInstances                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| MstCfgIdName                       | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| MstCfgIdRevLevel                   | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| <b>IMO Name—IStpInstanceInfo</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| Object Identification              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |                 |          |
| StpBridgeId                        | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| BridgePriority                     | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |                 | Y        |
| Designated Parent and Root Bridges | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| StpRootCost                        | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| IsRoot                             | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| StpRootPort                        | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| StpPortInfoTable                   | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |
| STP Instance Id                    | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y               | Y        |

**Table 5-95 Ethernet (IEEE 802.3) Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Vlan Id                            |     |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |      |       |       |          |       |          | Y        |          |
| StpDesignatedBridge                | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpDesignatedRoot                  | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| <b>IMO Name—IMstInstanceInfo</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| MstVlanIds                         | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| Same as IStpInstanceInfo           | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| <b>IMO Name—IPvstpInstanceInfo</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Protocol Type                      | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpBridgeMaxAge                    | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpBridgeHelloTime                 | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpBridgeForwardDelay              | Y   |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpProtocolSpecification           | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpVlanId                          | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpForwardDelay                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpMaxAge                          | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| <b>IMO Name—IRstpInstanceInfo</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| StpForceVersion                    | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| Same as IStpInstanceInfo           | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| <b>IMO Name—IStpPortInfo</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| StpPort                            |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortPriority                    |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortState                       |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortPathCost                    |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortEdgePort                    |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortPointToPoint                |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpPortRole                        |     |      |      |      |      |      |      |      |      |      | Y    |      |      | Y    |      | Y    |       |       |          |       |          | Y        | Y        |
| StpDesignatedPortIdentifier        |     |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpDesignatedBridge                |     |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpPortIdentifier                  |     |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |
| StpPortBpduGuardState              |     |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |       |       |          |       |          |          | Y        |

Table 5-95 Ethernet (IEEE 802.3) Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                        | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200            | 7300 | 7400            | 7500 | 7600 | 10000 | 12000 | XR 12000        | CRS-1           | ASR 1000 | ASR 9000 | MWR 2941        |
|----------------------------------|-----|------|------|------|------|------|------|------|------|------|------|-----------------|------|-----------------|------|------|-------|-------|-----------------|-----------------|----------|----------|-----------------|
| StpPortBpduFilterState           |     |      |      |      |      |      |      |      |      |      |      |                 |      | Y               |      | Y    |       |       |                 |                 |          |          | Y               |
| <b>IMO Name—IMstPortInfo</b>     |     |      |      |      |      |      |      |      |      |      |      |                 |      |                 |      |      |       |       |                 |                 |          |          |                 |
| MstPortHelloTime                 |     |      |      |      |      |      |      |      |      |      |      |                 |      | Y               |      | Y    |       |       |                 |                 |          | Y        | Y <sup>32</sup> |
| Same as IStpPortInfo             |     |      |      |      |      |      |      |      |      |      |      |                 |      | Y               |      | Y    |       |       |                 |                 |          | Y        | Y <sup>33</sup> |
| <b>IMO Name—IPvstpPortInfo</b>   |     |      |      |      |      |      |      |      |      |      |      |                 |      |                 |      |      |       |       |                 |                 |          |          |                 |
| PvstpPortFastState               |     |      |      |      |      |      |      |      |      |      |      |                 |      | Y               |      | Y    |       |       |                 |                 |          |          | Y <sup>34</sup> |
| <b>IMO Name—IEthernetChannel</b> |     |      |      |      |      |      |      |      |      |      |      |                 |      |                 |      |      |       |       |                 |                 |          |          |                 |
| Group Number                     | Y   |      |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y <sup>35</sup> |      | Y <sup>36</sup> |      | Y    |       | Y     | Y <sup>37</sup> | Y <sup>38</sup> | Y        | Y        |                 |
| Bandwidth                        | Y   |      |      |      |      |      |      |      | Y    | Y    | Y    | Y <sup>39</sup> |      | Y <sup>40</sup> |      | Y    |       | Y     | Y <sup>41</sup> | Y <sup>42</sup> | Y        | Y        |                 |
| Aggregation Protocol             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y <sup>43</sup> |      | Y <sup>44</sup> |      | Y    |       | Y     | Y <sup>45</sup> | Y <sup>46</sup> | Y        | Y        |                 |
| IANA Type                        | Y   |      | Y    | Y    |      | Y    | Y    |      | Y    | Y    | Y    | Y <sup>47</sup> |      | Y <sup>48</sup> |      | Y    | Y     | Y     | Y <sup>49</sup> | Y <sup>50</sup> | Y        | Y        |                 |
| Containing CTPs                  |     |      |      |      |      |      |      |      |      |      |      |                 |      |                 |      |      |       |       |                 |                 |          |          |                 |
| Contained CTPs                   |     |      |      |      |      |      |      |      |      |      |      |                 |      |                 |      |      |       |       |                 |                 |          |          |                 |
| Mac Address                      |     |      |      |      |      |      |      |      |      |      |      | Y <sup>51</sup> |      |                 |      |      |       |       |                 |                 |          |          |                 |
| Admin Status                     |     |      |      |      |      |      |      |      |      |      |      | Y <sup>52</sup> |      |                 |      |      |       |       |                 |                 |          |          |                 |
| Oper Status                      |     |      |      |      |      |      |      |      |      |      |      | Y <sup>53</sup> |      |                 |      |      |       |       |                 |                 |          |          |                 |

1, 2, 3, 4, 5, 6, 7Supported in IOS version 12.2(33)SRD1 and 12.2(40)T only.

8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25Supported in IOS versions 12.2(33)SRD1 and 12.2(40)T only.

26, 27, 28, 29, 30, 31, 32, 33, 34LAG is not supported for 12.0(33)S1.

35, 36, 37, 38ANA 3.5.3 and later: show lacp bundle is added.

39The current value used and the value that all bridges should use when acting as the root of the maximum age of learned spanning tree protocol port information (in hundredths of seconds).

40The current value used and the value that all bridges should use when acting as the root for hello time messages' keep alive interval of a spanning tree protocol root (in hundredths of seconds).

41The current value used and the value that all bridges should use when acting as the root for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds).

42, 50Array of Spanning Tree Protocol bridge information.

43, 44, 45, 46SNMP supported with ANA 3.6.0. The `show lacp bundle` command is supported with ANA 3.6.3 and later.

47Only Bridge Max Age is supported, not the current value.

48Only the Bridge Hello Time is supported, not the current value.

49Only the Bridge Forward Delay is supported, not the current value..

51, 52, 53Supported for 12.2(33)MRA only.

# ATM

**Table 5-96** ATM Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|--------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IAtm</b>                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ATM Address                                |     |      | Y    | Y    | Y    | Y    | Y    |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    |       |       |          |       | Y        |          | Y        |
| Interface Type                             |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       | Y     | Y        |       |          |          |          |
| VP and VC Ranges                           |     |      | Y    | Y    |      | Y    | Y    | Y    |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |          |
| VC Table                                   |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Cross-Connect Table                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IANA Type                                  |     | Y    | Y    | Y    | Y    | Y    |      |      | Y    | Y    |      |      | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Containing CTPs                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Tx Allocated Bandwidth                     |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     | Y        |       | Y        |          | Y        |
| Tx Maximum Bandwidth                       |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     | Y        |       | Y        |          | Y        |
| Tx UBR Allocated Bandwidth                 |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     |          |       | Y        |          | Y        |
| Tx CBR Allocated Bandwidth                 |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     |          |       | Y        |          | Y        |
| Rx Allocated Bandwidth                     |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     | Y        |       | Y        |          | Y        |
| Rx Maximum Bandwidth                       |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     | Y        |       | Y        |          | Y        |
| Rx UBR Allocated Bandwidth                 |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     |          |       | Y        |          | Y        |
| Rx CBR Allocated Bandwidth                 |     |      |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    |       | Y     |          |       | Y        |          | Y        |
| <b>IMO Name—IAtmVc</b>                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Channel Identifier                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Virtual Path Identifier                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Shaping Profile                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Discarded and Received Input Data Counters | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Dropped and Forward Output Data Counters   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Ingress Traffic Descriptor                 | Y   | Y    | Y    |      | Y    | Y    | Y    |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Egress Traffic Descriptor                  | Y   | Y    | Y    |      | Y    | Y    | Y    |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Administrative Status                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Operational Status                         | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| IANA Type                                  | Y   |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       | Y     | Y        |       |          |          |          |

Table 5-96 ATM Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|----------------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Containing CTPs                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IAtmTrafficDescriptor</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Traffic Descriptor Type                            |     |      | Y    | Y    | Y    |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Service Category                                   |     |      | Y    | Y    | Y    |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Cell Loss Priority                                 |     |      | Y    | Y    | Y    |      |      | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Cell Delay Variation                               |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Cell Delay Variation Tolerance                     |     |      | Y    | Y    | Y    |      |      | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Maximum High Priority and Aggregate Cell Rates     | Y   |      | Y    | Y    | Y    |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Minimum High Priority and Aggregate Cell Rates     | Y   |      | Y    | Y    | Y    |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Sustainable High Priority and Aggregate Cell Rates | Y   |      | Y    | Y    | Y    |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Peak High Priority and Aggregate Cell Rates        | Y   |      | Y    | Y    | Y    |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Name                                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Index                                              |     |      |      | Y    |      |      |      |      |      |      |      |      | Y    |      | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| <b>IMO Name—IAtmTrafficShapingDescriptor</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Maximum Burst Size                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Sustainable and Peak Cell Rates                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Cell Delay Variation                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| State                                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Buffer Size                                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Cell Loss Priority Discarded Size                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Name                                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Index                                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IAtmTrunk</b>                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Same as IAtm                                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IAtmLogicalPort/Trunk</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Resource Management Cell Termination               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Resource Management Cell Generation                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |

**Table 5-96** ATM Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                                   | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Effective Check Input and Output Capacities |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Admin Status                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Oper Status                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Same as IAtm                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IAtmTrunkVc</b>                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Destination Description                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Same as IAtmVc                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IIMAGroup</b>                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| AdminStatus                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| OperStatus                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| GroupName                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| ImaVersion                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Speed                                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| ConfiguredBandwidth                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| NumberOfLinks                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| NumberOfActiveLinks                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| MinimumNumberOfTxLinks                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| MinimumNumberOfRxLinks                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| ClockMode                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| FrameLength                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| interfaceName                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| groupStatus                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |

# Frame Relay

**Table 5-97** Frame Relay Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                                     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—Iframesrelay/IFrTrunk</b>         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Protocol Type                                 |     | Y    |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| VC Table                                      |     | Y    | Y    |      | Y    |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    |       | Y     |          |       | Y        |          |          |
| Cross-Connect Table                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IANA Type                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y     |       |          |       |          |          |          |
| Containing CTPs                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IfrVc</b>                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Data Link Connection Identifier               |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Traffic Descriptor                            |     | Y    | Y    |      | Y    |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Discard and Received Input Data Counters      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Dropped and Forward Output Data Counters      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Ingress Traffic Descriptor                    |     | Y    | Y    |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Egress Traffic Descriptor                     |     | Y    | Y    |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Administrative Status                         |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Operational Status                            |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| IANA Type                                     |     |      |      | Y    | Y    |      |      |      |      |      |      | Y    |      | Y    |      |      |       |       |          |       |          |          |          |
| Containing CTPs                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IfrTrafficDescriptor</b>          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Committed Rate                                |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Excess Burst Rate                             |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          |          |
| Name                                          |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Index                                         |     |      |      |      |      |      |      | Y    |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IframesrelayLogicalPort/Trunk</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Admin Status                                  |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |          |
| Oper Status                                   |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |       |       |          |       |          |          |          |
| Same as IFrameRelay                           |     |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      |      |       | Y     |          |       |          |          |          |
| <b>IMO Name—IfrTrunkVc</b>                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Destination Description                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |

**Table 5-97** *Frame Relay Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)*

| Attribute                      | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|--------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Same as IFRVc                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—IEncapsulation</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Connection Interface   |     | Y    | Y    |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Binding Information            |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      | Y     |       |          |       |          |          |          |

## Point to Point

**Table 5-98** *Point to Point Attribute Support on Cisco Routers—Cisco ANA Version 3.7*

| Attribute                                 | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IvcbasedEncapsulation</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Connection                        |     |      |      |      |      |      |      | Y    |      |      |      |      |      |      |      |      |       |       | Y        |       |          |          |          |
| Binding Information                       |     |      |      | Y    | Y    |      | Y    | Y    |      |      | Y    |      |      |      |      |      |       |       | Y        |       |          |          |          |
| Binding Status                            |     | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| IANA Type                                 |     | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| Containing CTPs                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        |       |          |          |          |
| Contained CTPs                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        |       |          |          |          |
| <b>IMO Name—Iencapsulation (HDLC/PPP)</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Connection                        |     | Y    | Y    |      |      |      |      | Y    |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          |       |          |          |          |
| Binding Information                       |     |      |      |      |      |      |      | Y    |      |      | Y    | Y    | Y    |      | Y    | Y    |       |       |          |       |          |          |          |
| Binding Status                            |     | Y    | Y    | Y    | Y    |      | Y    | Y    |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     |          |          |          |
| IANA Type                                 |     | Y    | Y    | Y    | Y    |      | Y    |      |      |      |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       |          |          |          |
| Containing CTPs                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |



# Physical Technologies

**Table 5-99 Physical Technologies Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                         | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941       |
|-----------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------------|
| <b>IM0 Name—ISonetSdh</b>         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Specific Type                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Loopback Type                     |     |      |      |      |      | Y    | Y    |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        |                |
| Scrambling Mode                   |     | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          |       | Y        |          |                |
| Same as IPhysicalLayer            |     |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      |       |       |          |       |          |          |                |
| TCAThresholdB1                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          |          |                |
| TCAThresholdB2                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          |          |                |
| TCAThresholdB3                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          |          |                |
| clocking                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          |          |                |
| <b>IM0 Name—IDS0Bundle</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Bundled Time Slots                | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       |          |          |                |
| Bundle Location                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      |      | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        |       |          |          |                |
| IANA Type                         | Y   | Y    | Y    | Y    | Y    |      |      | Y    |      |      | Y    |      |      |      |      | Y    |       |       | Y        |       |          |          |                |
| Containing CTPs                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Contained CTPs                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| AdminStatus                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       | Y        |       |          |          |                |
| OperStatus                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       | Y        |       |          |          |                |
| <b>IM0 Name—IDS1Pdh / IDS3Pdh</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Framing Type                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Cell Mapping Type                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Loopback Type                     |     |      |      |      |      |      |      |      | Y    | Y    |      |      |      |      |      |      |       |       |          |       |          |          |                |
| Scrambling Mode                   | Y   | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y <sup>1</sup> |
| Same as IPhysicalLayer            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                |
| portDescription                   |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       | Y        | Y     |          |          | Y <sup>2</sup> |
| internationalBit                  |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>3</sup> |
| nationalBits                      |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>4</sup> |
| framing                           |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>5</sup> |
| lineCode                          |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>6</sup> |
| cableLength                       |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>7</sup> |
| recoveredClockingId               |     |      |      |      | Y    |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>8</sup> |
| clocking                          |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       | Y        | Y     |          |          | Y <sup>9</sup> |

**Table 5-99 Physical Technologies Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| loopback   |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>10</sup> |
| alarmState |     |      |      |      | Y    |      |      |      |      |      |      |      |      |      |      | Y    |       |       | Y        |       |          |          | Y <sup>11</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 Not supported on IOS 12.2(33)MRA (CSR3.2).

## MPLS

**Table 5-100 MPLS Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IMpls</b>           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Distribution Protocol           |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Outer and Inner Labels          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          | Y        |          |
| Traffic Engineering Properties  |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Resource reservation Properties |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IANA Type                       |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      |      |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Containing CTPs                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—ILse</b>            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| MPLS Table                      |     |      |      |      |      |      |      |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| MPLS Aggregate Table            |     |      |      |      |      |      |      |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| MPLS Tunnel Segments            |     |      |      |      |      |      |      |      | Y    |      |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| LDP Service                     |     |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Logical Sons                    |     |      |      |      |      | Y    |      |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        |          | Y        |
| <b>IMO Name—ILDpService</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Local Identification Status     |     |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| LDP Peers                       |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—ILDpPeer</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Peer Identification             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Transport Address               |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Distribution Method             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

**Table 5-100 MPLS Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                           | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Protocol Type                       |     |      |      |      |      |      |      |      | Y    |      | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Path Vector Limit                   |     |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |      | Y    |       | Y     |          |       | Y        |          | Y        |
| Session Status                      |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Protocol Version Hold Time          |     |      |      |      |      |      |      |      | Y    | Y    | Y    |      |      |      |      |      |       |       |          |       |          |          |          |
| Hold Time                           |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Keep Alive Time                     |     |      |      |      |      |      |      |      | Y    | Y    | Y    |      |      |      |      |      |       |       | Y        | Y     |          | Y        |          |
| Peer Discovery Sources              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—ILdpDiscoverySource</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Interface Name                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Source Address                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Type                                |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IMplsEntry</b>          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Incoming Label                      |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Outgoing Interface and Label        |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Switching Action                    |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Next Hop IP Address                 |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Destination Mask                    |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Destination address                 |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IMplsAggregateEntry</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Routing Entity              |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Incoming Label                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Outgoing Interface and Label        |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Switching Action                    |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Next Hop IP Address                 |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

# MPLS TE

**Table 5-101 MPLS TE Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                                   | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000        | CRS-1           | ASR 1000 | ASR 9000 | MWR 2941        |
|---------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-----------------|-----------------|----------|----------|-----------------|
| IMO Name—IMplsTETunnel                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Destination Address                         |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>1</sup>  |
| Outgoing Interface and Label                |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>2</sup>  |
| LSP Identification                          |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>3</sup>  |
| Requested Bandwidth                         |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>4</sup>  |
| Measured Average Burst and Peak Bandwidth   |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>5</sup>  |
| Setup and Hold Priority                     |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>6</sup>  |
| Affinity Bits and Mask                      |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>7</sup>  |
| Automatic Route Announcement Status         |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>8</sup>  |
| Optimization Lock Down Status               |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>9</sup>  |
| Path Type                                   |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>10</sup> |
| Name                                        |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>11</sup> |
| Description                                 |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>12</sup> |
| Administrative Status                       |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>13</sup> |
| Operational Status                          |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>14</sup> |
| IANA Type                                   |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>15</sup> |
| is FRR Enabled                              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>16</sup> |
| IMO Name—IMplsTEProperties                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Administrative Weight                       |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>17</sup> | Y <sup>18</sup> | Y        | Y        | Y <sup>19</sup> |
| Attributes Identifier                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y <sup>20</sup> | Y <sup>21</sup> |          | Y        |                 |
| Signaling Protocol                          |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>22</sup> | Y <sup>23</sup> | Y        | Y        | Y <sup>24</sup> |
| Available Physical and Reservable Bandwidth |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>25</sup> | Y <sup>26</sup> | Y        | Y        | Y <sup>27</sup> |
| Reserved Bandwidth                          |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>28</sup> | Y <sup>29</sup> | Y        | Y        | Y <sup>30</sup> |
| IMO Name—IMplsTEPropertiesAllocationEntry   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Priority Level                              |     |      |      |      |      |      |      |      |      |      | Y    | Y    |      |      |      |      | Y     |       |                 |                 |          |          |                 |
| Allocated and Cumulative Bandwidth          |     |      |      |      |      |      |      |      |      |      | Y    | Y    |      |      |      |      | Y     |       |                 |                 |          |          |                 |
| IMO Name—IMplsTESegment                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Segment Type                                |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y               | Y               | Y        | Y        | Y <sup>31</sup> |

**Table 5-101 MPLS TE Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                                 | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|-------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| Measured Average Burst and Peak Bandwidth |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>32</sup> |
| LSP Identification                        |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>33</sup> |
| Name                                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>34</sup> |
| FRRTunnelName                             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>35</sup> |
| FRRTunnelState                            |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>36</sup> |
| AverageBandwidth                          |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>37</sup> |
| In Interface                              |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>38</sup> |
| Out interface                             |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>39</sup> |
| In Label                                  |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>40</sup> |
| Out Label                                 |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>41</sup> |
| Source address                            |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>42</sup> |
| Destination address                       |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y <sup>43</sup> |

<sup>1, 2, 3, 4, 5, 7, 8, 9, 10</sup>ANA 3.6.2 and earlier: show mpls traffic-eng link-management bandwidth-allocation \$telnetString\$. ANA 3.6.3 and later: show mpls traffic-eng link-management bandwidth-allocation interface \$telnetString\$.

<sup>6</sup>Till ANA 3.6.2 - show mpls traffic-eng link-management bandwidth-allocation \$telnetString\$ From ANA 3.6.3 - show mpls traffic-eng link-management bandwidth-allocation interface \$telnetString\$ For ANA 3.6.6(XR 3.8.0) -show mpls traffic-eng link-management interfaces \$telnetString\$(Administrative weight) First Registration Name for XR version less than 3.8.0 and second one is for XR version 3.8.0. Same for query too.

<sup>11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43</sup>Not supported on IOS 12.2(33)MRA (CSR3.2).

# VPN

**Table 5-102 VPN Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                         | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IVrf</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Routing Table             |     |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    | Y     |       |          | Y     | Y        | Y        | Y        |
| Exported Route Targets            |     |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    | Y     |       | Y        | Y     | Y        | Y        | Y        |
| Imported Route Targets            |     |      |      |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    | Y     |       | Y        | Y     | Y        | Y        | Y        |
| Route Distinguisher               |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| ARP Entity                        |     |      |      |      |      |      |      | Y    |      | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Name                              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Logical Sons                      |     |      |      |      |      |      | Y    |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Description                       |     |      |      |      |      |      |      |      |      | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Import Route-Map                  |     |      |      |      |      |      |      |      |      | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Export Route-Map                  |     |      |      |      |      |      |      |      |      | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IVrfEntry</b>         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Next Hop BGP Address              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Incoming and Outgoing Inner Label |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Outer Label                       |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Destination IP Subnet             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Next Hop IP Address               |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Type                              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Routing Protocol Type             |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Outgoing Interface Name           |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IMpBgp</b>            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| BGP Identifier                    | Y   |      |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Local Autonomous System           |     |      |      |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Cross Virtual Routing Table       |     |      |      |      |      | Y    | Y    |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| BGP Neighbors                     |     |      |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Logical Sons                      |     |      |      |      |      |      | Y    |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| <b>IMO Name—ICrossVrf</b>         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Virtual Routing Entries           |     |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        |          | Y        |
| Virtual Routing Entity Name       |     |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        |          | Y        |

**Table 5-102 VPN Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|--------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—ICrossVrfRoutingEntry</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Outgoing Virtual Routing Entity Identifier |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Incoming and Outgoing Virtual Routing Tags |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Destination IP Subnet                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Next Hop IP Address                        |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Type                                       |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Routing Protocol Type                      |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Outgoing Interface Name                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |

## PWE3

**Table 5-103 PWE3 Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000        | CRS-1           | ASR 1000 | ASR 9000 | MWR 2941        |
|--------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-----------------|-----------------|----------|----------|-----------------|
| <b>IMO Name—IPTPLayer2MplsTunnel</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Local and Remote Router Addresses          |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>1</sup>  | Y <sup>2</sup>  | Y        | Y        | Y <sup>3</sup>  |
| Local and Remote Virtual Connection Labels |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>4</sup>  | Y <sup>5</sup>  | Y        | Y        | Y <sup>6</sup>  |
| Tunnel Identification                      |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>7</sup>  | Y <sup>8</sup>  | Y        | Y        | Y <sup>9</sup>  |
| Tunnel Status                              |     |      |      |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>10</sup> | Y <sup>11</sup> | Y        | Y        | Y <sup>12</sup> |
| Local and Remote Tunnel Interface          |     |      |      |      |      |      |      |      |      |      | Y    |      |      |      |      |      |       |       | Y <sup>13</sup> |                 |          |          |                 |
| IANA Type                                  |     |      |      |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y <sup>14</sup> | Y               | Y        | Y        | Y <sup>15</sup> |
| Containing CTPs                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| Contained CTPs                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |                 |
| PsuedowireType                             |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y               | Y               | Y        | Y        | Y <sup>16</sup> |
| PreferredPathTunnel                        |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y               | Y               | Y        | Y        | Y <sup>17</sup> |
| LocalMTU                                   |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y               | Y               | Y        | Y        | Y <sup>18</sup> |
| RemoteMTU                                  |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y               | Y               | Y        | Y        | Y <sup>19</sup> |
| PeerStatus                                 |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y               | Y               | Y        | Y        | Y <sup>20</sup> |

**Table 5-103** *PWE3 Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)*

| Attribute         | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|-------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| SignalingProtocol |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y        | Y     | Y        | Y        | Y <sup>21</sup> |
| VFIName           |     |      |      |      |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       | Y     | Y        | Y     | Y        | Y        | Y <sup>22</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10Till ANA 3.6.2 show l2vpn xconnect detail | include (Group | AC: | PW:) show l2vpn xconnect group

\$groupName\$ xc-name \$xcname\$ detail show l2vpn xconnect group \$groupName\$ detail From ANA 3.6.3 - show l2vpn xconnect detail

11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22Supported only on IOS 12.2(33)MRA (CSR3.2).

## ACL

**Table 5-104** *ACL Attribute Support on Cisco Routers—Cisco ANA Version 3.7*

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000        | CRS-1           | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-----------------|-----------------|----------|----------|----------|
| <b>IMO Name—IAccessList</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |          |
| Type                               | Y   |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>1</sup>  | Y <sup>2</sup>  | Y        | Y        | Y        |
| Access List Entries                | Y   | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>3</sup>  | Y <sup>4</sup>  | Y        | Y        | Y        |
| Name or Id                         | Y   |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>5</sup>  | Y <sup>6</sup>  | Y        | Y        | Y        |
| Index                              | Y   |      |      |      |      |      | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>7</sup>  | Y <sup>8</sup>  | Y        | Y        | Y        |
| <b>IMO Name—IAccessListEntry</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                 |                 |          |          |          |
| Entry Identification               | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>9</sup>  | Y <sup>10</sup> | Y        | Y        | Y        |
| Action Logic                       | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>11</sup> | Y <sup>12</sup> | Y        | Y        | Y        |
| Source and Destination Address     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>13</sup> | Y <sup>14</sup> | Y        | Y        | Y        |
| Source and Destination Wildcard    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>15</sup> | Y <sup>16</sup> | Y        | Y        | Y        |
| Protocol Type                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>17</sup> | Y <sup>18</sup> | Y        | Y        | Y        |
| Source and Destination Port Ranges | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>19</sup> | Y <sup>20</sup> | Y        | Y        | Y        |
| Source and Destination Port Action | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>21</sup> | Y <sup>22</sup> | Y        | Y        | Y        |
| Protocol Specific Info             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>23</sup> | Y <sup>24</sup> | Y        | Y        | Y        |
| Differential Services Code Points  | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>25</sup> | Y <sup>26</sup> | Y        | Y        | Y        |
| Type of Service                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>27</sup> | Y <sup>28</sup> | Y        | Y        | Y        |



**Table 5-104 ACL Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000        | CRS-1           | ASR 1000 | ASR 9000 | MWR 2941 |
|------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-----------------|-----------------|----------|----------|----------|
| Precedence | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>29</sup> | Y <sup>30</sup> | Y        | Y        | Y        |
| Matches    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>31</sup> | Y <sup>32</sup> | Y        | Y        | Y        |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 ANA 3.6.0 and earlier: show access-lists ipv4. ANA 3.6.1 and later: show running-config ipv4 access-list.

## Physical Equipment

**Table 5-105 Physical Equipment Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                   | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000       | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------------|-------|----------|----------|----------|
| <b>IMO Name—IChassis</b>    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Description                 | Y   |      | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              |       | Y        | Y        | Y        |
| Equipment Holder Type       |     | Y    | Y    | Y    | Y    |      |      |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     |       |                |       | Y        |          | Y        |
| Contained Equipment Holders |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Contained Equipments        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       | Y        |          |          |
| Serial Number               | Y   |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              |       | Y        | Y        | Y        |
| <b>IMO Name—IShelf</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Description                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                | Y     |          |          |          |
| Status                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                | Y     |          |          |          |
| Equipment Holder Type       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Contained Equipment Holders |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Contained Equipments        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Serial Number               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                | Y     |          |          |          |
| <b>IMO Name—IModule</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Module Name                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y <sup>1</sup> | Y     | Y        | Y        | Y        |
| Module Description          | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              | Y     | Y        | Y        | Y        |
| Software Version            | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              | Y     | Y        | Y        | Y        |
| Operational Status          | Y   | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              | Y     | Y        | Y        | Y        |
| Hardware Type + Version     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y              | Y     | Y        | Y        | Y        |
| Managed IP Address          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |                |       |          |          |          |
| Redundant Equipment         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       | Y     | Y              |       |          |          |          |

**Table 5-105 Physical Equipment Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                             | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Configured Redundancy                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       | Y     | Y        | Y     | Y        | Y        |          |
| Redundancy Status                     | Y   |      | Y    | Y    |      | Y    | Y    |      |      |      | Y    | Y    |      |      |      | Y    |       | Y     | Y        | Y     | Y        | Y        | Y        |
| Operational Status Last Changed       | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Supported Physical Termination Points |     | Y    | Y    |      |      |      |      |      | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        |       | Y        |          | Y        |
| Serial Number (soft property)         | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Slots Number                          |     |      |      |      |      |      |      | Y    |      |      |      |      | Y    |      | Y    |      |       |       |          |       |          |          |          |

<sup>1</sup>Blower modules are supported in XR versions 3.7.1 and above. PEM Modules are supported in XR versions 3.8.1 and above. Pluggable modules are supported in XR versions 3.8.1 and above. Pluggable modules present under submodules are only supported. All ports in OCx modules will be modeled as SONET. The actual encapsulation is shown in the port properties.

## Base Logical Components

**Table 5-106 Base Logical Components Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IManagedElement</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IP Address                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Communication State             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Investigation State             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Element Category                | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Element Type and Key            | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Device Name                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| System Name                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| System Description              | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Up Time                         | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Software Version                | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Vendor Identity                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Memory and CPU Usage            | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| DRAM Free                       | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| DRAM Used                       | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

**Table 5-106 Base Logical Components Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                             | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| Flash Device Size                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| NVRAM Size                            | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Processor DRAM                        | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Sys Contact                           | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Sys Location                          | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Serial Number                         | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| File Systems                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        | Y     |          | Y        |          |
| <b>IMO Name—IContext</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Name                                  |     |      |      |      |      | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     |          |       | Y        |          | Y        |
| Bounded Connections                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IP Address Pools                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Forwarding Components List            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Traffic Descriptors List              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Tunnel Containers List                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Data Link Aggregation Containers List |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| <b>IMO Name—ISystemService</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Type                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Status                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Up Time                               | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

## Common

**Table 5-107 Common Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|--------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IPhysicalLayer</b>             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Media Type                                 |     | Y    | Y    | Y    | Y    | Y    | Y    |      |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Clocking Source                            | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Maximum Speed                              | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Is Internal Port                           | Y   | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Discarded Bandwidth                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Dropped Bandwidth                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Input Bandwidth                            |     |      | Y    | Y    |      | Y    | Y    | Y    |      | Y    |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Output Bandwidth                           |     |      | Y    | Y    |      | Y    | Y    | Y    |      | Y    |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Discarded and Received Input Data Counters | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Dropped and Forward Output Data Counters   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Administrative Status                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Operational Status                         | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Last Changed                               | Y   | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     |       | Y        |       | Y        |          | Y        |
| IANA Type                                  | Y   | Y    |      |      | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Containing CTPs                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Contained CTPs                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Port Alias                                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Location                                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Sending Alarms                             | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     |          | Y     | Y        | Y        | Y        |
| Connector Description                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Part ID                                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Connector Serial Num                       | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Product                                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Status                                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Managed                                    | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IBridge</b>                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Bridge Table                               | Y   |      |      |      |      |      |      |      | Y    |      |      |      |      | Y    |      | Y    | Y     |       | Y        |       |          | Y        | Y        |
| Type                                       | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    | Y     |       | Y        |       |          | Y        | Y        |
| MAC Address                                | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    | Y     |       |          |       |          | Y        | Y        |

**Table 5-107 Common Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                    | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| IP Interface                 | Y   |      |      |      |      |      |      |      |      |      |      |      |      | Y    |      | Y    | Y     |       | Y        |       |          | Y        | Y        |
| Name                         | Y   |      |      |      |      |      | Y    |      | Y    |      |      |      |      | Y    |      | Y    | Y     | Y     | Y        | Y     |          | Y        | Y        |
| Logical Sons                 | Y   |      |      |      |      |      | Y    |      | Y    |      |      |      |      | Y    |      | Y    | Y     | Y     | Y        | Y     |          | Y        | Y        |
| Vlan Type                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        |       |          |          |          |
| <b>IMO Name—IBridgeEntry</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Destination MAC              | Y   |      |      |      |      | Y    | Y    |      | Y    |      |      |      |      | Y    |      | Y    | Y     |       | Y        |       |          | Y        | Y        |
| Outgoing Interface           | Y   |      |      |      |      | Y    | Y    |      | Y    |      |      |      |      | Y    |      | Y    | Y     |       | Y        |       |          | Y        | Y        |

## ATM Cross Connect

**Table 5-108 ATM Cross Connect Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                         | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IvSwitchingEntity</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Cross Connect Table               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       | Y        |       |          |          | Y        |
| crossConnectTableSize             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       | Y        |       |          |          | Y        |
| Logical Sons                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | Y        |       |          |          |          |

## Additional Technologies

**Table 5-109 Additional Technologies Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute           | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—POS</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| POS                 | Y   | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        |          |          |

# DWDM

**Table 5-110 DWDM Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

|                        | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| IMO Name—IDWDM         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| laserStatus            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| txPower                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| rxPower                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| loopback               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| controllerStatus       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| wavelengthBand         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| msaItuChannel          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| frequency              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| wavelength             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| g709Status             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| detectedAlarms         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| assertedAlarms         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| opticsType             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| rxLosThreshold         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| location               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| IMO Name—IDwdmG709Info |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Location               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| Status                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuAlarmCounters       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OduAlarmCounters       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuAlarmReporting      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OduAlarmReporting      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuAssertedAlarms      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OduAssertedAlarms      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuDetectedAlarms      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OduDetectedAlarms      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuBerCounters         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuBerReporting        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuAssertedBers        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuDetectedBers        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| OtuBerThreshold        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |

**Table 5-110 DWDM Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| OtuTTI                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| OduTTI                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| FecInfo                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| FecMode                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          | Y     |          |          |          |
| <b>IMO Name—IDwdmPmSettings</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Location                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| IntervalType                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| FecPmSettings                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| OpticsPmSettings                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |
| OtnPmSettings                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          | Y     |          |          |          |

## Local Switching

**Table 5-111 Local Switching Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                             | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—ILocalSwitchingEntity</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| LocalSwitchingTable                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—ILocalSwitchingEntry</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Local Switching Entry Key             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Local Switching Entry Status          | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 1                             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 1 Port Name                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 1 Status                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 2                             | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 2 Port Name                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Segment 2 Status                      | Y   | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    |      | Y    |      | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

## BFD

**Table 5-112** BFD Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                   | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IBfdService</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Status                      |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| <b>IMO Name—IBfdSession</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| SourceIp                    |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| DestinationIp               |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| Interval                    |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| Multiplier                  |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| Protocol                    |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| State                       |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| Interface                   |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |
| Process                     |     |      |      | Y    |      |      |      |      |      |      |      | Y    |      |      |      | Y    |       |       | Y        | Y     | Y        | Y        | Y        |

## Clocking

**Table 5-113** Clocking Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IClockService</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ActiveClockSource             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| NcsMode                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| HoldTimeout                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| UseStratum4                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Mode                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| NcsPriorityList               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| PtpService                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| <b>IMO Name—IClockSource</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Priority                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Source                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Status                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Type                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |



Table 5-113 Clocking Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IPTpService</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Mode                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| ClockId                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| Domain                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| Priority1                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| Priority2                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| PtpEnabled                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| PtpInterfaceList                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| <b>IMO Name—IPTpInterface</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Version                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| AnnounceInterval                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| AnnounceTimeout                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| DestinationAddress              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| SourceAddress                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| DelayReq                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| MasterMode                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| SlaveMode                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| SyncInterval                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| SyncLimit                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| InterfaceXid                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          | Y        |
| <b>IMO Name—IACRService</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| RecoveredClockSource            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| RecoveredClockMode              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| CemInterface                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| RecoveredClockList              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| <b>IMO Name—IRecoveredClock</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ClockId                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| RecoveredClockMode              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Port                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Cem                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| Status                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |
| FrequencyOffset                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y        |

# Carrier Ethernet

**Table 5-114** Carrier Ethernet Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                             | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600            | 10000           | 12000           | XR 12000        | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|---------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|-----------------|-----------------|-------|----------|----------|-----------------|
| <b>IMO Name—IVsi</b>                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |                 |                 |                 |       |          |          |                 |
| vsiInstanceName                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>1</sup>  |
| vpnId                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>2</sup>  |
| discoveryMode                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>3</sup>  |
| vsiMode                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>4</sup>  |
| Operational state                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>5</sup>  |
| Administrative state                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        | Y <sup>6</sup>  |
| <b>IMO Name—IPseudowireProperties</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |                 |                 |                 |       |          |          |                 |
| isSplitHorizonEnabled                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        |                 |
| isAutoDiscovered                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               |       | Y        | Y        |                 |
| <b>IMO Name—IVLANTaggedInterface</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |                 |                 |                 |       |          |          |                 |
| InterfaceName                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>7</sup>  | Y <sup>8</sup>  | Y <sup>9</sup>  | Y     | Y        | Y        | Y <sup>10</sup> |
| Inner Vlan Id                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>11</sup> | Y <sup>12</sup> | Y <sup>13</sup> | Y     | Y        | Y        | Y <sup>14</sup> |
| Outer Vlan Id                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>15</sup> | Y <sup>16</sup> | Y <sup>17</sup> | Y     | Y        | Y        | Y <sup>18</sup> |
| Encap Type                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>19</sup> | Y <sup>20</sup> | Y <sup>21</sup> | Y     | Y        | Y        | Y <sup>22</sup> |
| Operational state                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>23</sup> | Y <sup>24</sup> | Y <sup>25</sup> | Y     | Y        | Y        | Y <sup>26</sup> |
| Administrative state                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>27</sup> | Y <sup>28</sup> | Y <sup>29</sup> | Y     | Y        | Y        | Y <sup>30</sup> |
| ConfiguredDescription                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               | Y <sup>31</sup> | Y <sup>32</sup> | Y               | Y     | Y        | Y        | Y <sup>33</sup> |
| <b>IMO Name—IEfp</b>                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |                 |                 |                 |       |          |          |                 |
| EfpId                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>34</sup> |                 |                 | Y <sup>35</sup> | Y     |          | Y        |                 |
| RewriteParams                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>36</sup> |                 |                 | Y <sup>37</sup> | Y     |          | Y        |                 |
| EncapsParams                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>38</sup> |                 |                 | Y <sup>39</sup> | Y     |          | Y        |                 |
| AdminStatus                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>40</sup> |                 |                 | Y <sup>41</sup> | Y     |          | Y        |                 |
| OperStatus                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>42</sup> |                 |                 | Y <sup>43</sup> | Y     |          | Y        |                 |
| SplitHorizonGroup                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>44</sup> |                 |                 | Y <sup>45</sup> | Y     |          | Y        |                 |
| MatchCriteria                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>46</sup> |                 |                 | Y <sup>47</sup> | Y     |          | Y        |                 |
| ConfiguredDescription                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y               |                 |                 | Y               | Y     |          | Y        |                 |
| GetServiceInstanceId                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>48</sup> |                 |                 | Y <sup>49</sup> | Y     |          | Y        |                 |
| SetServiceInstanceId                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y <sup>50</sup> |                 |                 | Y <sup>51</sup> | Y     |          | Y        |                 |

1, 2, 3, 4, 5, 6, 7, 8, 9SNMP is used for versions greater than SRD.

10, 11, 12, 13, 14, 15, 16Supported in IOS versions 12.2(28)SB1 and above.

17, 18, 19, 20, 21, 22, 23Supported in IOS versions 12.0(31)S and above only.

24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 Supported for versions greater than IOX 3.8..

39, 40, 41, 42, 43, 44 Supported only on IOS 12.2(33)MRA (CSR3.2)..

45, 46, 47, 48, 49, 50, 51 Not supported on IOS 12.2(33)MRA (CSR3.2)..

## CDP

**Table 5-115** CDP Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                    | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IM0 Name—ICdpService</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| cdpHoldtime                  | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| cdpMessageInterval           | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| cdpDeviceId                  | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| cdpState                     | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| cdpVersion                   | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| <b>IM0 Name—ICdpNeighbor</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| remoteDeviceId               | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| remotePortId                 | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| remoteIPAddress              | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| localPortId                  | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

## Discovery Protocol

**Table 5-116** Discovery Protocol Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IM0 Name—IDiscoveryProtocol</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| DiscoveryProtocolType              | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |
| Info                               | Y   | Y    | Y    | Y    | Y    | Y    | Y    |      | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y    | Y     | Y     | Y        | Y     | Y        | Y        | Y        |

## VTP

**Table 5-117** VTP Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                   | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IVtpService</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Version                     |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 1        |          |
| OperatingMode               |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 2        |          |
| DomainName                  |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 3        |          |
| ConfigurationRevision       |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 4        |          |
| isPruningEnabled            |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 5        |          |
| isAuthenticationEnabled     |     |      |      |      | Y    |      |      | Y    |      |      |      |      |      |      |      | Y    |       |       |          |       |          | 6        |          |

<sup>1, 2, 3, 4, 5, 6</sup>The MIB provides data by default, but the device does not support VTP.

## L2Channel

**Table 5-118** L2Channel Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                 | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—ICEMEncap</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| cemIfName                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| <b>IMO Name—ICEMGroup</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| IdlePattern               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| IdleCAS                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| DeJitter                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| PayloadSize               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| RTP                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| RTPHeader                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| TimeSlots                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| AdminStatus               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |
| OperStatus                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       | Y        |          | Y        |

# MLPPP

**Table 5-119** MLPPP Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute              | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IMLPPP</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| InterfaceName          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| GroupName              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| MTU                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| FragmentDelay          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| FragmentDisable        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| FragmentMaximum        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| FragmentSize           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| Interleave             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| Keepalive              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| KeepaliveTime          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| KeepaliveRetry         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| ActiveLink             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| MinimumConfiguredLink  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| MaximumConfiguredLink  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| LocalMRRU              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| RemoteMRRU             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| LoadThreshold          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          | Y        |
| LCPStatus              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| AdminStatus            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |
| OperStatus             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          | Y        |

# REP

**Table 5-120** REP Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| <b>IMO Name—IREFService</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| version                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>1</sup>  |
| administrativeVlan              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>2</sup>  |
| notificationEnabled             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>3</sup>  |
| <b>IMO Name—IREFSegmentInfo</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| segmentId                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>4</sup>  |
| segmentComplete                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>5</sup>  |
| <b>IMO Name—IREFPortInfo</b>    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| portName                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>6</sup>  |
| portKey                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>7</sup>  |
| segmentId                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>8</sup>  |
| portType                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>9</sup>  |
| portRole                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>10</sup> |
| operStatus                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>11</sup> |
| blockedVlans                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>12</sup> |
| preemptTimer                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>13</sup> |
| lslAgeoutTimer                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>14</sup> |
| remoteDeviceName                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>15</sup> |
| remoteDeviceMac                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>16</sup> |
| remotePortName                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>17</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 REP supported only on IOS 12.2(33)MRA(CSR 3.2).

## CFM

Table 5-121 CFM Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                                     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|-----------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| <b>IMO Name—ICfmService</b>                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| cacheSize                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>1</sup>  |
| maximumCacheSize                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>2</sup>  |
| holdTime                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>3</sup>  |
| version                                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>4</sup>  |
| maintenanceIntermediatePointsTable            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>5</sup>  |
| maintenanceDomain                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>6</sup>  |
| <b>IMO Name—IMaintenanceDomain</b>            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| name                                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>7</sup>  |
| level                                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>8</sup>  |
| Id                                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>9</sup>  |
| maintenanceAssociation                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          | Y <sup>10</sup> |
| <b>IMO Name—IMaintenanceEndPoint</b>          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| macAddress                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>11</sup> |
| Interface                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>12</sup> |
| continuityCheckStatus                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>13</sup> |
| direction                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>14</sup> |
| <b>IMO Name—IMaintenanceAssociation</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| name                                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>15</sup> |
| associationType                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>16</sup> |
| maximalMeps                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>17</sup> |
| continuityCheckInterval                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>18</sup> |
| continuityCheckEnable                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>19</sup> |
| crossCheckEnable                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>20</sup> |
| direction                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>21</sup> |
| bridge                                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>22</sup> |
| maintenanceEndPoints                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>23</sup> |
| cfmRemoteMaintenanceEndPoints                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>24</sup> |
| <b>IMO Name—IMaintenanceIntermediatePoint</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| level                                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>25</sup> |
| cfmInterface                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>26</sup> |

**Table 5-121** CFM Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941        |
|--------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|-----------------|
| isAutocreated                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>27</sup> |
| Vlans                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>28</sup> |
| macAddress                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>29</sup> |
| <b>IMO Name—IRemoteMaintenanceEndPoint</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |                 |
| mepId                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>30</sup> |
| macAddress                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>31</sup> |
| level                                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>32</sup> |
| maintenanceEndPointStatus                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>33</sup> |
| maintenanceEndPointOid                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          | Y        | Y <sup>34</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 CFM supported only on IOS 12.2(33)MRA(CSR 3.2).

## SONET/SDH/T3 Path Channelization

**Table 5-122** SONET/SDH/T3 Path Channelization Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—IDS1PdhChannelized</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Au4Number                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| Au3Number                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| Sts1Number                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| Tug3Number                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| Tug2Number                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| VtNumber                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| C11Number                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| C12Number                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| Vt15Number                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| Vt2Number                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| T1Number                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| E1Number                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| PathType                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| Description                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |



**Table 5-122 SONET/SDH/T3 Path Channelization Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                    | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IM0 Name—ISonetSdhHop</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Description                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| AppliqueType                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| PathType                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| <b>IM0 Name—ISonetSts1</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Sts1Number                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     | Y        |       |          |          |          |
| <b>IM0 Name—ISdhAu4</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Au4Number                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |
| <b>IM0 Name—ISdhAu3</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| Au3Number                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    | Y     | Y     |          |       |          |          |          |

## SyncE

**Table 5-123 SyncE Attribute Support on Cisco Routers—Cisco ANA Version 3.7**

| Attribute                       | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IM0 Name—ISyncE</b>          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| synchronousMode                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| equipmentClock                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| clockMode                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| ssmOption                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| esmcMode                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| holdOffTimer                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| waitToRestore                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| Revertive                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| <b>IM0 Name—ISyncEInterface</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| selectionInput                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| ingressESMCMode                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| egressESMCMode                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| ingressQLMode                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| ingressQuality                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| egressQLMode                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| egressQuality                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |

**Table 5-123** SyncE Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|---------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| waitToRestore |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |
| holdOffTimer  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Y    |       |       |          |       |          |          |          |

## SBC

**Table 5-124** SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7

| Attribute                          | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| <b>IMO Name—ISbcService</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| sbcMode                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| releaseVersion                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| applicationVersion                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| haStatus                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISBE</b>               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| callRedirectLimit                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| onholdTimeout                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—IDBE</b>               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| dbeLocationID                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| dbeType                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—IDbeMediaInterface</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| addressRange                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| vrfName                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| managedBy                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| portRange                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| serviceClass                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| status                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| natMode                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| termination                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcAccount</b>        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| name                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| adjacencyList                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeAaaInterface</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| networkId                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

Table 5-124 SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                                     | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-----------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| vrf                                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeBillingProperties</b>         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ldrCheckTime                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| adminStatus                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| operationStatus                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| billingMethod                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| localBillingAddress                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| cachePath                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| cacheMaxSize                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| cacheMinorAlarm                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| cacheMajorAlarm                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| cacheCriticalAlarm                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| retryInterval                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeBillingInstanceProperties</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceNr                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| batchSize                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| batchTime                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| deactMode                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| transportStatus                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| adminStatus                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeRadiusClientProperty</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| sbeRetryInterval                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| clientType                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| sbeConcurrentRequestsLimit                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| sbeRetryLimit                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| radiusMode                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeRadiusServerProperties</b>    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| serverPriority                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| serverKey                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| portNumber                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcAdjacencyEnd</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| peerSubnetRestriction                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isMediaPassthrough                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isHuntingTriggerDisabled                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

**Table 5-124 SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                                    | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|----------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| huntingTriggers                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| vrf                                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| localSignalingAddress                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| remoteSignalingAddress                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| localSignalingPort                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| remoteSignalingPort                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| operationStatus                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| instanceName                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| transportProtocol                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcAdjacencyGroup</b>           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| name                                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| adjacencyList                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcSipAdjacencyEnd</b>          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| preferredTransport                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| registrationTargetAddress                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| registrationTargetPor                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcSipAdjacencyEndAuthRealm</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| domain                                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| username                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| password                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeConfiguredBlackList</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| blacklistType                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| instancename                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeConfiguredBlackListEntry</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| eventType                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| triggerSize                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| triggerPeriod                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| blackListingPeriod                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isDefaultTriggerSize                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isDefaultTriggerPeriod                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCurrentBlacklisting</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| sourceAddress                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isAllSourceAddresses                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| sourcePortType                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

**Table 5-124 SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                                    | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|----------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| sourcePortNumber                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| timeRemaining                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCodecList</b>                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| name                                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCodecListEntry</b>           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| minPacketizationPeriod                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| codecName                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—IDbeH248Profile</b>              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| profileVersion                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| packages                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeMediaGateway</b>             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| codecList                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| ipAddress                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—IDbeMGC</b>                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| remoteIP                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| remotePort                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| transport                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbcH248ControlInterface</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| ipAddress                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| transport                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| port                                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeGlobalHuntingTriggerList</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| huntingMode                                  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| huntingTriggers                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCacPolicySet</b>             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| firstScope                                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCacPolicyTable</b>           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceName                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| instanceDescription                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| matchType                                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCacRuleEntry</b>             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| scope                                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCallPolicySet</b>            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| isActive                                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| policySetNumber                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

**Table 5-124 SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)**

| Attribute                           | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| name                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| description                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCallPolicyTable</b> |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceName                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| instanceDescription                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| matchType                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeCallRuleEntry</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| entryNumber                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| action                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| matchValue                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| entryCategory                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbePolicySet</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| isActive                            |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| policySetNumber                     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| name                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| description                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbePolicyTable</b>     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| matchType                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| name                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| description                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeRuleEntry</b>       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| entryNumber                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| action                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| matchValue                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| entryCategory                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeSdpMatchTable</b>   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| tableType                           |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| matchStrings                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeSdpPolicyTable</b>  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| name                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| <b>IMO Name—ISbeQosProfile</b>      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| classOfService                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| markingType                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| dscp                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

Table 5-124 SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                           | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|-------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| ipPrecedence                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| tos                                 |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipHeaderProfile       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceName                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isInUse                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| profileType                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| description                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipHeaderProfileEntry  |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| entryNr                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| action                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| value                               |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| conditions                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| parameterProfile                    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipHeaderProfileHeader |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| name                                |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipMethodProfile       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| isPassthrough                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipMethodProfileMethod |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceName                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| action                              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| mapStatusCode                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| headerProfile                       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipOptionProfile       |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| options                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipParameterProfile    |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| parameters                          |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipProfile             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| instanceName                        |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| isInUse                             |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| profileType                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| description                         |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| IMO Name—ISbeSipTimerProperties     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       |          |          |          |
| tcpConnectTimeout                   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| tcpIdleTimeout                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| tlsIdleTimeout                      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |

**Table 5-124** SBC Attribute Support on Cisco Routers—Cisco ANA Version 3.7 (continued)

| Attribute                  | 800 | 1000 | 1600 | 1700 | 1800 | 2500 | 2600 | 2800 | 3600 | 3700 | 3800 | 7200 | 7300 | 7400 | 7500 | 7600 | 10000 | 12000 | XR 12000 | CRS-1 | ASR 1000 | ASR 9000 | MWR 2941 |
|----------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|----------|-------|----------|----------|----------|
| inviteTimeout              |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| udpFirstRetransmitInterval |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |
| udpMaxRetransmitInterval   |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |          |       | Y        |          |          |





## CHAPTER 6

# Support Information for Cisco Switches

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This chapter contains support information for Virtual Network Elements (VNEs) that manage Cisco switches in Cisco ANA Version 3.7. For more information about the objects and attributes described in this chapter, see Part 2, Technology Support and Information Objects.

This chapter contains the following topics:

- [Cisco Catalyst 2900 Series Switches, page 6-2](#)
- [Cisco ME 3400 Series Ethernet Access Switches, page 6-4](#)
- [Cisco Catalyst 3500 XL Series Switches, page 6-8](#)
- [Cisco Catalyst 3550 Series Switches, page 6-10](#)
- [Cisco Catalyst 3560 Series Switches, page 6-12](#)
- [Cisco Catalyst 3750 Series Switches, page 6-15](#)
- [Cisco Catalyst 3750 Metro Series Switches, page 6-17](#)
- [Cisco Catalyst 4000 Series Switches, page 6-21](#)
- [Cisco Catalyst 4500 Series Switches, page 6-25](#)
- [Cisco Catalyst 4900 Series Switches, page 6-32](#)
- [Cisco ME 4900 Series Ethernet Switch, page 6-37](#)
- [Cisco Catalyst 5000 Series Switches, page 6-41](#)
- [Cisco Catalyst 6500 Series \(CatOS\) Switches, page 6-43](#)
- [Cisco Catalyst 6500 Series \(IOS\) Switches, page 6-48](#)
- [Cisco ME 6500 Series Ethernet Switches \(6524\), page 6-59](#)
- [Supported Technologies on Cisco Switches, page 6-64](#)

# Cisco Catalyst 2900 Series Switches

This section includes the following information about Cisco Catalyst 2900 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 2900 Series Switches](#)):

- [Cisco Catalyst 2900 Series—Supported Software Versions](#), page 6-2
- [Cisco Catalyst 2900 Series—Supported Topologies](#), page 6-2
- [Cisco Catalyst 2900 Series—Supported Modules](#), page 6-3
- [Cisco Catalyst 2900 Series—Supported Technologies](#), page 6-3
- [Cisco Catalyst 2900 Series—Supported Service Events](#), page 6-4
- [Cisco Catalyst 2900 Series—Supported Commands](#), page 6-4

## Cisco Catalyst 2900 Series—Supported Software Versions

**Table 6-1**      *Supported Software Versions for Cisco Catalyst 2900 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.0(5)WC17      | 3.6.2       |
| 12.1(22)EA8      | 3.6.2       |
| 12.1(22)EA8a     | 3.6.2       |
| 12.2(25)FX       | 3.6.0       |
| CatOS 9.00.04    | 3.6.0       |

## Cisco Catalyst 2900 Series—Supported Topologies

**Table 6-2**      *Supported Topologies for Cisco Catalyst 2900 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco Catalyst 2900 Series—Supported Modules

**Table 6-3**      *Supported Modules for Cisco Catalyst 2900 Series—Cisco ANA Version 3.7*

| Module Name  | ANA Version | Module Description                                                                                                                   |
|--------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| WS-C2912-XL  | 3.6.0       | 12 fixed autosensing 10/100 ports                                                                                                    |
| WS-C2924M-XL | 3.6.0       | 24 fixed autosensing 10/100 ports 2 expansion slots                                                                                  |
| WS-C2948G    | 3.6.0       | 48 10/100 ports and 2 fixed, gigabit interface converter (GBIC)-based 1000BASE-X uplink ports<br>1.5 RU switch Catalyst OS installed |
| WS-X2948     | 3.6.0       | Switching Supervisor                                                                                                                 |

## Cisco Catalyst 2900 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 2900 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [LLDP](#), page 6-92
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94

## Cisco Catalyst 2900 Series—Supported Service Events

**Table 6-4** *Supported Service Events for Cisco Catalyst 2900 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco Catalyst 2900 Series—Supported Commands

**Table 6-5** *Supported Commands for Cisco Catalyst 2900 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco ME 3400 Series Ethernet Access Switches

This section includes the following information about Cisco ME 3400 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco ME 3400 Series Ethernet Access Switches](#)):

- [Cisco ME 3400 Series—Supported Software Versions](#), page 6-5
- [Cisco ME 3400 Series—Supported Topologies](#), page 6-6
- [Cisco ME 3400 Series—Supported Modules](#), page 6-6
- [Cisco ME 3400 Series—Supported Technologies](#), page 6-7
- [Cisco ME 3400 Series—Supported Service Events](#), page 6-7
- [Cisco ME 3400 Series—Supported Commands](#), page 6-8

## Cisco ME 3400 Series—Supported Software Versions

**Table 6-6** Supported Software Versions for Cisco ME 3400 Series—Cisco ANA Version 3.7

| Software Version | ANA Version         |
|------------------|---------------------|
| 12.2(0.0.48)EY   | 3.6.5 <sup>1</sup>  |
| 12.2(25)SEG      | 3.6.1               |
| 12.2(35)SE       | 3.6.1 <sup>2</sup>  |
| 12.2(35)SE1      | 3.6.1 <sup>3</sup>  |
| 12.2(35)SE3      | 3.6.1 <sup>4</sup>  |
| 12.2(35)SE4      | 3.6.4 <sup>5</sup>  |
| 12.2(37)SE       | 3.6.3 <sup>6</sup>  |
| 12.2(37)SE1      | 3.6.4 <sup>7</sup>  |
| 12.2(44)EY       | 3.6.5 <sup>8</sup>  |
| 12.2(44)EY4      | 3.6.5 <sup>9</sup>  |
| 12.2(44)SE       | 3.6.3 <sup>10</sup> |
| 12.2(44)SE1      | 3.6.4 <sup>11</sup> |
| 12.2(46)SE       | 3.6.4 <sup>12</sup> |
| 12.2(50)SE       | 3.6.6 <sup>13</sup> |
| 12.2(50)SE1      | 3.7 <sup>14</sup>   |
| 12.2(52)SE       | 3.6.7 <sup>15</sup> |
| 12.2(53)SE       | 3.7 <sup>16</sup>   |
| 12.3(22)S        | 3.6.1 <sup>17</sup> |
| 12.3(23)         | 3.6.1 <sup>18</sup> |
| 12.3(23)S1       | 3.6.1 <sup>19</sup> |
| 12.3(23)S2       | 3.6.1 <sup>20</sup> |
| 12.3(23)S3       | 3.6.1 <sup>21</sup> |

<sup>1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 17, 18, 19, 20, 21</sup> ANA models pluggable ports for this IOS version.

<sup>9</sup> Tested with modified version of 12.2(44)EY. ANA models pluggable ports for this IOS version.

<sup>14, 15, 16</sup> ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco ME 3400 Series—Supported Topologies

**Table 6-7** Supported Topologies for Cisco ME 3400 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |
| LAG            | LAG            | 3.6.1       |

## Cisco ME 3400 Series—Supported Modules

**Table 6-8** Supported Modules for Cisco ME 3400 Series—Cisco ANA Version 3.7

| Module Name   | ANA Version | Module Description                                                                                                              |
|---------------|-------------|---------------------------------------------------------------------------------------------------------------------------------|
| GLC-EX-SMD    | 3.6.7       | 1000BASE-EX extended SFP transceiver module                                                                                     |
| GLC-FE-100FX  | 3.6.7       | 100BaseFX-SFP module for 100 MB ports,1310 -nm wavelength ,2 Km over MMF                                                        |
| GLC-FE-100LX  | 3.6.7       | 100BaseLX10-SFP module for 100 MB ports,1310 -nm wavelength ,10 Km over SMF                                                     |
| GLC-LH-SM     | 3.6.4       | 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength                                                       |
| GLC-ZX-SM     | 3.7         | Contains a Class 1 laser of 1550 nm for 1000BASE-ZX (extended wavelength) applications                                          |
| ME340X-PWR-AC | 3.6.7       | AC power supply and fan module for ME-3400E-24TS-M and ME-3400EG-12CS-M                                                         |
| SFP-GE-L      | 3.6.4       | 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, extended operating temperature range and DOM support |
| SFP-GE-S      | 3.6.7       | 1000BASE-Sx Short wavelength gigabit ethernet SFP.                                                                              |
| SFP-GE-Z      | 3.6.7       | 1000BASE-Zx Extended reach gigabit ethernet SFP.                                                                                |

## Cisco ME 3400 Series—Supported Technologies

The following technologies are supported by the Cisco ME 3400 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Routing Protocols](#), page 6-67
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [ACL](#), page 6-85
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [Additional Technologies](#), page 6-89
- [LLDP](#), page 6-92
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [REP](#), page 6-94
- [CFM](#), page 6-95

## Cisco ME 3400 Series—Supported Service Events

**Table 6-9**      *Supported Service Events for Cisco ME 3400 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Link Down/Up         | 3.6.1       | Y         |
| Device Unreachable   | 3.6.1       | N         |
| CPU Over Utilized    | 3.6.1       | N         |
| Memory Over Utilized | 3.6.1       | N         |
| Device Unsupported   | 3.6.1       | N         |
| Discard Packets      | 3.6.1       | N         |
| Dropped Packets      | 3.6.1       | N         |
| Module Unsupported   | 3.6.1       | N         |
| Port Flapping        | 3.6.1       | N         |
| Port Down            | 3.6.1       | Y         |
| Rx Over Utilized     | 3.6.1       | N         |
| Tx Over Utilized     | 3.6.1       | N         |
| Card Up/Down         | 3.6.1       | Y         |
| CFM Domain Fault     | 3.7         | N         |

## Cisco ME 3400 Series—Supported Commands

**Table 6-10**      *Supported Commands for Cisco ME 3400 Series—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

## Cisco Catalyst 3500 XL Series Switches

This section includes the following information about Cisco Catalyst 3500 XL Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 3500 XL Series Switches](#)):

- [Cisco Catalyst 3500 XL Series—Supported Software Versions](#), page 6-9
- [Cisco Catalyst 3500 XL Series—Supported Topologies](#), page 6-9
- [Cisco Catalyst 3500 XL Series—Supported Modules](#), page 6-9
- [Cisco Catalyst 3500 XL Series—Supported Technologies](#), page 6-9
- [Cisco Catalyst 3500 XL Series—Supported Service Events](#), page 6-10
- [Cisco Catalyst 3500 XL Series—Supported Commands](#), page 6-10



## Cisco Catalyst 3500 XL Series—Supported Software Versions

**Table 6-11**      *Supported Software Versions for Cisco Catalyst 3500 XL Series—Cisco ANA Version 3.7*

| Software Version    | ANA Version |
|---------------------|-------------|
| Cat IOS 12.0(5)WC9a | 3.6.0       |

## Cisco Catalyst 3500 XL Series—Supported Topologies

**Table 6-12**      *Supported Topologies for Cisco Catalyst 3500 XL Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco Catalyst 3500 XL Series—Supported Modules

**Table 6-13**      *Supported Modules for Cisco Catalyst 3500 XL Series—Cisco ANA Version 3.7*

| Module Name    | ANA Version | Module Description                                   |
|----------------|-------------|------------------------------------------------------|
| C3K-BLWR-60CFM | 3.6.4       | Fan Module for the Catalyst 3750-E and 3560-E Series |

## Cisco Catalyst 3500 XL Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 3500 XL Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94

## Cisco Catalyst 3500 XL Series—Supported Service Events

**Table 6-14** *Supported Service Events for Cisco Catalyst 3500 XL Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| VPN Leak             | 3.6.0       | N         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco Catalyst 3500 XL Series—Supported Commands

**Table 6-15** *Supported Commands for Cisco Catalyst 3500 XL Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 3550 Series Switches

This section includes the following information about Cisco Catalyst 3550 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 3550 Series Switches](#)):

- [Cisco Catalyst 3550 Series—Supported Software Versions](#), page 6-11
- [Cisco Catalyst 3550 Series—Supported Topologies](#), page 6-11
- [Cisco Catalyst 3550 Series—Supported Technologies](#), page 6-11
- [Cisco Catalyst 3550 Series—Supported Service Events](#), page 6-12
- [Cisco Catalyst 3550 Series—Supported Commands](#), page 6-12

## Cisco Catalyst 3550 Series—Supported Software Versions

**Table 6-16** Supported Software Versions for Cisco Catalyst 3550 Series—Cisco ANA Version 3.7

| Software Version | ANA Version |
|------------------|-------------|
| 12.1(11)EA       | 3.6.1       |
| 12.1(12c)EA1     | 3.6.1       |
| 12.1(13)EA       | 3.6.1       |
| 12.1(14)AX3      | 3.6.1       |
| 12.1(14)EA1      | 3.6.1       |
| 12.1(19)EA       | 3.6.1       |
| 12.1(20)EA       | 3.6.1       |
| 12.1(22)EA       | 3.6.1       |
| 12.1(22)EA6      | 3.6.1       |
| 12.1(22)EA8a     | 3.6.1       |

## Cisco Catalyst 3550 Series—Supported Topologies

**Table 6-17** Supported Topologies for Cisco Catalyst 3550 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco Catalyst 3550 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 3550 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [Additional Technologies](#), page 6-89
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94

## Cisco Catalyst 3550 Series—Supported Service Events

**Table 6-18** *Supported Service Events for Cisco Catalyst 3550 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Cloud Problem                                       | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |

## Cisco Catalyst 3550 Series—Supported Commands

**Table 6-19** *Supported Commands for Cisco Catalyst 3550 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 3560 Series Switches

This section includes the following information about Cisco Catalyst 3560 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 3560 Series Switches](#)):

- [Cisco Catalyst 3560 Series—Supported Software Versions](#), page 6-13
- [Cisco Catalyst 3560 Series—Supported Topologies](#), page 6-13
- [Cisco Catalyst 3560 Series—Supported Modules](#), page 6-14
- [Cisco Catalyst 3560 Series—Supported Technologies](#), page 6-14
- [Cisco Catalyst 3560 Series—Supported Service Events](#), page 6-15
- [Cisco Catalyst 3560 Series—Supported Commands](#), page 6-15

## Cisco Catalyst 3560 Series—Supported Software Versions

**Table 6-20**      *Supported Software Versions for Cisco Catalyst 3560 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.1(13)EA1a     | 3.6.0       |
| 12.1(14)EA1a     | 3.6.0       |
| 12.1(22)EA1      | 3.6.2       |
| 12.1(22)EA5      | 3.6.1       |
| 12.1(22)EA8a     | 3.6.1       |
| 12.1(25)EW       | 3.6.0       |
| 12.1(6)EA1a      | 3.6.0       |
| 12.2(25)SEC      | 3.6.2       |
| 12.2(25)SEC2     | 3.6.2       |
| 12.2(25)SED      | 3.6.0       |
| 12.2(25)SEE2     | 3.6.1       |

## Cisco Catalyst 3560 Series—Supported Topologies

**Table 6-21**      *Supported Topologies for Cisco Catalyst 3560 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco Catalyst 3560 Series—Supported Modules

**Table 6-22**      *Supported Modules for Cisco Catalyst 3560 Series—Cisco ANA Version 3.7*

| Module Name    | ANA Version | Module Description                                                   |
|----------------|-------------|----------------------------------------------------------------------|
| C3K-BLWR-60CFM | 3.6.4       | Fan Module for the Catalyst 3750-E and 3560-E Series                 |
| WS-C3560-24PS  | 3.6.1       | 24 Ethernet 10/100 ports and 2 SFP-based Gigabit Ethernet ports      |
| WS-C3560-48PS  | 3.6.0       | 48 Ethernet 10/100 ports and 4 SFP-based Gigabit Ethernet ports      |
| WS-C3560-48TS  | 3.6.2       | 48 Ethernet 10/100 ports and 4 SFP-based Gigabit Ethernet ports      |
| WS-C3560G-24PS | 3.6.1       | 24 Ethernet 10/100/1000 ports and 4 SFP-based Gigabit Ethernet ports |
| WS-C3560G-24TS | 3.6.1       | 24 Ethernet 10/100/1000 ports and 4 SFP-based Gigabit Ethernet ports |
| WS-C3560G-48PS | 3.6.1       | 48 Ethernet 10/100/1000 ports and 4 SFP-based Gigabit Ethernet ports |
| WS-C3560G-48TS | 3.6.0       | 48 Ethernet 10/100/1000 ports and 4 SFP-based Gigabit Ethernet ports |

## Cisco Catalyst 3560 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 3560 Series in Cisco ANA Version 3.7:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [VPN, page 6-82](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [Additional Technologies, page 6-89](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)
- [REP, page 6-94](#)

## Cisco Catalyst 3560 Series—Supported Service Events

**Table 6-23** Supported Service Events for Cisco Catalyst 3560 Series—Cisco ANA Version 3.7

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| VPN Leak             | 3.6.0       | N         |
| Cloud Problem        | 3.6.0       | N         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco Catalyst 3560 Series—Supported Commands

**Table 6-24** Supported Commands for Cisco Catalyst 3560 Series—Cisco ANA Version 3.7

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 3750 Series Switches

This section includes the following information about Cisco 3750 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 3750 Series Switches](#)):

- [Cisco 3750 Series—Supported Software Versions](#), page 6-16
- [Cisco 3750 Series—Supported Topologies](#), page 6-16
- [Cisco 3750 Series—Supported Technologies](#), page 6-16
- [Cisco 3750 Series—Supported Service Events](#), page 6-17
- [Cisco 3750 Series—Supported Commands](#), page 6-17

## Cisco 3750 Series—Supported Software Versions

**Table 6-25**      *Supported Software Versions for Cisco 3750 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 12.2(25)EY3      | 3.6.0       |
| 12.2(25)SEC2     | 3.6.2       |
| 12.2(52)SE       | 3.6.7       |
| 12.2(50)SE       | 3.6.7       |

## Cisco 3750 Series—Supported Topologies

**Table 6-26**      *Supported Topologies for Cisco 3750 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco 3750 Series—Supported Technologies

The following technologies are supported by the Cisco 3750 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [LLDP](#), page 6-92
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94



## Cisco 3750 Series—Supported Service Events

**Table 6-27**      *Supported Service Events for Cisco 3750 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco 3750 Series—Supported Commands

**Table 6-28**      *Supported Commands for Cisco 3750 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 3750 Metro Series Switches

This section includes the following information about Cisco Catalyst 3750 Metro Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 3750 Metro Series Switches](#)):

- [Cisco Catalyst 3750 Metro Series—Supported Software Versions](#), page 6-18
- [Cisco Catalyst 3750 Metro Series—Supported Topologies](#), page 6-18
- [Cisco Catalyst 3750 Metro Series—Supported Modules](#), page 6-19
- [Cisco Catalyst 3750 Metro Series—Supported Technologies](#), page 6-19
- [Cisco Catalyst 3750 Metro Series—Supported Service Events](#), page 6-20
- [Cisco 3750 Metro Series—Supported Commands](#), page 6-21

## Cisco Catalyst 3750 Metro Series—Supported Software Versions

**Table 6-29** *Supported Software Versions for Cisco Catalyst 3750 Metro Series—Cisco ANA Version 3.7*

| Software Version | ANA Version         |
|------------------|---------------------|
| 12.2(25)EY*      | 3.6.3 <sup>1</sup>  |
| 12.2(25)EY3      | 3.6.3 <sup>2</sup>  |
| 12.2(25)SEB4     | 3.6.3 <sup>3</sup>  |
| 12.2(25)SEG1     | 3.6.3 <sup>4</sup>  |
| 12.2(35)SE       | 3.6.3 <sup>5</sup>  |
| 12.2(37)SE*      | 3.6.3 <sup>6</sup>  |
| 12.2(37)SE1      | 3.6.3 <sup>7</sup>  |
| 12.2(40)SE       | 3.6.3 <sup>8</sup>  |
| 12.2(44)SE1      | 3.6.3 <sup>9</sup>  |
| 12.2(46)SE       | 3.6.4 <sup>10</sup> |
| 12.2(50)SE       | 3.6.6 <sup>11</sup> |
| 12.2(52)SE       | 3.6.7 <sup>12</sup> |
| 12.2(53)SE       | 3.7 <sup>13</sup>   |

<sup>1, 2, 3, 4, 5, 6, 7, 8, 9, 10</sup> ANA models pluggable ports for this IOS version.

<sup>11, 12, 13</sup> ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco Catalyst 3750 Metro Series—Supported Topologies

**Table 6-30** *Supported Topologies for Cisco Catalyst 3750 Metro Series—Cisco ANA Version 3.7*

| Topology Type | Link Type   | ANA Version |
|---------------|-------------|-------------|
| BGP           | BGP         | 3.6.0       |
| Ethernet      | Ethernet    | 3.6.0       |
| MPLS          | MPLS        | 3.6.0       |
| PPP/HDLC      | PPP or HDLC | 3.6.0       |
| LAG           | LAG         | 3.6.3       |

## Cisco Catalyst 3750 Metro Series—Supported Modules

**Table 6-31**      *Supported Modules for Cisco Catalyst 3750 Metro Series—Cisco ANA Version 3.7*

| Module Name      | ANA Version | Module Description                                                                                                              |
|------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------|
| CATALYST375024ME | 3.6.0       | Metro Ethernet Catalyst 3750 Module. 24-10/100 + 2 SFP (Small Formfactor Pluggable) ports for downlinks                         |
| GLC-EX-SMD       | 3.6.7       | 1000BASE-EX extended SFP transceiver module                                                                                     |
| GLC-LH-SM        | 3.6.5       | 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength                                                       |
| PWR-ME3750-AC    | 3.7         | Primary AC power supply                                                                                                         |
| PWR-ME3750-DC    | 3.7         | Primary DC power supply                                                                                                         |
| SFP-GE-L         | 3.6.5       | 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, extended operating temperature range and DOM support |

## Cisco Catalyst 3750 Metro Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 3750 Metro Series in Cisco ANA Version 3.7:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [MPLS, page 6-79](#)
- [MPLS TE, page 6-81](#)
- [VPN, page 6-82](#)
- [PWE3, page 6-84](#)
- [ACL, page 6-85](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [Additional Technologies, page 6-89](#)
- [Local Switching, page 6-90](#)
- [BFD, page 6-90](#)
- [LLDP, page 6-92](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)

- [REP, page 6-94](#)
- [CFM, page 6-95](#)

## Cisco Catalyst 3750 Metro Series—Supported Service Events

**Table 6-32**      *Supported Service Events for Cisco Catalyst 3750 Metro Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Discard Packets      | 3.6.0       | N         |
| Dropped Packets      | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Rx Over Utilized     | 3.6.0       | N         |
| Tx Over Utilized     | 3.6.0       | N         |
| BGP Neighbor Down    | 3.6.0       | Y         |
| Card Up/Down         | 3.6.0       | Y         |
| Keepalive set        | 3.7         | N         |
| Keepalive not set    | 3.7         | N         |
| CFM Domain Fault     | 3.7         | N         |

## Cisco 3750 Metro Series—Supported Commands

**Table 6-33**      *Supported Commands for Cisco 3750 Metro Series—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

## Cisco Catalyst 4000 Series Switches

This section includes the following information about Cisco Catalyst 4000 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 4000 Series Switches](#)):

- [Cisco Catalyst 4000 Series—Supported Software Versions](#), page 6-22
- [Cisco Catalyst 4000 Series—Supported Topologies](#), page 6-22
- [Cisco Catalyst 4000 Series—Supported Modules](#), page 6-22
- [Cisco Catalyst 4000 Series—Supported Technologies](#), page 6-24
- [Cisco Catalyst 4000 Series—Supported Service Events](#), page 6-24
- [Cisco Catalyst 4000 Series—Supported Commands](#), page 6-24

## Cisco Catalyst 4000 Series—Supported Software Versions

**Table 6-34** Supported Software Versions for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7

| Software Version | ANA Version        |
|------------------|--------------------|
| IOS 12.1(12c)EW1 | 3.6.0 <sup>1</sup> |
| IOS 12.2(20)EWA1 | 3.6.0 <sup>2</sup> |
| IOS 12.2(25)SG   | 3.6.0 <sup>3</sup> |
| IOS 12.2(31)SGA2 | 3.6.2 <sup>4</sup> |
| IOS 12.2(50)SG1  | 3.6.7 <sup>5</sup> |
| IOS 12.2(52)SG   | 3.6.7 <sup>6</sup> |
| IOS 12.2(53)SG   | 3.7 <sup>7</sup>   |

<sup>1, 2, 3, 4</sup>ANA models pluggable ports for this IOS version.

<sup>5, 6, 7</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco Catalyst 4000 Series—Supported Topologies

**Table 6-35** Supported Topologies for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco Catalyst 4000 Series—Supported Modules

**Table 6-36** Supported Modules for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7

| Module Name   | ANA Version | Module Description                              |
|---------------|-------------|-------------------------------------------------|
| CWDM-SFP-1470 | 3.6.0       | CWDM SFP 1470 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1490 | 3.6.0       | CWDM SFP 1490 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1510 | 3.6.0       | CWDM SFP 1510 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1530 | 3.6.0       | CWDM SFP 1530 nm, Gigabit Ethernet and 1G/2G FC |
| CWDM-SFP-1550 | 3.6.0       | CWDM SFP 1550 nm, Gigabit Ethernet and 1G/2G FC |

**Table 6-36 Supported Modules for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                   |
|-------------------|-------------|----------------------------------------------------------------------|
| CWDM-SFP-1570     | 3.6.0       | CWDM SFP 1570 nm, Gigabit Ethernet and 1G/2G FC                      |
| CWDM-SFP-1590     | 3.6.0       | CWDM SFP 1590 nm, Gigabit Ethernet and 1G/2G FC                      |
| CWDM-SFP-1610     | 3.6.0       | CWDM SFP 1610 nm, Gigabit Ethernet and 1G/2G FC                      |
| WS-U4504-FX-MT    | 3.6.0       | FE Uplink Daughter Card, 4-port 100FX (MTRJ)                         |
| WS-X4014          | 3.6.0       | Catalyst 4006 Supervisor 3, Spare                                    |
| WS-X4124-FX-MT    | 3.6.0       | FE Switching Module, 24-port 100FX (MTRJ)                            |
| WS-X4148-FX-MT    | 3.6.0       | FE Switching Module, 48-100FX MMF (MTRJ)                             |
| WS-X4148-RJ       | 3.6.0       | 10/100 Fast Ethernet Module, 48 Ports (RJ-45)                        |
| WS-X4148-RJ21     | 3.6.0       | Telco switch module, 48-port 10/100 (4xRJ21)                         |
| WS-X4148-RJ45V    | 3.6.0       | Inline Power 10/100, 48-port (RJ45)                                  |
| WS-X4232-GB-RJ    | 3.6.0       | E/FE/GE Module, 2-GE (GBIC), 32-10/100 FE (RJ-45)                    |
| WS-X4232-RJ-XX    | 3.6.0       | FE Base Module, 32-10/100(RJ45)+ Modular Uplink slot                 |
| WS-X4248-RJ21V    | 3.6.0       | 48-port PoE 10/100 BASE-TX switching module                          |
| WS-X4248-RJ45V    | 3.6.0       | 48-port PoE 10/100BASE-TX switching module                           |
| WS-X4302-GB       | 3.6.0       | 2-port 1000BASE-X (GBIC) Gigabit Ethernet                            |
| WS-X4306-GB       | 3.6.0       | Gigabit Ethernet Module, 6 Ports (GBIC)                              |
| WS-X4412-2GB-T    | 3.6.0       | GE Module, 12-1000T (RJ45)+2-1000X (GBIC Slot)                       |
| WS-X4418-GB       | 3.6.0       | GE Module, Server Switching 18 Ports (GBIC)                          |
| WS-X4424-GB-RJ45  | 3.6.0       | 24-port 10/100/1000BASE-T Gigabit Ethernet switching module          |
| WS-X4424-GB-RJ-45 | 3.6.0       | 24 port 10/100/1000 Auto-Sensing Module (RJ45)                       |
| WS-X4448-GB-LX    | 3.6.0       | 48-port 1000BASE-LX (SFP included) Gigabit Ethernet switching module |
| WS-X4448-GB-RJ45  | 3.6.0       | 48 port 10/100/1000 Auto-Sensing Module (RJ45)                       |
| WS-X4548-GB-RJ45  | 3.6.0       | 48-port Gigabit Ethernet 10/100/1000BASE-T switching module          |
| WS-X4548-GB-RJ45V | 3.6.0       | 48-port PoE 10/100/1000BASE-T switching module                       |

## Cisco Catalyst 4000 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 4000 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94

## Cisco Catalyst 4000 Series—Supported Service Events

**Table 6-37**      *Supported Service Events for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco Catalyst 4000 Series—Supported Commands

**Table 6-38**      *Supported Commands for Cisco Catalyst 4000 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |



# Cisco Catalyst 4500 Series Switches

This section includes the following information about Cisco Catalyst 4500 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 4500 Series Switches](#)):

- [Cisco Catalyst 4500 Series—Supported Software Versions](#), page 6-25
- [Cisco Catalyst 4500 Series—Supported Topologies](#), page 6-26
- [Cisco Catalyst 4500 Series—Supported Modules](#), page 6-26
- [Cisco Catalyst 4500 Series—Supported Technologies](#), page 6-31
- [Cisco Catalyst 4500 Series—Supported Service Events](#), page 6-31
- [Cisco Catalyst 4500 Series—Supported Commands](#), page 6-32

## Cisco Catalyst 4500 Series—Supported Software Versions

**Table 6-39**      *Supported Software Versions for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version         |
|------------------|---------------------|
| 12.1(13)EW       | 3.6.0               |
| 12.2(20)EWA      | 3.6.0 <sup>1</sup>  |
| 12.2(25)EWA14    | 3.6.6 <sup>2</sup>  |
| 12.2(31)SGA2     | 3.6.2 <sup>3</sup>  |
| 12.2(50)SG1      | 3.6.7 <sup>4</sup>  |
| 12.2(52)SG       | 3.6.6 <sup>5</sup>  |
| 12.2(52)XO       | 3.6.7 <sup>6</sup>  |
| 12.2(53)SG       | 3.7 <sup>7</sup>    |
| 12.1(12c)EW1     | 3.6.0 <sup>8</sup>  |
| 12.2(20)EWA1     | 3.6.0 <sup>9</sup>  |
| 12.2(25)SG       | 3.6.0 <sup>10</sup> |

<sup>1, 2, 3, 6, 8, 9, 10</sup>ANA models pluggable ports for this IOS version.

<sup>4, 5, 7</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.

## Cisco Catalyst 4500 Series—Supported Topologies

**Table 6-40** Supported Topologies for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Framerelay     | Framerelay     | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco Catalyst 4500 Series—Supported Modules

**Table 6-41** Supported Modules for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7

| Module Name    | ANA Version | Module Description                                                                  |
|----------------|-------------|-------------------------------------------------------------------------------------|
| CWDM-SFP-1550  | 3.7         | Cisco 10GBASE-ZR X2 Module for SMF                                                  |
| DWDM-X2-30.33= | 3.7         | Cisco 10GBASE-SR X2 Module for MMF                                                  |
| DWDM-X2-31.12= | 3.7         | Cisco Catalyst 4500 E-Series 48-Port Premium PoE 10/100/1000                        |
| DWDM-X2-31.90= | 3.7         | Cisco Catalyst 4500 E-Series 48-Port 802.3af PoE and PoEP-ready 10/100/1000 (RJ-45) |
| DWDM-X2-32.68= | 3.7         | 10GBASE-CX4 X2 Module                                                               |
| DWDM-X2-34.25= | 3.7         | 1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength    |
| DWDM-X2-35.04= | 3.7         | 1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength    |
| DWDM-X2-35.82= | 3.7         | 1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength                       |
| DWDM-X2-36.61= | 3.7         | 100BASE-BX10-U SFP                                                                  |
| DWDM-X2-38.19= | 3.7         | 100BASE-BX10-D SFP                                                                  |
| DWDM-X2-38.98= | 3.7         | 100BASE-ZX SFP module for 100-MB ports, 1550 nm wavelength, 80 km over SMF          |
| DWDM-X2-39.77= | 3.7         | 100BASE-LX10 SFP for Fast Ethernet SFP ports                                        |
| DWDM-X2-40.56= | 3.7         | Cisco 1000BASE-T GBIC                                                               |
| DWDM-X2-42.14= | 3.7         | 10GBASE-DWDM 1560.61 nm X2 (100-GHz ITU grid)                                       |
| DWDM-X2-42.94= | 3.7         | 10GBASE-DWDM 1530.33 nm X2 (100-GHz ITU grid)                                       |
| DWDM-X2-43.73= | 3.7         | 10GBASE-DWDM 1531.12 nm X2 (100-GHz ITU grid)                                       |

**Table 6-41**      **Supported Modules for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7**

| Module Name    | ANA Version | Module Description                            |
|----------------|-------------|-----------------------------------------------|
| DWDM-X2-44.53= | 3.7         | 10GBASE-DWDM 1531.90 nm X2 (100-GHz ITU grid) |
| DWDM-X2-46.12= | 3.7         | 10GBASE-DWDM 1532.68 nm X2 (100-GHz ITU grid) |
| DWDM-X2-46.92= | 3.7         | 10GBASE-DWDM 1534.25 nm X2 (100-GHz ITU grid) |
| DWDM-X2-47.72= | 3.7         | 10GBASE-DWDM 1535.04 nm X2 (100-GHz ITU grid) |
| DWDM-X2-48.51= | 3.7         | 10GBASE-DWDM 1535.82 nm X2 (100-GHz ITU grid) |
| DWDM-X2-50.12= | 3.7         | 10GBASE-DWDM 1536.61 nm X2 (100-GHz ITU grid) |
| DWDM-X2-50.92= | 3.7         | 10GBASE-DWDM 1538.19 nm X2 (100-GHz ITU grid) |
| DWDM-X2-51.72= | 3.7         | 10GBASE-DWDM 1538.98 nm X2 (100-GHz ITU grid) |
| DWDM-X2-52.52= | 3.7         | 10GBASE-DWDM 1539.77 nm X2 (100-GHz ITU grid) |
| DWDM-X2-54.13= | 3.7         | 10GBASE-DWDM 1540.56 nm X2 (100-GHz ITU grid) |
| DWDM-X2-54.94= | 3.7         | 10GBASE-DWDM 1542.14 nm X2 (100-GHz ITU grid) |
| DWDM-X2-55.75= | 3.7         | 10GBASE-DWDM 1542.94 nm X2 (100-GHz ITU grid) |
| DWDM-X2-56.55= | 3.7         | 10GBASE-DWDM 1543.73 nm X2 (100-GHz ITU grid) |
| DWDM-X2-58.17= | 3.7         | 10GBASE-DWDM 1544.53 nm X2 (100-GHz ITU grid) |
| DWDM-X2-58.98= | 3.7         | 10GBASE-DWDM 1546.12 nm X2 (100-GHz ITU grid) |
| DWDM-X2-59.79= | 3.7         | 10GBASE-DWDM 1546.92 nm X2 (100-GHz ITU grid) |
| DWDM-X2-60.61= | 3.7         | 10GBASE-DWDM 1547.72 nm X2 (100-GHz ITU grid) |
| GLC-BX-D       | 3.7         | 10GBASE-DWDM 1548.51 nm X2 (100-GHz ITU grid) |
| GLC-BX-U       | 3.7         | 10GBASE-DWDM 1550.12 nm X2 (100-GHz ITU grid) |
| GLC-FE-100BX-D | 3.7         | 10GBASE-DWDM 1550.92 nm X2 (100-GHz ITU grid) |

**Table 6-41**      **Supported Modules for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                                             |
|-------------------|-------------|------------------------------------------------------------------------------------------------|
| GLC-FE-100BX-U    | 3.7         | 10GBASE-DWDM 1551.72 nm X2 (100-GHz ITU grid)                                                  |
| GLC-FE-100FX      | 3.7         | 10GBASE-DWDM 1552.52 nm X2 (100-GHz ITU grid)                                                  |
| GLC-FE-100LX      | 3.7         | 10GBASE-DWDM 1554.13 nm X2 (100-GHz ITU grid)                                                  |
| GLC-FE-100ZX      | 3.7         | 10GBASE-DWDM 1554.94 nm X2 (100-GHz ITU grid)                                                  |
| GLC-LH-SM         | 3.6.7       | 10GBASE-DWDM 1555.75 nm X2 (100-GHz ITU grid)                                                  |
| GLC-SX-MM         | 3.7         | 10GBASE-DWDM 1556.55 nm X2 (100-GHz ITU grid)                                                  |
| GLC-ZX-SM         | 3.6.7       | 10GBASE-DWDM 1558.17 nm X2 (100-GHz ITU grid)                                                  |
| PWR-C45-1300ACV   | 3.6.4       | 10GBASE-DWDM 1558.98 nm X2 (100-GHz ITU grid)                                                  |
| PWR-C45-1400DC    | 3.6.7       | 10GBASE-DWDM 1559.79 nm X2 (100-GHz ITU grid)                                                  |
| PWR-C45-1400DC-P  | 3.7         | 48 Port 10/100/1000 Premium POE Line Card with Jumbo Frame Support.                            |
| PWR-C45-2800ACV   | 3.6.7       | 10GBASE-LX4 X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector             |
| WS-G5483          | 3.7         | Cisco Catalyst 4500 1400 WDC Power Supply with PEM (PoE)                                       |
| WS-U4504-FX-MT    | 3.6.0       | Cisco CWDM SFP 1550 nm; Gigabit Ethernet and 1G/2G FC                                          |
| WS-X4013+         | 3.6.0       | 100BASE-FX SFP module for 100-MB ports, 1310 nm wavelength, 2 km over MMF                      |
| WS-X4013+10GE     | 3.7         | Cisco Catalyst 4500 Supervisor Engine II-Plus-10GE, 2x10GE (X2) and 4x1GE (SFP), Console RJ-45 |
| WS-X4013+TS       | 3.6.0       | Catalyst 4500 4-port 100FX(MTRJ) Uplink for WS-X4232-RJ-XX                                     |
| WS-X4014          | 3.6.0       | Catalyst 4500 Supervisor II-Plus (IOS), 2GE, Console(RJ-45)                                    |
| WS-X4124-FX-MT    | 3.6.0       | Catalyst 4503 SupII-Plus-TS, 12 10/100/1000 PoE+8 SFP slots                                    |
| WS-X4124-RJ45     | 3.6.0       | Supervisor Engine III                                                                          |
| WS-X4148-FE-BD-LC | 3.6.0       | 24-Port 100BASE-FX Fast Ethernet Switching Module                                              |
| WS-X4148-FE-LX-MT | 3.6.0       | 24-Port 10/100BASE-TX Fast Ethernet Switching Module                                           |

**Table 6-41 Supported Modules for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                       |
|-------------------|-------------|--------------------------------------------------------------------------|
| WS-X4148-FX-MT    | 3.6.0       | 48-Port 100BASE-BX10-D Fast Ethernet Switching Module                    |
| WS-X4148-RJ       | 3.6.0       | 48-Port 100Base-LX-MT Fast Ethernet Switching Module                     |
| WS-X4148-RJ21     | 3.6.0       | Catalyst 4500 FE Switching Module, 48-100FX MMF(MTRJ)                    |
| WS-X4148-RJ45V    | 3.6.0       | Catalyst 4500 10/100 Auto Module, 48-Ports (RJ-45)                       |
| WS-X4224-RJ45V    | 3.6.0       | Catalyst 4500 10/100 Module, 48-Ports Telco (4xRJ21)                     |
| WS-X4232-GB-RJ    | 3.6.0       | 10/100BASE-TX Fast Ethernet switching module with Cisco pre-standard PoE |
| WS-X4232-L3       | 3.6.0       | Catalyst 4500 10/100 PoE 802.3af 24-ports (RJ45)                         |
| WS-X4232-RJ-XX    | 3.6.0       | Catalyst 4500 32-10/100 (RJ-45),2-GE(GBIC)                               |
| WS-X4248-FE-SFP   | 3.6.0       | Layer 3 Services Module                                                  |
| WS-X4248-RJ21V    | 3.6.0       | Catalyst 4500 10/100 Module,32-ports(RJ45)+Modular uplinks               |
| WS-X4248-RJ45V    | 3.6.0       | Catalyst 4500 48-Port 100BASE-X (SFPs Optional)                          |
| WS-X4302-GB       | 3.6.0       | Catalyst 4500 PoE 802.3af 10/100, 48-Ports (RJ21)                        |
| WS-X4306-GB       | 3.6.0       | Catalyst 4500 PoE 802.3af 10/100, 48-Ports (RJ45)                        |
| WS-X4412-2GB-T    | 3.6.0       | Catalyst 4500 Gigabit Ethernet Module, 2-Ports (GBIC)                    |
| WS-X4418-GB       | 3.6.0       | Catalyst 4500 Gigabit Ethernet Module, 6-Ports (GBIC)                    |
| WS-X4424-GB-RJ45  | 3.6.0       | 1000BASE-T plus 1000BASE-X Gigabit Ethernet switching module             |
| WS-X4448-GB-LX    | 3.6.0       | Catalyst 4500 GE Module, Server Switching 18-Ports (GBIC)                |
| WS-X4448-GB-RJ45  | 3.6.0       | Catalyst 4500 24-port 10/100/1000 Module (RJ45)                          |
| WS-X4448-GB-SFP   | 3.6.0       | 1000BASE-X Gigabit Ethernet switching module                             |
| WS-X4506-GB-T     | 3.6.0       | Catalyst 4500 48-Port 10/100/1000 Module (RJ45)                          |
| WS-X4515          | 3.6.0       | Catalyst 4500 48-Port 1000Base-X (SFPs Optional)                         |
| WS-X4516          | 3.6.0       | Catalyst 4500 6-Port 10/100/1000 PoE or SFP (Optional)                   |
| WS-X4516-10GE     | 3.6.0       | Catalyst 4500 Supervisor IV (2 GE),Console(RJ-45)                        |
| WS-X4524-GB-RJ45V | 3.6.0       | Catalyst 4500 Supervisor V (2 GE),Console(RJ-45)                         |
| WS-X4548-GB-RJ45  | 3.6.0       | Catalyst 4500 Supervisor V-10GE, 2x10GE (X2) and 4x1GE (SFP)             |
| WS-X4548-GB-RJ45V | 3.6.0       | Catalyst 4500 PoE 802.3af 10/ 100/1000 24-ports (RJ45)                   |

**Table 6-41**      **Supported Modules for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7**

| Module Name      | ANA Version | Module Description                                                                            |
|------------------|-------------|-----------------------------------------------------------------------------------------------|
| WS-X45-SUP6-E    | 3.6.7       | Catalyst 4500 Enhanced 48-Port 10/100/1000 Base-T (RJ-45)                                     |
| WS-X45-SUP6L-E   | 3.6.7       | Catalyst 4500 PoE 802.3af 10/100/1000, 48-Ports (RJ45)                                        |
| WS-X4604-GWY     | 3.6.0       | Catalyst 4000 Access Gateway Module                                                           |
| WS-X4606-X2-E    | 3.6.7       | Cisco 4506 Power supply module                                                                |
| WS-X4624-SFP-E   | 3.6.7       | 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength                     |
| WS-X4648-RJ45V+E | 3.7         | Cisco Catalyst 4500 E-Series 48-Port 802.3af PoE and PoEP-ready 10/100/1000 (RJ-45)           |
| WS-X4648-RJ45V-E | 3.7         | Cisco Catalyst 4500 E-Series 48-port 802.3af PoE 10/100/1000 (RJ-45)                          |
| X2-10GB-CX4      | 3.7         | 10 Gigabit Ethernet X2 with Copper Wire (Data and PoE)                                        |
| X2-10GB-ER       | 3.6.7       | Catalyst 4500 E-Series Sup 6-E, 2x10GE(X2) w/Twin Gig                                         |
| X2-10GB-LR       | 3.6.7       | Catalyst 4500 E-Series Sup 6L-E, 2x10GE(X2) w/Twin Gig                                        |
| X2-10GB-LRM      | 3.7         | 10GBASE-LRM X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector            |
| X2-10GB-LX4      | 3.7         | 10GBASE-LX4 X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector            |
| X2-10GB-SR       | 3.7         | 10GBASE-ER X2 transceiver module for SMF, 1550-nm wavelength, SC duplex connector             |
| X2-10GB-ZR       | 3.7         | 10GBASE-LR Serial 1310-nm long-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF) |

## Cisco Catalyst 4500 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 4500 Series in Cisco ANA Version 3.7:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [VPN, page 6-82](#)
- [ACL, page 6-85](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [LLDP, page 6-92](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)
- [REP, page 6-94](#)

## Cisco Catalyst 4500 Series—Supported Service Events

**Table 6-42**      *Supported Service Events for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Card Up/Down                                        | 3.6.0       | Y         |

## Cisco Catalyst 4500 Series—Supported Commands

**Table 6-43** *Supported Commands for Cisco Catalyst 4500 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 4900 Series Switches

This section includes the following information about Cisco Catalyst 4900 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 4900 Series Switches](#)):

- [Cisco Catalyst 4900 Series—Supported Software Versions](#), page 6-32
- [Cisco Catalyst 4900 Series—Supported Topologies](#), page 6-33
- [Cisco Catalyst 4900 Series—Supported Modules](#), page 6-33
- [Cisco Catalyst 4900 Series—Supported Technologies](#), page 6-36
- [Cisco Catalyst 4900 Series—Supported Service Events](#), page 6-37
- [Cisco Catalyst 4900 Series—Supported Commands](#), page 6-37

## Cisco Catalyst 4900 Series—Supported Software Versions

**Table 6-44** *Supported Software Versions for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| IOS 12.2(25)EWA  | 3.6.3 <sup>1</sup> |
| IOS 12.2(25)EWA2 | 3.6.3 <sup>2</sup> |
| IOS 12.2(25)EWA4 | 3.6.2 <sup>3</sup> |
| IOS 12.2(25)EWA6 | 3.6.2 <sup>4</sup> |
| IOS 12.2(31)SG   | 3.6.1 <sup>5</sup> |
| IOS 12.2(31)SGA1 | 3.6.1 <sup>6</sup> |
| IOS 12.2(50)SG   | 3.7 <sup>7</sup>   |
| IOS 12.2(52)SG   | 3.6.6 <sup>8</sup> |
| IOS 12.2(53)SG   | 3.7 <sup>9</sup>   |

<sup>1, 2, 3, 4, 5, 6</sup>ANA models pluggable ports for this IOS version.

<sup>7, 8, 9</sup>ANA recognizes all maintenance builds in this IOS release train. ANA models pluggable ports for this IOS version.



## Cisco Catalyst 4900 Series—Supported Topologies

**Table 6-45** Supported Topologies for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |
| LAG            | LAG            | 3.6.1       |

## Cisco Catalyst 4900 Series—Supported Modules

**Table 6-46** Supported Modules for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7

| Module Name     | ANA Version | Module Description                                           |
|-----------------|-------------|--------------------------------------------------------------|
| CAB-SM-LCSC-1M  | 3.6.1       | 1m fiber single-mode LC-to-SC connectors                     |
| CAB-SM-LCSC-5M  | 3.6.1       | 5m fiber single-mode LC-to-SC connectors                     |
| CSS5-CABLX-LCSC | 3.6.1       | Cisco CSS 11500 10m fiber single-mode LX LC-to-SC connectors |
| CSS5-CABSX-LC   | 3.6.1       | Cisco CSS 11500 10m fiber multimode SX LC connectors         |
| CSS5-CABSX-LCSC | 3.6.1       | Cisco CSS 11500 10m fiber multimode SX LC-to-SC connectors   |
| CWDM-SFP-1470   | 3.6.1       | Longwave 1470 nm laser single-mode                           |
| CWDM-SFP-1490   | 3.6.1       | Longwave 1490 nm laser single-mode                           |
| CWDM-SFP-1510   | 3.6.1       | Longwave 1510 nm laser single-mode                           |
| CWDM-SFP-1530   | 3.6.1       | Longwave 1530 nm laser single-mode                           |
| CWDM-SFP-1550   | 3.6.1       | Longwave 1550 nm laser single-mode                           |
| CWDM-SFP-1570   | 3.6.1       | Longwave 1570 nm laser single-mode                           |
| CWDM-SFP-1590   | 3.6.1       | Longwave 1590 nm laser single-mode                           |
| CWDM-SFP-1610   | 3.6.1       | Longwave 1610 nm laser single-mode                           |
| CWDM-SFP-XXXX   | 3.6.1       | CWDM small form-factor pluggable module                      |
| DWDM-X2-30.33=  | 3.7         | 10GBASE-DWDM 1530.33 nm X2 (100-GHz ITU grid)                |
| DWDM-X2-31.12=  | 3.7         | 10GBASE-DWDM 1531.12 nm X2 (100-GHz ITU grid)                |
| DWDM-X2-31.90=  | 3.7         | 10GBASE-DWDM 1531.90 nm X2 (100-GHz ITU grid)                |
| DWDM-X2-32.68=  | 3.7         | 10GBASE-DWDM 1532.68 nm X2 (100-GHz ITU grid)                |

**Table 6-46**      **Supported Modules for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7**

| Module Name    | ANA Version | Module Description                            |
|----------------|-------------|-----------------------------------------------|
| DWDM-X2-34.25= | 3.7         | 10GBASE-DWDM 1534.25 nm X2 (100-GHz ITU grid) |
| DWDM-X2-35.04= | 3.7         | 10GBASE-DWDM 1535.04 nm X2 (100-GHz ITU grid) |
| DWDM-X2-35.82= | 3.7         | 10GBASE-DWDM 1535.82 nm X2 (100-GHz ITU grid) |
| DWDM-X2-36.61= | 3.7         | 10GBASE-DWDM 1536.61 nm X2 (100-GHz ITU grid) |
| DWDM-X2-38.19= | 3.7         | 10GBASE-DWDM 1538.19 nm X2 (100-GHz ITU grid) |
| DWDM-X2-38.98= | 3.7         | 10GBASE-DWDM 1538.98 nm X2 (100-GHz ITU grid) |
| DWDM-X2-39.77= | 3.7         | 10GBASE-DWDM 1539.77 nm X2 (100-GHz ITU grid) |
| DWDM-X2-40.56= | 3.7         | 10GBASE-DWDM 1540.56 nm X2 (100-GHz ITU grid) |
| DWDM-X2-42.14= | 3.7         | 10GBASE-DWDM 1542.14 nm X2 (100-GHz ITU grid) |
| DWDM-X2-42.94= | 3.7         | 10GBASE-DWDM 1542.94 nm X2 (100-GHz ITU grid) |
| DWDM-X2-43.73= | 3.7         | 10GBASE-DWDM 1543.73 nm X2 (100-GHz ITU grid) |
| DWDM-X2-44.53= | 3.7         | 10GBASE-DWDM 1544.53 nm X2 (100-GHz ITU grid) |
| DWDM-X2-46.12= | 3.7         | 10GBASE-DWDM 1546.12 nm X2 (100-GHz ITU grid) |
| DWDM-X2-46.92= | 3.7         | 10GBASE-DWDM 1546.92 nm X2 (100-GHz ITU grid) |
| DWDM-X2-47.72= | 3.7         | 10GBASE-DWDM 1547.72 nm X2 (100-GHz ITU grid) |
| DWDM-X2-48.51= | 3.7         | 10GBASE-DWDM 1548.51 nm X2 (100-GHz ITU grid) |
| DWDM-X2-50.12= | 3.7         | 10GBASE-DWDM 1550.12 nm X2 (100-GHz ITU grid) |
| DWDM-X2-50.92= | 3.7         | 10GBASE-DWDM 1550.92 nm X2 (100-GHz ITU grid) |
| DWDM-X2-51.72= | 3.7         | 10GBASE-DWDM 1551.72 nm X2 (100-GHz ITU grid) |
| DWDM-X2-52.52= | 3.7         | 10GBASE-DWDM 1552.52 nm X2 (100-GHz ITU grid) |

**Table 6-46**      **Supported Modules for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7**

| Module Name      | ANA Version        | Module Description                                                                                                 |
|------------------|--------------------|--------------------------------------------------------------------------------------------------------------------|
| DWDM-X2-54.13=   | 3.7                | 10GBASE-DWDM 1554.13 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-54.94=   | 3.7                | 10GBASE-DWDM 1554.94 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-55.75=   | 3.7                | 10GBASE-DWDM 1555.75 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-56.55=   | 3.7                | 10GBASE-DWDM 1556.55 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-58.17=   | 3.7                | 10GBASE-DWDM 1558.17 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-58.98=   | 3.7                | 10GBASE-DWDM 1558.98 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-59.79=   | 3.7                | 10GBASE-DWDM 1559.79 nm X2 (100-GHz ITU grid)                                                                      |
| DWDM-X2-60.61=   | 3.7                | 10GBASE-DWDM 1560.61 nm X2 (100-GHz ITU grid)                                                                      |
| GLC-BX-D         | 3.6.1 <sup>1</sup> | 1000BASE-BX10-D downstream bidirectional single fiber; with DOM                                                    |
| GLC-BX-U         | 3.6.1 <sup>2</sup> | 1000BASE-BX10-U upstream bidirectional single fiber; with DOM                                                      |
| GLC-LH-SM        | 3.6.1 <sup>3</sup> | Gigabit Ethernet SFP, LC connector LH transceiver                                                                  |
| GLC-SX-MM        | 3.6.1 <sup>4</sup> | Gigabit Ethernet SFP, LC connector SX transceiver                                                                  |
| GLC-T            | 3.6.1              | Gigabit Ethernet SFP, RJ-45 connector, 1000BASE-T transceiver                                                      |
| GLC-ZX-SM        | 3.6.1 <sup>5</sup> | Gigabit Ethernet SFP, LC connector ZX transceiver                                                                  |
| PWR-C49M-1000AC  | 3.7                | Cisco Catalyst 4900M AC Power Supply                                                                               |
| PWR-C49M-1000DC  | 3.7                | 4900M DC power supply, 1000 watts module                                                                           |
| WS-C4948         | 3.6.1              | Catalyst 4000 series fixed configuration switch with 48 10/100/1000BaseT wirespeed ports and 4 1000BaseX SFP ports |
| WS-C4948-10GE    | 3.6.1              | Catalyst 4000 series fixed configuration switch with 48 10/100/1000BaseT wirespeed ports and 2 10Gbps X2 ports     |
| WS-X4904-10GE    | 3.7                | Catalyst 4000 series fixed configuration switch with 48 10/100/1000BaseT wirespeed ports and 4 1000BaseX SFP ports |
| WS-X4908-10GE    | 3.7                | Catalyst 4900M series, half height line card with 8 port 2:1 10GE interface                                        |
| WS-X4920-GB-RJ45 | 3.7                | Catalyst 4900M series, half height line card with 20 port 10/100/1000 RJ45 interface                               |
| WS-X4992         | 3.7                | Cisco Catalyst 4900M Spare Fan Tray                                                                                |

**Table 6-46**      **Supported Modules for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7**

| Module Name | ANA Version         | Module Description                                                                 |
|-------------|---------------------|------------------------------------------------------------------------------------|
| X2-10GB-CX4 | 3.6.1 <sup>6</sup>  | 10GBASE-CX4 single-mode X2 module                                                  |
| X2-10GB-ER  | 3.6.1 <sup>7</sup>  | 10GBASE-ER single-mode X2 module                                                   |
| X2-10GB-LR  | 3.6.1 <sup>8</sup>  | 10GBASE-LR single-mode X2 module                                                   |
| X2-10GB-LRM | 3.7                 | 10GBASE-LX4 X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector |
| X2-10GB-LX4 | 3.6.1 <sup>9</sup>  | 10GBASE-LX4 single-mode X2 module                                                  |
| X2-10GB-SR  | 3.6.1 <sup>10</sup> | 10GBASE-SR single-mode X2 module                                                   |
| X2-10GB-ZR  | 3.7                 | 10GBASE-ZR X2 transceiver module for SMF, 1550-nm wavelength, SC duplex connector  |
| X2-10GE-CX4 | 3.6.1               | 10GBASE-CX4 X2 Module                                                              |
| X2-10GE-ER  | 3.6.1               | 10GBASE-ER X2 Module                                                               |
| X2-10GE-LR  | 3.6.1               | 10GBASE-LR X2 Module                                                               |
| X2-10GE-LX4 | 3.6.1               | 10GBASE-LX4 X2 Module                                                              |
| X2-10GE-SR  | 3.6.1               | 10GBASE-SR X2 Module                                                               |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10Support verified in ANA 3.7.

## Cisco Catalyst 4900 Series—Supported Technologies

The following technologies are supported by the Cisco Catalyst 4900 Series in Cisco ANA Version 3.7:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [VPN, page 6-82](#)
- [ACL, page 6-85](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [Additional Technologies, page 6-89](#)
- [LLDP, page 6-92](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)
- [REP, page 6-94](#)

## Cisco Catalyst 4900 Series—Supported Service Events

**Table 6-47** Supported Service Events for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.1       | Y         |
| Interface Status Down/Up                            | 3.6.1       | Y         |
| Card In/Out                                         | 3.6.1       | Y         |
| Link Down/Up                                        | 3.6.1       | Y         |
| Device Unreachable                                  | 3.6.1       | N         |
| CPU Over Utilized                                   | 3.6.1       | N         |
| Memory Over Utilized                                | 3.6.1       | N         |
| Device Unsupported                                  | 3.6.1       | N         |
| Discard Packets                                     | 3.6.1       | N         |
| Dropped Packets                                     | 3.6.1       | N         |
| Module Unsupported                                  | 3.6.1       | N         |
| Port Flapping                                       | 3.6.1       | N         |
| Port Down                                           | 3.6.1       | Y         |
| Rx Over Utilized                                    | 3.6.1       | N         |
| Tx Over Utilized                                    | 3.6.1       | N         |
| Cloud Problem                                       | 3.6.1       | N         |
| Layer 2 Tunnel Down                                 | 3.6.1       | N         |
| Card Up/Down                                        | 3.6.1       | Y         |
| Keepalive set                                       | 3.7         | N         |
| Keepalive not set                                   | 3.7         | N         |

## Cisco Catalyst 4900 Series—Supported Commands

**Table 6-48** Supported Commands for Cisco Catalyst 4900 Series—Cisco ANA Version 3.7

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco ME 4900 Series Ethernet Switch

This section includes the following information about Cisco 4924 ME switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco ME 4900 Series Ethernet Switch](#)):

- [Cisco 4924 ME—Supported Software Versions](#), page 6-38

- [Cisco 4924 ME—Supported Topologies, page 6-38](#)
- [Cisco 4924 ME—Supported Modules, page 6-38](#)
- [Cisco 4924 ME—Supported Technologies, page 6-40](#)
- [Cisco 4924 ME—Supported Service Events, page 6-41](#)
- [Cisco 4924 ME—Supported Commands, page 6-41](#)

## Cisco 4924 ME—Supported Software Versions

**Table 6-49** *Supported Software Versions for Cisco 4924 ME—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.2(25)EWA      | 3.6.3 <sup>1</sup> |
| 12.2(25)EWA4     | 3.6.3 <sup>2</sup> |
| 12.2(25)EWA6     | 3.6.3 <sup>3</sup> |
| 12.2(31)SG       | 3.6.3 <sup>4</sup> |
| 12.2(31)SGA1     | 3.6.1 <sup>5</sup> |
| 12.2(46)SG       | 3.6.6 <sup>6</sup> |
| 12.2(50)SG       | 3.6.6 <sup>7</sup> |
| 12.2(53)SG       | 3.7 <sup>8</sup>   |

1, 2, 3, 4, 5, 6, 7, 8 ANA models pluggable ports for this IOS version.

## Cisco 4924 ME—Supported Topologies

**Table 6-50** *Supported Topologies for Cisco 4924 ME—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.1       |
| Physical Layer | Physical Layer | 3.6.1       |

## Cisco 4924 ME—Supported Modules

**Table 6-51** *Supported Modules for Cisco 4924 ME—Cisco ANA Version 3.7*

| Module Name    | ANA Version | Module Description                       |
|----------------|-------------|------------------------------------------|
| CAB-SM-LCSC-1M | 3.6.1       | 1m fiber single-mode LC-to-SC connectors |
| CAB-SM-LCSC-5M | 3.6.1       | 5m fiber single-mode LC-to-SC connectors |

**Table 6-51**      **Supported Modules for Cisco 4924 ME—Cisco ANA Version 3.7 (continued)**

| Module Name     | ANA Version | Module Description                                                                         |
|-----------------|-------------|--------------------------------------------------------------------------------------------|
| CSS5-CABLX-LCSC | 3.6.1       | Cisco CSS 11500 10m fiber single-mode LX LC-to-SC connectors                               |
| CSS5-CABSX-LC   | 3.6.1       | Cisco CSS 11500 10m fiber multimode SX LC connectors                                       |
| CSS5-CABSX-LCSC | 3.6.1       | Cisco CSS 11500 10m fiber multimode SX LC-to-SC connectors                                 |
| CWDM-SFP-1470   | 3.6.1       | Cisco CWDM SFP 1470 nm; Gigabit Ethernet and 1G/2G FC (gray)                               |
| CWDM-SFP-1490   | 3.6.1       | Cisco CWDM SFP 1490 nm; Gigabit Ethernet and FC (violet)                                   |
| CWDM-SFP-1510   | 3.6.1       | Cisco CWDM SFP 1510 nm; Gigabit Ethernet and 1G/2G FC (blue)                               |
| CWDM-SFP-1530   | 3.6.1       | Cisco CWDM SFP 1530 nm; Gigabit Ethernet and 1G/2G FC (green)                              |
| CWDM-SFP-1550   | 3.6.1       | Cisco CWDM SFP 1550 nm; Gigabit Ethernet and 1G/2G FC (yellow)                             |
| CWDM-SFP-1570   | 3.6.1       | Cisco CWDM SFP 1570 nm; Gigabit Ethernet and 1G/2G FC (orange)                             |
| CWDM-SFP-1590   | 3.6.1       | Cisco CWDM SFP 1590 nm; Gigabit Ethernet and 1G/2G FC (red)                                |
| CWDM-SFP-1610   | 3.6.1       | Cisco CWDM SFP 1610 nm; Gigabit Ethernet and 1G/2G FC (brown)                              |
| GLC-BX-D        | 3.6.1       | 1000BASE-BX10-D downstream bidirectional single fiber; with DOM                            |
| GLC-BX-U        | 3.6.1       | 1000BASE-BX10-U upstream bidirectional single fiber; with DOM                              |
| GLC-LH-SM       | 3.6.1       | Gigabit Ethernet SFP, LC connector LH transceiver                                          |
| GLC-SX-MM       | 3.6.1       | Gigabit Ethernet SFP, LC connector SX transceiver                                          |
| GLC-T           | 3.6.1       | Gigabit Ethernet SFP, RJ-45 connector, 1000BASE-T transceiver                              |
| GLC-ZX-SM       | 3.6.1       | Gigabit Ethernet SFP, LC connector ZX transceiver                                          |
| ME-4924-10GE    | 3.6.1       | Cisco ME 4924-10GE, IP Base software image (RIP, static routes), no power supply, fan tray |
| PWR-C49-300DC   | 3.6.6       | Power Supply ( DC 300W)                                                                    |
| WS-X4991        | 3.6.6       | Fan Tray                                                                                   |
| X2-10GE-CX4     | 3.6.1       | 10GBASE-CX4 X2 Module                                                                      |
| X2-10GE-ER      | 3.6.1       | 10GBASE-ER X2 Module                                                                       |
| X2-10GE-LR      | 3.6.1       | 10GBASE-LR X2 Module                                                                       |
| X2-10GE-LX4     | 3.6.1       | 10GBASE-LX4 X2 Module                                                                      |

**Table 6-51**      *Supported Modules for Cisco 4924 ME—Cisco ANA Version 3.7 (continued)*

| Module Name | ANA Version | Module Description   |
|-------------|-------------|----------------------|
| X2-10GE-SR  | 3.6.1       | 10GBASE-SR X2 Module |

## Cisco 4924 ME—Supported Technologies

The following technologies are supported by the Cisco 4924 ME in Cisco ANA Version 3.7:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [VPN, page 6-82](#)
- [ACL, page 6-85](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [Additional Technologies, page 6-89](#)
- [LLDP, page 6-92](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)
- [REP, page 6-94](#)



## Cisco 4924 ME—Supported Service Events

**Table 6-52**      *Supported Service Events for Cisco 4924 ME—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.1       | N         |
| Link Down/Up         | 3.6.1       | N         |
| Device Unreachable   | 3.6.1       | N         |
| CPU Over Utilized    | 3.6.1       | N         |
| Memory Over Utilized | 3.6.1       | N         |
| Device Unsupported   | 3.6.1       | N         |
| Discard Packets      | 3.6.1       | N         |
| Dropped Packets      | 3.6.1       | N         |
| Module Unsupported   | 3.6.1       | N         |
| Port Flapping        | 3.6.1       | N         |
| Port Down            | 3.6.1       | N         |
| Rx Over Utilized     | 3.6.1       | N         |
| Tx Over Utilized     | 3.6.1       | N         |
| Card Up/Down         | 3.6.1       | N         |

## Cisco 4924 ME—Supported Commands

**Table 6-53**      *Supported Commands for Cisco 4924 ME—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 5000 Series Switches

This section includes the following information about Cisco 5000 Series switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 5000 Series Switches](#)):

- [Cisco 5000 Series—Supported Software Versions](#), page 6-42
- [Cisco 5000 Series—Supported Topologies](#), page 6-42
- [Cisco 5000 Series—Supported Technologies](#), page 6-42
- [Cisco 5000 Series—Supported Service Events](#), page 6-43
- [Cisco 5000 Series—Supported Commands](#), page 6-43

## Cisco 5000 Series—Supported Software Versions

**Table 6-54**      *Supported Software Versions for Cisco 5000 Series—Cisco ANA Version 3.7*

| Software Version | ANA Version |
|------------------|-------------|
| 4.5(15)          | 3.7         |

## Cisco 5000 Series—Supported Topologies

**Table 6-55**      *Supported Topologies for Cisco 5000 Series—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Business       | Business       | 3.7         |
| Ethernet       | Ethernet       | 3.7         |
| Physical Layer | Physical Layer | 3.7         |

## Cisco 5000 Series—Supported Technologies

The following technologies are supported by the Cisco 5000 Series in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94

## Cisco 5000 Series—Supported Service Events

**Table 6-56**      *Supported Service Events for Cisco 5000 Series—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | N         |
| Interface Status Down/Up                            | 3.6.0       | N         |
| Card In/Out                                         | 3.6.0       | N         |
| Link Down/Up                                        | 3.6.0       | N         |
| Device Unreachable                                  | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | N         |

## Cisco 5000 Series—Supported Commands

**Table 6-57**      *Supported Commands for Cisco 5000 Series—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 6500 Series (CatOS) Switches

This section includes the following information about Cisco Catalyst 6500 Series (CatOS) switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 6500 Series \(CatOS\) Switches](#)):

- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Software Versions](#), page 6-44
- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Topologies](#), page 6-44
- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Modules](#), page 6-44
- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Technologies](#), page 6-47
- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Service Events](#), page 6-48
- [Cisco Catalyst 6500 Series \(CatOS\)—Supported Commands](#), page 6-48

## Cisco Catalyst 6500 Series (CatOS)—Supported Software Versions

**Table 6-58**      *Supported Software Versions for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7*

| Software Version | ANA Version      |
|------------------|------------------|
| 6.4(10)          | 3.6.3            |
| 7.6(1)           | 3.6.3            |
| 7.6(8)           | 3.6.3            |
| 8.3(4)           | 3.6.3            |
| 8.4.1            | 3.6.3            |
| 8.5(1)           | 3.7 <sup>1</sup> |
| 8.5(7)           | 3.7              |

<sup>1</sup>ANA recognizes all maintenance builds in this CatOS release train.

## Cisco Catalyst 6500 Series (CatOS)—Supported Topologies

**Table 6-59**      *Supported Topologies for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| Ethernet       | Ethernet       | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco Catalyst 6500 Series (CatOS)—Supported Modules

**Table 6-60**      *Supported Modules for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7*

| Module Name        | ANA Version | Module Description                                                       |
|--------------------|-------------|--------------------------------------------------------------------------|
| AIP                | 3.6.0       | ATM Interface Processor                                                  |
| CAT6509            | 3.6.0       | Catalyst 6500 Plus with 9 slots                                          |
| CAT6K-MSFC         | 3.6.0       | Multilevel Switching Feature Card for the Catalyst 6000 series           |
| CAT6K-MSFC2        | 3.6.0       | Multilevel Switching Feature Card Version 2 for the Catalyst 6000 series |
| CAT6K-WSF-6700-CFC | 3.6.0       | Catalyst 6500 centralized Forwarding Card                                |
| CAT6K-WSF-6K-DFC3A | 3.6.0       | Catalyst 6500 Distributed L3 switching engine IIIa                       |
| CAT6K-WSF-6K-PFC3A | 3.6.0       | Catalyst 6500 Centralized L3 switching engine IIIa                       |

**Table 6-60**      **Supported Modules for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7**

| Module Name                   | ANA Version | Module Description                                                                   |
|-------------------------------|-------------|--------------------------------------------------------------------------------------|
| CAT6K-WSF-6K-VPWR-GE          | 3.6.0       | Cat6k voice daughter cards                                                           |
| CAT6K-WS-SUP32-GE-3B          | 3.6.0       | cat6k-ws-sup32-ge-3b                                                                 |
| CAT6K-WS-SUP720               | 3.6.0       | Catalyst 6500 Supervisor Module 720 CPU board                                        |
| CAT6K-WS-SUP720-BASE          | 3.6.0       | Catalyst 6500 Supervisor Module 720 base board                                       |
| CAT6K-WS-SVC-IDSM2            | 3.6.0       | Catalyst 6500 Intrusion Detection Module                                             |
| CAT6K-WSX-6066-SLB-APC        | 3.6.0       | Content Switching Module                                                             |
| CAT6K-WSX-6148-GE-TX          | 3.6.0       | Catalyst 6000 48 port10/100/1000BaseT(RJ-45) module                                  |
| CAT6K-WSX-6148-RJ45           | 3.6.0       | 48 port10/100BaseTX(RJ-45) module                                                    |
| CAT6K-WSX-6248A-RJ45          | 3.6.0       | Catalyst 6000 48-port 10/100BaseTX RJ-45                                             |
| CAT6K-WSX-6248-RJ45           | 3.6.0       | Catalyst 6000 Family 48-port 10/100 RJ-45 module                                     |
| CAT6K-WSX-6348-RJ45           | 3.6.0       | 48-port 10/100 ethernet module                                                       |
| CAT6K-WSX-6416-GBIC           | 3.6.0       | 16-port GBIC Gigabit ethernet module                                                 |
| CAT6K-WSX-6515-GETX           | 3.6.0       | Catalyst 6500 16 port 10/100/1000BaseT (RJ-45) module                                |
| CAT6K-WSX-6516A-GBIC          | 3.6.0       | Catalyst 6500 16 port 1000BaseX (GBIC)                                               |
| CAT6K-WSX-6516-GBIC           | 3.6.0       | Catalyst 6500 16 port 1000BaseX GBIC                                                 |
| CAT6K-WSX-6524-MMMT           | 3.6.0       | Catalyst 6500 24 port 100BaseX MM (MT-RJ) module                                     |
| CAT6K-WSX-6548-GETX           | 3.6.0       | Catalyst 6500 48 port 10/100/1000 (RJ-45)                                            |
| CAT6K-WSX-6548-RJ21           | 3.6.0       | Catalyst 6500 48 port 10/100BaseTX (RJ-21)                                           |
| CAT6K-WSX-6548-RJ45           | 3.6.0       | 48 port 10/100 Hydra2+/Hydra2V+                                                      |
| CAT6K-WSX-6704-10GE           | 3.6.0       | Catalyst 6500 4 port 10 GE                                                           |
| CAT6K-WSX-6724-SFP            | 3.6.0       | Catalyst 6500 24 port 1000Base FX (SFP GBIC)                                         |
| CAT6K-WSX-6748-GETX           | 3.6.0       | Catalyst 6500 48 port 10/100/1000 (RJ-45)                                            |
| CAT6K-WSX-SUP1A-2GE           | 3.6.0       | Catalyst 6500 2 port 1000BaseX Supervisor module (GBIC)                              |
| CAT6K-WSX-SUP2-2GE            | 3.6.0       | Supervisor 2 with 2 Gigabit Ethernet ports                                           |
| CATALYST 6500 FIREWALL MODULE | 3.6.0       | Catalyst 6500 Firewall Module                                                        |
| CEF720 48 PORT 1000MB SFP     | 3.6.0       | Catalyst 6500 48 port 1000Base FX (SFP GBIC)                                         |
| FSIP                          | 3.6.0       | Fast Serial Interface processor                                                      |
| HDV                           | 3.6.0       | High Density Voice module                                                            |
| MIP                           | 3.6.0       | MultiChanel Interface Processor                                                      |
| MSFC2A ROUTE ENGINE           | 3.6.0       | MSFC2A Route Engine                                                                  |
| OC192-POS-RPR1-SM-VSR-S PA    | 3.6.0       | 1 port OC-192c/STM-64 POS/RPR single mode very short reach Shared Port Adapter =SPA= |

**Table 6-60**      **Supported Modules for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7**

| Module Name                | ANA Version | Module Description                                       |
|----------------------------|-------------|----------------------------------------------------------|
| PA-1T3-PLUS                | 3.6.0       | pa-1t3-plus                                              |
| PA-2FEISL-TX               | 3.6.0       | pa-2feisl-tx                                             |
| PA-2T3-PLUS                | 3.6.0       | pa-2t3-plus                                              |
| PA-8CE1                    | 3.6.0       | pa-8ce1                                                  |
| PA-A4T                     | 3.6.0       | pa-a4t                                                   |
| PA-A8T-V35                 | 3.6.0       | pa-a8t-v35                                               |
| PA-AH1T                    | 3.6.0       | pa-ah1t                                                  |
| PA-AH2T                    | 3.6.0       | pa-ah2t                                                  |
| PA-ATMDX-DS3               | 3.6.0       | pa-atmdx-ds3                                             |
| PA-ATMDX-E3                | 3.6.0       | pa-atmdx-e3                                              |
| PA-ATMDX-MM-OC3            | 3.6.0       | pa-atmdx-mm-oc3                                          |
| PA-ATMDX-SMI-OC3           | 3.6.0       | pa-atmdx-smi-oc3                                         |
| PA-ATMDX-SML-OC3           | 3.6.0       | pa-atmdx-sml-oc3                                         |
| PA-CE3                     | 3.6.0       | pa-ce3                                                   |
| PA-POSSW-LR                | 3.6.0       | pa-poss-w-lr                                             |
| PA-POSSW-MM                | 3.6.0       | pa-poss-w-mm                                             |
| PA-POSSW-SM                | 3.6.0       | pa-poss-w-sm                                             |
| PM-1FE-1T1                 | 3.6.0       | pm-1fe-1t1                                               |
| POLICY FEATURE CARD 3      | 3.6.0       | Policy Feature Card 3                                    |
| POS-OC12-MM                | 3.6.0       | pos-oc12-mm                                              |
| RP                         | 3.6.0       | ROMmon Recovery Procedure                                |
| SPA-10X1GE                 | 3.6.1       | 10-port Gigabit Ethernet SPA, SFP Optics                 |
| SPA-1XTENGE-XFP            | 3.6.1       | 1-port 10 Gigabit Ethernet SPA, LANPHY XFP Optics        |
| SPA-2XOC3-ATM              | 3.6.1       | 2-port OC-3c/STM-1c ATM SPA                              |
| SPA-2XOC48POS/RPR          | 3.6.1       | 1-port 10 Gigabit Ethernet Shared Port Adapter XFP based |
| SPA-4XOC3-ATM              | 3.6.1       | 4-port OC-3c/STM-1c ATM SPA                              |
| TRIP                       | 3.6.0       | trip                                                     |
| VPN MODULE                 | 3.6.0       | VPN Module                                               |
| VPN MODULE SUPPORTING 3DES | 3.6.0       | VPN Module supporting 3DES                               |
| WS-C6500-SFM               | 3.6.0       | Switch Fabric Module                                     |
| WS-C6509-NEB-A             | 3.6.1       | Enhanced 9-slot vertically oriented chassis              |
| WS-F6K-PWR                 | 3.6.0       | CATALYST 6000 INLINE POWER CARD, REF                     |

**Table 6-60**      **Supported Modules for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7**

| Module Name        | ANA Version | Module Description                                                            |
|--------------------|-------------|-------------------------------------------------------------------------------|
| WS-SUP720-3BXL     | 3.6.0       | Catalyst 6500/Cisco 7600 Supervisor 720 Fabric MSFC3 PFC3BXL                  |
| WS-SVC-ADM-1-K9=   | 3.6.0       | Catalyst 6500 Cisco Anomaly Detection Module                                  |
| WS-SVC-AGM-1-K9=   | 3.6.0       | Catalyst 6500 Cisco Anomaly Guard Module                                      |
| WS-SVC-IDS2-BUN-K9 | 3.6.1       | Cisco Catalyst 6500 Series Intrusion Detection System (IDSM-2) Service Module |
| WS-SVC-SSL-1-K9=   | 3.6.0       | SSL Module for Catalyst 6500                                                  |
| WS-X6148-FE-SFP    | 3.6.0       | Cisco Catalyst 6500 48-port 100BASE-X SFP Module                              |
| WSX-6408A-GBIC     | 3.6.0       | Catalyst 6000 8-port Gigabit Ethernet Module                                  |
| WSX-6408-GBIC      | 3.6.0       | Card with 8 Gigabit Ethernet ports for the Catalyst 6000 series               |
| WS-X6500-SFM2      | 3.6.0       | Switch Fabric Module 2                                                        |
| WVIC-2DSU-T1(V2)   | 3.6.0       | wvic-2dsu-t1(V2)                                                              |

## Cisco Catalyst 6500 Series (CatOS)—Supported Technologies

The following technologies are supported by the Cisco Catalyst 6500 Series (CatOS) in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [Frame Relay](#), page 6-76
- [Point to Point](#), page 6-77
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [CDP](#), page 6-93
- [VTP](#), page 6-94

## Cisco Catalyst 6500 Series (CatOS)—Supported Service Events

**Table 6-61** *Supported Service Events for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7*

| Event Name           | ANA Version | Expedited |
|----------------------|-------------|-----------|
| Card In/Out          | 3.6.0       | Y         |
| Link Down/Up         | 3.6.0       | Y         |
| Device Unreachable   | 3.6.0       | N         |
| CPU Over Utilized    | 3.6.0       | N         |
| Memory Over Utilized | 3.6.0       | N         |
| Device Unsupported   | 3.6.0       | N         |
| Module Unsupported   | 3.6.0       | N         |
| Port Flapping        | 3.6.0       | N         |
| Port Down            | 3.6.0       | Y         |
| Cloud Problem        | 3.6.0       | N         |
| Card Up/Down         | 3.6.0       | Y         |

## Cisco Catalyst 6500 Series (CatOS)—Supported Commands

**Table 6-62** *Supported Commands for Cisco Catalyst 6500 Series (CatOS)—Cisco ANA Version 3.7*

| Command                      | ANA Version |
|------------------------------|-------------|
| Show REP Segment Information | 3.7         |

## Cisco Catalyst 6500 Series (IOS) Switches

This section includes the following information about Cisco Catalyst 6500 Series (IOS) switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco Catalyst 6500 Series \(IOS\) Switches](#)):

- [Cisco Catalyst 6500 Series \(IOS\)—Supported Software Versions](#), page 6-49
- [Cisco Catalyst 6500 Series \(IOS\)—Supported Topologies](#), page 6-50
- [Cisco Catalyst 6500 Series \(IOS\)—Supported Modules](#), page 6-50
- [Cisco Catalyst 6500 Series \(IOS\)—Supported Technologies](#), page 6-57
- [Cisco Catalyst 6500 Series \(IOS\)—Supported Service Events](#), page 6-58
- [Cisco Catalyst 6500 Series \(IOS\)—Supported Commands](#), page 6-59



## Cisco Catalyst 6500 Series (IOS)—Supported Software Versions

**Table 6-63**      *Supported Software Versions for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7*

| Software Version           | ANA Version         |
|----------------------------|---------------------|
| IOS 12.1                   | 3.6.1               |
| IOS 12.1(13)E6             | 3.6.2               |
| IOS 12.1(20)E3             | 3.6.2               |
| IOS 12.2(17d)SXB           | 3.6.1               |
| IOS 12.2(18)SXD2           | 3.6.2               |
| IOS 12.2(18)SXD5           | 3.6.2               |
| IOS 12.2(18)SXE            | 3.6.1 <sup>1</sup>  |
| IOS 12.2(18)SXF            | 3.6.1 <sup>2</sup>  |
| IOS 12.2(18)SXF7           | 3.6.2 <sup>3</sup>  |
| IOS 12.2(33)               | 3.6.1 <sup>4</sup>  |
| IOS 12.2(33)SRA            | 3.6.1 <sup>5</sup>  |
| IOS 12.2(33)SRA6           | 3.6.3 <sup>6</sup>  |
| IOS 12.2(33)SRD1           | 3.7 <sup>7</sup>    |
| IOS 12.2(33)SRD2           | 3.6.7 <sup>8</sup>  |
| IOS 12.2(33)SXH            | 3.6.3 <sup>9</sup>  |
| IOS 12.2(33)SXH1           | 3.6.3 <sup>10</sup> |
| IOS 12.2(33)SXH2           | 3.6.6 <sup>11</sup> |
| IOS 12.2(33)SXH2a          | 3.6.5 <sup>12</sup> |
| IOS 12.2(33)SXI            | 3.6.4 <sup>13</sup> |
| IOS 12.2(nightly.SR070916) | 3.6.1 <sup>14</sup> |
| starts with 12.2(SIERRA)   | 3.6.1 <sup>15</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 ANA models pluggable ports for this IOS version.

## Cisco Catalyst 6500 Series (IOS)—Supported Topologies

**Table 6-64** Supported Topologies for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| PWE3 (Martini) | Tunnel         | 3.6.0       |
| GRE Tunnel     | GRE Tunnel     | 3.6.0       |
| VPN (VRF)      | VPN            | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.0       |

## Cisco Catalyst 6500 Series (IOS)—Supported Modules

**Table 6-65** Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7

| Module Name       | ANA Version | Module Description                                                |
|-------------------|-------------|-------------------------------------------------------------------|
| 4000W-DC          | 3.6.2       | 4000W DC PS for 7609/7613Chassis                                  |
| 6000W-DC          | 3.6.2       | 6000W DC PS                                                       |
| 7600-ES+40G3C     | 3.6.7       | 7600 ES+ Line Card, 40xGE SFP with DFC 3C                         |
| 7600-ES20         | 3.6.1       | Cisco 7600 Series Ethernet Services Card                          |
| 7600-ES20-10G3C   | 3.6.1       | Cisco 7600 ES20 line card, 2x10GE XFP with DFC 3C                 |
| 7600-ES20-10G3CXL | 3.6.1       | Cisco 7600 ES20 line card, 2x10GE XFP with DFC 3CXL               |
| 7600-ES20-GE3C    | 3.6.1       | Cisco 7600 ES20 line card, 20xGE SFP with DFC 3C                  |
| 7600-ES20-GE3CXL  | 3.6.1       | Cisco 7600 ES20 line card, 20xGE SFP with DFC 3CXL                |
| 7600-ES20-PROC    | 3.6.1       | 7600 ES20 PROC FRU                                                |
| 7600-ES40-G3CXL   | 3.6.4       | 7600 ES+ Line Card, 40xGE SFP with DFC 3CXL                       |
| 7600-MSFC4        | 3.6.1       | c7600 MSFC4 Daughterboard                                         |
| 7600-SIP-200      | 3.6.0       | SPA Interface Processor-200                                       |
| 7600-SIP-400      | 3.6.0       | SPA Interface Processor-400                                       |
| 7600-SIP-600      | 3.6.0       | SPA Interface Processor-600                                       |
| 7600-SSC-400      | 3.6.3       | Cisco 7600 / Catalyst 6500 Services SPA Carrier Card-400 Rev. 2.0 |
| ACE20-MOD-K9      | 3.6.3       | Application Control Engine 20 Hardware                            |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                               |
|-------------------|-------------|----------------------------------------------------------------------------------|
| CAT6500FIREWALLSM | 3.6.2       | Cisco Catalyst 6500 Series Firewall Services Module                              |
| CAT6500SSLSM      | 3.6.2       | Cisco Catalyst 6500 Series SSL Services Module                                   |
| CEVFAN            | 3.6.1       | Fan                                                                              |
| DFC-3C            | 3.6.1       | Distributed Forwarding Card 3C                                                   |
| FAN-MOD-09        | 3.6.4       | Catalyst 6509-NEB-A Fan Tray                                                     |
| GLC_BX-U          | 3.6.7       | 1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength |
| GLC-BX-D          | 3.6.7       | 1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength |
| GLC-LH-SM         | 3.6.4       | Short Wave fiber Gigabit Ethernet                                                |
| MSFC4             | 3.6.2       | Multilayer Switch Feature Card                                                   |
| OSM-12CT3T1       | 3.6.0       | 12-port channelized/unchannelized CT3-T1                                         |
| OSM-1CHOC12T3-SI  | 3.6.0       | 1-port channelized OC-12, SM-IR                                                  |
| OSM-1OC48-POS-SI+ | 3.6.0       | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-IR                                |
| OSM-1OC48-POS-SL+ | 3.6.0       | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-LR                                |
| OSM-1OC48-POS-SS+ | 3.6.0       | Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-SR                                |
| OSM-2+4GE-WAN+    | 3.6.0       | 4-port Gigabit Ethernet WAN (GBIC) with two Layer 2 LAN ports; CEF256            |
| OSM-2OC12-ATM-MM+ | 3.6.0       | Enhanced 2-port OC-12/STM-4 ATM OSM, MM                                          |
| OSM-2OC12-ATM-SI+ | 3.6.0       | Enhanced 2-port OC-12/STM-4 ATM OSM, SM-IR                                       |
| OSM-2OC12-POS-SI+ | 3.6.0       | Enhanced 2-port OC-12c/STM-4c POS, SM-IR; CEF256                                 |
| OSM-4OC12-POS-SI+ | 3.6.0       | Enhanced 4-port OC-12c/STM-4c POS, SM-IR; CEF256                                 |
| OSM-4OC3-POS-SI+  | 3.6.0       | Enhanced 4-port OC-3c/STM-1c POS, SM-IR;                                         |
| PA-1FE-TX         | 3.6.0       | 1-port Fast Ethernet port adapter                                                |
| PA-1FE-FX         | 3.6.0       | 1-port Fast Ethernet port adapter                                                |
| PA-2CE/PRI        | 3.6.1       | Not Found                                                                        |
| PA-2FE-TX         | 3.6.0       | 2-port Fast Ethernet port adapter                                                |
| PA-4T+            | 3.6.0       | T1/E1 port adapters                                                              |
| PA-A3-E3          | 3.6.0       | ATM with traffic shaping port adapters                                           |
| PA-A3-T3          | 3.6.0       | ATM with traffic shaping port adapters                                           |
| PA-MC-2E1/120     | 3.6.1       | 2 port multichannel E1 port adapter with G.703 120ohm interf                     |
| PA-MC-4T1         | 3.6.0       | T1/E1 port adapters                                                              |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                       |
|-------------------|-------------|----------------------------------------------------------|
| PA-MC-8T1         | 3.6.0       | T1/E1 port adapters                                      |
| PA-MC-STM-1       | 3.6.0       | Multichannel STM-1 port adapters                         |
| PA-MCX-8TE1       | 3.6.1       | 8 port multichannel T1/E1 8PRI port adapter              |
| PA-POS-2OC3       | 3.6.0       | 2-port POS OC3c/STM1 port adapter                        |
| PFC-3C            | 3.6.2       | Policy Feature Card 3C                                   |
| PFC-3CXL          | 3.6.1       | Policy Feature Card 3Cxl (PFC3CXL)                       |
| PWR-2700-AC/4     | 3.6.4       | 2700W AC power supply for Cisco Catalyst 6504-E          |
| PWR-2700-DC/4     | 3.6.2       | 2700W DC Power Supply for Cisco 6504-E                   |
| PWR-4000-DC       | 3.6.4       | Cisco 4000 Watt DC power supply for Catalyst 6000        |
| RSP720-3C-GE      | 3.6.1       | Route Switch Processor 720 with PFC3C                    |
| RSP720-3CXL       | 3.6.4       | Catalyst 6500 Supervisor Module 720 base board           |
| SFP-GE-L          | 3.6.4       | 1000BASE-LH/LX pluggable transceiver                     |
| SFP-GE-S          | 3.6.7       | 1000BASE-Sx Short wavelength gigabit ethernet SFP        |
| SFP-GE-T          | 3.6.7       | 1000BASE-T Copper gigabit ethernet SFP                   |
| SFP-GE-Z          | 3.6.7       | 1000BASE-Zx Extended reach gigabit ethernet SFP          |
| SFP-OC3-IR1       | 3.6.0       | Intermediate range, single-mode fiber                    |
| SFP-OC3-LR1       | 3.6.0       | Long range, single-mode fiber                            |
| SFP-OC3-MM        | 3.6.0       | Short range, multimode fiber                             |
| SFP-OC3-SR        | 3.6.1       | OC3/STM1 SFP, Single-mode fiber, Short Reach             |
| SPA-10X1GE        | 3.6.0       | 10-port Gigabit Ethernet SPA, SFP Optics                 |
| SPA-10X1GE-V2     | 3.6.0       | 10-port Gigabit Ethernet SPA, SFP Optics                 |
| SPA-1XCHSTM1/OC3  | 3.6.0       | 1-port Channelized STM1/OC3 to DS0 SPA                   |
| SPA-1XOC12-ATM    | 3.6.0       | 1-Port OC-12c/STM-4c ATM SPA                             |
| SPA-1XOC12-POS    | 3.6.0       | 1-port OC-12c/STM-4c POS SPA                             |
| SPA-1XOC48-ATM    | 3.6.0       | 1 port OC-48c/STM-16 ATM SPA                             |
| SPA-1XTENGE-XFP   | 3.6.0       | 1-port 10 Gigabit Ethernet SPA, LANPHY XFP Optics        |
| SPA-24CHT1-CE-ATM | 3.6.0       | 24-Port Channelized T1/E1/J1 ATM CEoP SPA                |
| SPA-2X1GE         | 3.6.0       | 2-port Gigabit Ethernet SPA, SFP Optics                  |
| SPA-2X1GE-V2      | 3.6.0       | 2-port Gigabit Ethernet SPA, SFP Optics                  |
| SPA-2XCT3/DS0     | 3.6.0       | 2-port Channelized T3 to DS0 SPA                         |
| SPA-2XOC3-ATM     | 3.6.0       | 2-port OC-3c/STM-1c ATM SPA                              |
| SPA-2XOC3-POS     | 3.6.0       | 2-port OC-3c/STM-1c POS SPA                              |
| SPA-2XOC48POS/RPR | 3.6.1       | 1-port 10 Gigabit Ethernet Shared Port Adapter XFP based |
| SPA-2XOC48POS/RPR | 3.6.0       | 2 port OC-48 POS/RPR SPA with SFP Optics                 |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                                                                       |
|-------------------|-------------|--------------------------------------------------------------------------------------------------------------------------|
| SPA-2XT3/E3       | 3.6.0       | 2-port Clear Channel T3/E3 SPA                                                                                           |
| SPA-4X1FE-TX-V2   | 3.6.0       | 4-port 10/100 Ethernet SPA TX                                                                                            |
| SPA-4XCT3/DS0     | 3.6.0       | 4-port Channelized T3 to DS0 SPA                                                                                         |
| SPA-4XOC3-ATM     | 3.6.0       | 4-port OC-3c/STM-1c ATM SPA                                                                                              |
| SPA-4XOC3-POS     | 3.6.0       | 4-port OC-3c/STM-1c POS SPA                                                                                              |
| SPA-4XOC48POSRR   | 3.6.0       | 4-port OC-48c/STM-16 POS/DPT/RPR SPA                                                                                     |
| SPA-4XT3/E3       | 3.6.0       | 4-port Clear Channel T3/E3 SPA                                                                                           |
| SPA-5X1GE         | 3.6.0       | 5-port Gigabit Ethernet SPA, SFP Optics                                                                                  |
| SPA-5X1GE-V2      | 3.6.2       | 5-Port Gigabit Ethernet Shared Port Adapter                                                                              |
| SPA-8X1FE-TX-V2   | 3.6.0       | 8-port 10/100 Ethernet SPA TX                                                                                            |
| SPA-8XCHT1E1      | 3.6.0       | 8-Port Channelized T1/E1 SPA                                                                                             |
| SPA-CHOC3-CE-ATM  | 3.6.2       | 1-port Channelized OC3/STM-1 ATM + Circuit Emulation Shared Port Adapter                                                 |
| SPA-OC192POS-LR   | 3.6.0       | 1-port OC-192c/STM-64 POS/RPR SPA, SM-LR                                                                                 |
| SPA-OC192POS-XFP  | 3.6.0       | 1-port OC-192c/STM-64 POS/RPR SPA, XFP Optics                                                                            |
| VS-S720-10G-3C    | 3.6.1       | Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with two 10 Gigabit Ethernet ports and MSFC3 PFC3C    |
| VS-S720-10G-3CXL  | 3.6.1       | Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with two 10 Gigabit Ethernet ports and MSFC3 PFC3C XL |
| WS-6700-DFC3B     | 3.6.1       | Catalyst 6500 Distributed forwarding card 3B                                                                             |
| WS-6700-DFC3BXL   | 3.6.1       | Catalyst 6500 Distributed forwarding card 3B XL                                                                          |
| WS-C6000-CL       | 3.7         | Cisco Catalyst 6000 Clock FRU                                                                                            |
| WS-C6503-E-FAN    | 3.6.4       | Catalyst 6503-E Chassis Fan Tray                                                                                         |
| WS-C6506-E-FAN    | 3.6.4       | Catalyst 6506 - E chassis fan Tray                                                                                       |
| WS-C6509-E-FAN    | 3.6.0       | High-capacity fan tray                                                                                                   |
| WS-C6509-NEB-A    | 3.6.1       | Enhanced 9-slot vertically oriented chassis                                                                              |
| WS-C6509-NEB-FAN  | 3.6.4       | Catalyst 6509-NEB Fan Tray for 9-Vertical-Slot System                                                                    |
| WS-C6509-V-E-FAN  | 3.6.4       | Catalyst 6509-V-E Fan Tray                                                                                               |
| WS-C6513-CL       | 3.7         | Cisco Clock Module WS-C6513-CL                                                                                           |
| WS-C6K-13SLT-FAN2 | 3.6.0       | High Speed Fan Tray for Catalyst 6513 / Cisco 7613                                                                       |
| WS-C6K-VTT        | 3.7         | Catalyst 6000 VTT Module                                                                                                 |
| WS-CAC-2500W      | 3.6.4       | Catalyst 6500 2500W AC power supply                                                                                      |
| WS-CAC-3000W      | 3.6.4       | Catalyst 6500 3000W AC power supply                                                                                      |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name        | ANA Version | Module Description                                                                                              |
|--------------------|-------------|-----------------------------------------------------------------------------------------------------------------|
| WS-CAC-4000W-INT   | 3.6.3       | 4000W AC PowerSupply, International (cable included)                                                            |
| WS-CAC-6000W       | 3.6.0       | 6000W AC power supply                                                                                           |
| WS-CDC-2500W       | 3.6.4       | Cisco 2500 Watt DC power supply for Catalyst 6000 or 8500 series                                                |
| WS-F6700-DFC3A     | 3.6.1       | Distributed Forwarding Card 3                                                                                   |
| WS-F6700-DFC3BXL   | 3.6.0       | Distributed Forwarding Card 3BXL (DFC3BXL) for use on CEF720 modules                                            |
| WS-F6700-DFC3C     | 3.6.0       | Distributed Forwarding Card 3C (DFC3C) for use on CEF720 modules                                                |
| WS-F6700-DFC-3C    | 3.6.2       | Catalyst 6500 Distributed forwarding card 3C                                                                    |
| WS-F6700-DFC3CXL   | 3.6.0       | Distributed Forwarding Card 3CXL (DFC3CXL) for use on CEF720 modules                                            |
| WS-F6700-DFC-3CXL  | 3.6.2       | Catalyst 6500 Distributed forwarding card 3C XL                                                                 |
| WS-F6K-FE48X2-AF   | 3.6.0       | IEEE 802.3af PoE daughter card                                                                                  |
| WS-F6K-GE48-AF     | 3.6.0       | IEEE 802.3af PoE daughter card                                                                                  |
| WS-F6K-MSFC2       | 3.6.1       | Multilevel Switching Feature Card Version 2 for Catalyst 6000 that is treated as a standalone system by the NMS |
| WS-F6K-PFC2        | 3.6.1       | Catalyst 6500 L3 switching engine II                                                                            |
| WS-F6K-PFC3BXL     | 3.6.0       | Policy Feature Card 3BXL (PFC3BXL)                                                                              |
| WS-F6K-PFC3CXL     | 3.6.0       | Policy Feature Card 3CXL (PFC3CXL)                                                                              |
| WS-F6K-VPWR        | 3.6.0       | PoE Daughter card                                                                                               |
| WS-F6K-VPWR-GE     | 3.6.0       | PoE Daughter card                                                                                               |
| WS-G5486           | 3.6.4       | Long Haul fiber Gigabit Ethernet                                                                                |
| WS-G6483           | 3.6.0       | 10GBASE-ER serial 1550 nm extended-reach OIM                                                                    |
| WS-G6488           | 3.6.0       | 10GBASE-LR serial 1310 nm long-reach OIM                                                                        |
| WS-SUP32-10GE-3B   | 3.6.0       | Supervisor Engine 32                                                                                            |
| WS-SUP32-GE-3B     | 3.6.0       | Supervisor Engine 32                                                                                            |
| WS-SUP720-3B       | 3.6.0       | Supervisor Engine 720 with PFC3B                                                                                |
| WS-SUP720-3BXL     | 3.6.0       | Supervisor Engine 720 with PFC3BXL                                                                              |
| WS-SVC-FWM-1       | 3.6.0       | Catalyst 6500 Firewall Module                                                                                   |
| WS-SVC-IDS2-BUN-K9 | 3.6.1       | Cisco Catalyst 6500 Series Intrusion Detection System (IDS2) Service Module                                     |
| WS-SVC-IDSM-2      | 3.6.1       | Catalyst 6500 Intrusion Detection Module                                                                        |
| WS-SVC-MWAM-1      | 3.6.0       | Multi-Processor WAN Application Module                                                                          |
| WS-SVC-NAM-1       | 3.6.0       | Network Analysis module 1                                                                                       |
| WS-SVC-NAM-2       | 3.6.0       | Network Analysis module 2                                                                                       |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                      |
|-------------------|-------------|-------------------------------------------------------------------------|
| WS-X6148A-GE-TX   | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                     |
| WS-X6148A-RJ-45   | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148FE-SFP    | 3.6.1       | Catalyst 6500 48 port 100Base-X SFP module                              |
| WS-X6148-FE-SFP   | 3.6.0       | 48 port 100BASE-FX Fast Ethernet Switching Module                       |
| WS-X6148-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                     |
| WS-X6148-RJ-21    | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6148X2-RJ-45  | 3.6.0       | 96 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6196-RJ-21    | 3.6.0       | 96 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6248A-TEL     | 3.6.0       | 48 port 10/100TX RJ-21 Enhanced Ethernet/Fast Ethernet Switching Module |
| WS-X6248-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6248-TEL      | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module          |
| WS-X6316-GE-TX    | 3.6.0       | 16-port Gigabit Ethernet RJ-45                                          |
| WS-X6324-100FX-SM | 3.6.0       | 24 port 100FX Single Mode Fast Ethernet Switching Module                |
| WS-X6348-RJ-21    | 3.6.0       | 6500 48 port 10/100BaseTX (RJ-21)                                       |
| WS-X6348-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module          |
| WS-X6408A-GBIC    | 3.6.0       | 8-port Gigabit Ethernet GBIC Enhanced QoS Module                        |
| WS-X6408-GBIC     | 3.6.0       | 8-port Gigabit Ethernet GBIC                                            |
| WS-X6416-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6502-10GE     | 3.6.0       | 1-port 10-Gigabit Ethernet                                              |
| WS-X6516A-GBIC    | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6516-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                           |
| WS-X6516-GE-TX    | 3.6.0       | 16 port 10/100/1000 Base-T Ethernet Switching Module                    |
| WS-X6548-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                     |

**Table 6-65**      **Supported Modules for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7**

| Module Name       | ANA Version | Module Description                                                                                |
|-------------------|-------------|---------------------------------------------------------------------------------------------------|
| WS-X6548-RJ-21    | 3.6.0       | 48 port 10/100TX RJ-21 Ethernet/Fast Ethernet Switching Module                                    |
| WS-X6548-RJ-45    | 3.6.0       | 48 port 10/100TX RJ-45 Ethernet/Fast Ethernet Switching Module                                    |
| WS-X6582-2PA      | 3.6.0       | Enhanced FlexWAN Module;                                                                          |
| WS-X6700-CFC      | 3.6.0       | Centralized Forwarding Card                                                                       |
| WS-X6704-10GE     | 3.6.0       | 4-port 10-Gigabit Ethernet                                                                        |
| WS-X6708-10G-3C   | 3.6.1       | C6K 8 port 10 Gigabit Ethernet module with DFC3C (req. X2)                                        |
| WS-X6708-10GE     | 3.6.3       | C6K 8 port 10 Gigabit Ethernet module with DFC                                                    |
| WS-X6724-SFP      | 3.6.0       | 24-port Gigabit Ethernet SFP                                                                      |
| WS-X6748-GE-TX    | 3.6.0       | 48 port 10/100/1000 RJ-45 Ethernet Switching Module                                               |
| WS-X6748-SFP      | 3.6.0       | 48-port Gigabit Ethernet SFP                                                                      |
| WS-X6816-GBIC     | 3.6.0       | 16-port Gigabit Ethernet GBIC                                                                     |
| WS-X6K-S1A-MSFC2  | 3.6.1       | Catalyst 6000 Supervisor Engine 1A, 2 Gigabit Ethernet, plus MSFC2 and policy feature card (PFC)  |
| WS-X6K-S2-MSFC2   | 3.6.1       | Catalyst 6500 Supervisor Engine-2, 2GE, plus MSFC-2 / PFC-2                                       |
| WS-X6K-SUP2-2GE   | 3.6.1       | Supervisor 2 with 2 Gigabit Ethernet ports                                                        |
| X2-10GB-SR        | 3.6.5       | 10GBASE-SR Serial 850-nm short-reach multimode (MMF)                                              |
| XENPAK-10GB-ER    | 3.6.0       | 10GBASE-ER Serial 1550-nm extended-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF) |
| XENPAK-10GB-LR    | 3.6.4       | 10 Gigabit Ethernet Serial 1310nm Laser Xenpak Module                                             |
| XENPAK-10GB-SR    | 3.6.0       | 10GBASE-SR Serial 850-nm short-reach multimode fiber (MMF)                                        |
| XFP-10GLR-OC192SR | 3.6.4       | OC192 XFP Single Mode Long Reach 2 (80km).                                                        |



## Cisco Catalyst 6500 Series (IOS)—Supported Technologies

The following technologies are supported by the Cisco Catalyst 6500 Series (IOS) in Cisco ANA Version 3.7:

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- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [ATM, page 6-73](#)
- [Point to Point, page 6-77](#)
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- [MPLS, page 6-79](#)
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- [CFM, page 6-95](#)

## Cisco Catalyst 6500 Series (IOS)—Supported Service Events

**Table 6-66**      *Supported Service Events for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Adaptive Polling                                    | 3.6.0       | N         |
| BGP link down                                       | 3.6.1       | Y         |
| MPLS interface removed                              | 3.6.0       | Y         |
| Shelf out                                           | 3.6.7       | N         |
| VSI Up/Down                                         | 3.6.7       | N         |
| VSI Admin Down                                      | 3.6.7       | N         |
| EFP Up/Down                                         | 3.6.7       | N         |
| EFP Admin Down                                      | 3.6.7       | N         |
| EFP down due to error disabled                      | 3.6.7       | N         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |
| CFM Domain Fault                                    | 3.7         | N         |

## Cisco Catalyst 6500 Series (IOS)—Supported Commands

**Table 6-67**      *Supported Commands for Cisco Catalyst 6500 Series (IOS)—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

## Cisco ME 6500 Series Ethernet Switches (6524)

This section includes the following information about Cisco ME 6500 Series (6524) switches (for information on the NE types supported in Cisco ANA Version 3.7, see [Cisco ME 6500 Series Ethernet Switches \(6524\)](#)):

- [Cisco ME 6500 Series \(6524\)—Supported Software Versions](#), page 6-60
- [Cisco ME 6500 Series \(6524\)—Supported Topologies](#), page 6-60
- [Cisco ME 6500 Series \(6524\)—Supported Modules](#), page 6-60
- [Cisco ME 6500 Series \(6524\)—Supported Technologies](#), page 6-61
- [Cisco ME 6500 Series \(6524\)—Supported Service Events](#), page 6-62
- [Cisco ME 6500 Series \(6524\)—Supported Commands](#), page 6-63

## Cisco ME 6500 Series (6524)—Supported Software Versions

**Table 6-68** *Supported Software Versions for Cisco ME 6500 Series (6524)—Cisco ANA Version 3.7*

| Software Version | ANA Version        |
|------------------|--------------------|
| 12.2             | 3.6.0              |
| 12.2(18)ZU       | 3.6.0 <sup>1</sup> |
| 12.2(18)ZU1      | 3.6.0 <sup>2</sup> |
| 12.2(18)ZU2      | 3.6.0 <sup>3</sup> |
| 12.2(33)SXI      | 3.7 <sup>4</sup>   |

<sup>1,2,3,4</sup>ANA models pluggable ports for this IOS version.

## Cisco ME 6500 Series (6524)—Supported Topologies

**Table 6-69** *Supported Topologies for Cisco ME 6500 Series (6524)—Cisco ANA Version 3.7*

| Topology Type  | Link Type      | ANA Version |
|----------------|----------------|-------------|
| ATM            | ATM            | 3.6.0       |
| BGP            | BGP            | 3.6.0       |
| Ethernet       | Ethernet       | 3.6.0       |
| MPLS           | MPLS           | 3.6.0       |
| VPN (VRF)      | VPN            | 3.6.0       |
| Physical Layer | Physical Layer | 3.6.0       |
| LAG            | LAG            | 3.6.2       |

## Cisco ME 6500 Series (6524)—Supported Modules

**Table 6-70** *Supported Modules for Cisco ME 6500 Series (6524)—Cisco ANA Version 3.7*

| Module Name    | ANA Version | Module Description                                     |
|----------------|-------------|--------------------------------------------------------|
| ME-C6524GT-8S  | 3.6.0       | 32 ports Cisco ME 6524 Ethernet Switch Rev. 1.1        |
| WS-6148A-GE-TX | 3.6.0       | Catalyst 6500 48 port 10/100/1000BaseTX (RJ-45) module |
| WS-6148-GE-TX  | 3.6.0       | Catalyst 6000 48 port 10/100/1000BaseT (RJ-45) module  |

## Cisco ME 6500 Series (6524)—Supported Technologies

The following technologies are supported by the Cisco ME 6500 Series (6524) in Cisco ANA Version 3.7:

- [IP](#), page 6-65
- [Routing Protocols](#), page 6-67
- [Ethernet \(IEEE 802.3\)](#), page 6-68
- [MPLS](#), page 6-79
- [MPLS TE](#), page 6-81
- [VPN](#), page 6-82
- [PWE3](#), page 6-84
- [ACL](#), page 6-85
- [Physical Equipment](#), page 6-86
- [Base Logical Components](#), page 6-87
- [Common](#), page 6-88
- [Additional Technologies](#), page 6-89
- [Carrier Ethernet](#), page 6-91
- [LLDP](#), page 6-92
- [CDP](#), page 6-93
- [Discovery Protocol](#), page 6-93
- [VTP](#), page 6-94
- [REP](#), page 6-94
- [CFM](#), page 6-95

## Cisco ME 6500 Series (6524)—Supported Service Events

**Table 6-71**      *Supported Service Events for Cisco ME 6500 Series (6524)—Cisco ANA Version 3.7*

| Event Name                                          | ANA Version | Expedited |
|-----------------------------------------------------|-------------|-----------|
| Primary HSRP Interface Active/Inactive              | 3.6.0       | N         |
| Secondary HSRP Interface Active/Inactive            | 3.6.0       | N         |
| All IP Interfaces Down / Active IP Interfaces Found | 3.6.0       | Y         |
| Interface Status Down/Up                            | 3.6.0       | Y         |
| Card In/Out                                         | 3.6.0       | Y         |
| Link Down/Up                                        | 3.6.0       | Y         |
| Device Unreachable                                  | 3.6.0       | N         |
| CPU Over Utilized                                   | 3.6.0       | N         |
| Memory Over Utilized                                | 3.6.0       | N         |
| Device Unsupported                                  | 3.6.0       | N         |
| Discard Packets                                     | 3.6.0       | N         |
| Dropped Packets                                     | 3.6.0       | N         |
| Module Unsupported                                  | 3.6.0       | N         |
| Port Flapping                                       | 3.6.0       | N         |
| Port Down                                           | 3.6.0       | Y         |
| Rx Over Utilized                                    | 3.6.0       | N         |
| Tx Over Utilized                                    | 3.6.0       | N         |
| VPN Leak                                            | 3.6.0       | N         |
| Cloud Problem                                       | 3.6.0       | N         |
| Broken LSP Discovered                               | 3.6.0       | N         |
| MPLS Black Hole                                     | 3.6.0       | N         |
| Layer 2 Tunnel Down                                 | 3.6.0       | N         |
| MPLS TE Tunnel Down/Flapping                        | 3.6.0       | N         |
| BGP Neighbor Down                                   | 3.6.0       | N         |
| Card Up/Down                                        | 3.6.0       | Y         |
| Vlan Tagged Interface Up/Down                       | 3.6.7       | N         |
| Vlan Tagged Interface AdminDown                     | 3.6.7       | N         |
| CFM Domain Fault                                    | 3.7         | N         |

## Cisco ME 6500 Series (6524)—Supported Commands

**Table 6-72**      *Supported Commands for Cisco ME 6500 Series (6524)—Cisco ANA Version 3.7*

| Command                                           | ANA Version |
|---------------------------------------------------|-------------|
| Configure CFM Maintenance Domain                  | 3.7         |
| Configure CFM Global Parameters                   | 3.7         |
| Configure CFM MIP                                 | 3.7         |
| Configure CFM Continuity Check                    | 3.7         |
| Configure CFM Service ID                          | 3.7         |
| Configure CFM MEP                                 | 3.7         |
| Enable CFM Continuity Check                       | 3.7         |
| Enable CFM SNMP Server Traps                      | 3.7         |
| Diagnose CFM with Show MEP Status                 | 3.7         |
| Diagnose CFM with Show MEP Crosscheck Status      | 3.7         |
| Diagnose CFM with Ping Remote MEP with MAC        | 3.7         |
| Diagnose CFM with Ping Remote MEP with MPID       | 3.7         |
| Diagnose CFM with Ping Remote MEP with Multicast  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MAC  | 3.7         |
| Diagnose CFM with Traceroute Remote MEP with MPID | 3.7         |
| Show REP Segment Information                      | 3.7         |

# Supported Technologies on Cisco Switches

The following sections list the objects and attributes that are supported on Cisco switches in Cisco ANA Version 3.7 per technology:

- [IP, page 6-65](#)
- [Routing Protocols, page 6-67](#)
- [Ethernet \(IEEE 802.3\), page 6-68](#)
- [ATM, page 6-73](#)
- [Frame Relay, page 6-76](#)
- [Point to Point, page 6-77](#)
- [Physical Technologies, page 6-78](#)
- [MPLS, page 6-79](#)
- [MPLS TE, page 6-81](#)
- [VPN, page 6-82](#)
- [PWE3, page 6-84](#)
- [ACL, page 6-85](#)
- [Physical Equipment, page 6-86](#)
- [Base Logical Components, page 6-87](#)
- [Common, page 6-88](#)
- [Additional Technologies, page 6-89](#)
- [Local Switching, page 6-90](#)
- [BFD, page 6-90](#)
- [Carrier Ethernet, page 6-91](#)
- [LLDP, page 6-92](#)
- [CDP, page 6-93](#)
- [Discovery Protocol, page 6-93](#)
- [VTP, page 6-94](#)
- [REP, page 6-94](#)
- [CFM, page 6-95](#)



# IP

**Table 6-73 IP Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                       | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500           | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------------|------|--------|------|------|------|------|--------|------|----------------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IPIInterface</b>    |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IP Address                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      | Y    | Y          | Y        | Y      |
| Subnetwork Mask                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      | Y    | Y          | Y        | Y      |
| IP Interface Addresses Array    | Y    |        |      | Y    | Y    |      | Y      |      |                |      |        | Y    | Y          | Y        | Y      |
| Interface Name                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      | Y    | Y          | Y        | Y      |
| Interface Description           |      |        |      |      | Y    |      | Y      | Y    |                |      |        | Y    |            | Y        | Y      |
| IP Interface State              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      | Y    | Y          | Y        | Y      |
| OSPF Interface Cost             |      |        |      |      |      |      |        |      |                |      |        |      |            | Y        |        |
| Broadcast Address               |      |        |      |      |      |      |        | Y    |                |      |        |      |            | Y        |        |
| MTU                             |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Lookup Method                   |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Address Resolution Type         |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| ARP Timeout                     |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Secured ARP                     |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| ICMP Mask Reply                 |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IGMP Proxy                      |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| HSRP Groups                     |      |        |      |      |      |      | Y      |      | Y <sup>1</sup> |      |        |      |            | Y        | Y      |
| IP Multiplexing Table           |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IANA Type                       |      |        |      |      |      |      |        | Y    |                |      |        |      |            |          |        |
| Containing CTPs                 |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Contained CTPs                  |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| <b>IMO Name—IIPMuxEntry</b>     |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Termination Point               |      |        |      | Y    | Y    |      | Y      |      |                |      |        |      |            | Y        | Y      |
| Destination IP Subnet           |      |        |      | Y    | Y    |      | Y      |      |                |      |        |      |            | Y        | Y      |
| <b>IMO Name—IIRoutingEntity</b> |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Routing Table                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    |        | Y    | Y          | Y        | Y      |
| ARP Entity                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    |        |      | Y          | Y        | Y      |
| Routing Table Changes           |      |        |      |      |      |      |        |      |                |      |        | Y    |            |          |        |
| Name                            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    |        | Y    | Y          | Y        | Y      |
| Logical Sons                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    |        | Y    | Y          | Y        | Y      |
| <b>IMO Name—IIRoutingEntry</b>  |      |        |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Destination IP Subnet           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      | Y    | Y          | Y        | Y      |

**Table 6-73** IP Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute                                 | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------------------------|------|--------|------|------|------|------|--------|------|-----------------|-----------------|--------|------|------------|----------|--------|
| Next Hop IP Address                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| Type                                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| Routing Protocol Type                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| Outgoing Interface Name                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| <b>IMO Name—IARPEntity</b>                |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| ARP Table                                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y               | Y               |        | Y    | Y          | Y        | Y      |
| <b>IMO Name—IARPEntity</b>                |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| IP Address                                | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| MAC Address                               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| Port                                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y               | Y               | Y      | Y    | Y          | Y        | Y      |
| Entry Type                                |      |        |      |      |      |      | Y      | Y    |                 | Y               |        | Y    |            | Y        | Y      |
| <b>IMO Name—IIPPool</b>                   |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| IP Address Pool Entries                   |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Name                                      |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Index                                     |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| <b>IMO Name—IIPRangeBasedIPPoolEntry</b>  |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Start IP Address                          |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| End IP Address                            |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Unused Addresses                          |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Used Addresses                            |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Reserved Addresses                        |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| <b>IMO Name—IIPSubnetBasedIPPoolEntry</b> |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| IP Subnet                                 |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Unused Addresses                          |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Used Addresses                            |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Reserved Addresses                        |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| <b>IMO Name—HSRPGGroupEntry</b>           |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Group Number                              |      |        |      |      |      |      | Y      |      | Y <sup>2</sup>  | Y <sup>3</sup>  |        |      |            | Y        | Y      |
| Port Description                          |      |        |      |      |      |      | Y      |      | Y <sup>4</sup>  | Y <sup>5</sup>  |        |      |            | Y        | Y      |
| Priority                                  |      |        |      |      |      |      | Y      |      | Y <sup>6</sup>  | Y <sup>7</sup>  |        |      |            | Y        | Y      |
| Coupled Router                            |      |        |      |      |      |      | Y      |      | Y <sup>8</sup>  | Y <sup>9</sup>  |        |      |            | Y        | Y      |
| State                                     |      |        |      |      |      |      | Y      |      | Y <sup>10</sup> | Y <sup>11</sup> |        |      |            | Y        | Y      |
| Tracking Interfaces                       |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Virtual IP Address                        |      |        |      |      |      |      | Y      |      | Y <sup>12</sup> | Y <sup>13</sup> |        |      |            | Y        | Y      |

**Table 6-73** IP Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute                     | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------------|------|--------|------|------|------|------|--------|------|-----------------|-----------------|--------|------|------------|----------|--------|
| Virtual MAC Address           |      |        |      |      |      |      | Y      |      | Y <sup>14</sup> | Y <sup>15</sup> |        |      |            | Y        | Y      |
| <b>IMO Name—I Tunnel GRE</b>  |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Name                          |      |        |      |      |      |      | Y      |      | Y <sup>16</sup> | Y <sup>17</sup> | Y      | Y    |            | Y        | Y      |
| Tunnel Destination and Source |      |        |      |      |      |      | Y      |      | Y <sup>18</sup> | Y <sup>19</sup> | Y      | Y    |            | Y        | Y      |
| IP Address                    |      |        |      |      |      |      | Y      |      | Y <sup>20</sup> | Y <sup>21</sup> | Y      | Y    |            | Y        | Y      |
| IP Interface State            |      |        |      |      |      |      |        |      |                 | Y               |        |      |            | Y        | Y      |
| IANA Type                     |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Containing CTPs               |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Contained CTPs                |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Keep Alive Time               |      |        |      |      |      |      | Y      |      |                 | Y               |        | Y    |            |          |        |
| Keep Alive Retry              |      |        |      |      |      |      | Y      |      |                 | Y               |        | Y    |            |          |        |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 Supported for 4503E, 4507RE, 4507, and 4506E only.

12, 13, 14, 15, 16, 17, 18, 19, 20, 21 Validated with 12.2(52)SG only.

## Routing Protocols

**Table 6-74** Routing Protocols Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                            | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------|------|--------|------|------|------|------|--------|------|-----------------|-----------------|--------|------|------------|----------|--------|
| <b>IMO Name—I Bgp Neighbor Entry</b> |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Remote Identifier                    |      |        |      |      | Y    |      | Y      |      | Y <sup>1</sup>  | Y <sup>2</sup>  | Y      |      |            | Y        | Y      |
| Neighbor Type                        |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Distributing Interfaces              |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Remote Address                       |      |        |      |      | Y    |      | Y      |      | Y <sup>3</sup>  | Y <sup>4</sup>  | Y      |      |            | Y        | Y      |
| Remote Autonomous System             |      |        |      |      | Y    |      | Y      |      | Y <sup>5</sup>  | Y <sup>6</sup>  | Y      |      |            | Y        | Y      |
| Peer State                           |      |        |      |      | Y    |      | Y      |      | Y <sup>7</sup>  | Y <sup>8</sup>  | Y      |      |            | Y        | Y      |
| Hold Time                            |      |        |      |      | Y    |      | Y      |      | Y <sup>9</sup>  | Y <sup>10</sup> | Y      |      |            | Y        | Y      |
| Keep Alive Time                      |      |        |      |      | Y    |      | Y      |      | Y <sup>11</sup> | Y <sup>12</sup> | Y      |      |            | Y        | Y      |
| VrfName                              |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Address family                       |      |        |      |      | Y    |      |        |      |                 |                 |        |      |            |          |        |

**Table 6-74** *Routing Protocols Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)*

| Attribute                  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|----------------------------|------|--------|------|------|------|------|--------|------|-----------------|-----------------|--------|------|------------|----------|--------|
| <b>IMO Name—IOSpfEntry</b> |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Area Identifier            |      | Y      |      |      |      |      | Y      |      | Y <sup>13</sup> | Y <sup>14</sup> | Y      |      |            | Y        | Y      |
| IP Address                 |      | Y      |      |      |      |      | Y      |      | Y <sup>15</sup> | Y <sup>16</sup> | Y      |      |            | Y        | Y      |
| Type                       |      | Y      |      |      |      |      | Y      |      | Y <sup>17</sup> | Y <sup>18</sup> | Y      |      |            | Y        | Y      |
| Administrative Status      |      | Y      |      |      |      |      | Y      |      | Y <sup>19</sup> | Y <sup>20</sup> | Y      |      |            | Y        | Y      |
| Ospf Entry State           |      | Y      |      |      |      |      | Y      |      | Y <sup>21</sup> | Y <sup>22</sup> | Y      |      |            | Y        | Y      |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11Supported for 4503E, 4507RE, 4507, and 4506E only.

12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22Validated with 12.2(52)SG only.

## Ethernet (IEEE 802.3)

**Table 6-75** *Ethernet (IEEE 802.3) Attribute Support on Cisco Switches—Cisco ANA Version 3.7*

| Attribute                                      | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—ILinkAggregationGroup802dot3ad</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| dot3adAggMACAddress                            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggActorSystemPriority                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggActorSystemID                         | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggActorAdminKey                         | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggActorOperKey                          | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggPartnerSystemID                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggPartnerSystemPriority                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggPartnerOperKey                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| dot3adAggCollectorMaxDelay                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| GroupNumber                                    | Y    | Y      | Y    | Y    | Y    | Y    |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| AggregationProtocolType                        | Y    | Y      | Y    | Y    | Y    | Y    |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| MacAddress                                     | Y    | Y      | Y    | Y    | Y    | Y    |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| ChannelAdminStatus                             | Y    | Y      | Y    | Y    | Y    | Y    |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| ChannelOperStatus                              | Y    | Y      | Y    | Y    | Y    | Y    |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| <b>IMO Name—IEthernet</b>                      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MAC Address                                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |

**Table 6-75 Ethernet (IEEE 802.3) Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                      | 2900 | ME3400          | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500           | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------|------|-----------------|------|------|------|------|--------|------|----------------|------|--------|------|------------|----------|--------|
| Duplex Mode                    |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Output Flow Control            |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Input Flow Control             |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IANA Type                      |      |                 |      |      |      |      |        |      |                |      |        |      |            |          | Y      |
| Containing CTPs                |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Contained CTPs                 |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Port Type                      |      | Y               |      |      |      |      |        |      |                |      |        |      |            |          |        |
| <b>IMO Name—IVlanInterface</b> |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Mode                           |      | Y               |      | Y    | Y    | Y    | Y      |      | Y <sup>1</sup> | Y    | Y      |      | Y          | Y        | Y      |
| Native VLAN Identification     |      | Y               |      | Y    | Y    | Y    | Y      |      | Y <sup>2</sup> | Y    | Y      |      | Y          | Y        | Y      |
| Virtual LAN Table              |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IANA Type                      |      |                 |      |      |      |      |        |      |                |      |        |      |            |          | Y      |
| Containing CTPs                |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Contained CTPs                 |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| vlanAdminType                  |      | Y               |      |      |      |      | Y      |      |                | Y    |        |      | Y          |          |        |
| vlanencapType                  |      | Y               |      |      |      |      | Y      |      |                | Y    |        |      | Y          |          |        |
| getAccess                      |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Allowed Vlans                  |      |                 |      |      |      |      | Y      |      |                | Y    |        |      | Y          |          |        |
| <b>IMO Name—IVlanEncapMux</b>  |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| IANA Type                      |      |                 |      |      |      | Y    | Y      |      |                |      |        |      |            |          |        |
| Containing CTPs                |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| Contained CTPs                 |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| <b>IMO Name—IVlanMapping</b>   |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| direction                      |      | Y <sup>3</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| vlanMatchCriteria              |      | Y <sup>4</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| vlanRewriteDefinition          |      | Y <sup>5</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| Drop                           |      | Y <sup>6</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| Vlan                           |      | Y <sup>7</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| innerVlan                      |      | Y <sup>8</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| translatedVlan                 |      | Y <sup>9</sup>  |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| translatedInnerVlan            |      | Y <sup>10</sup> |      |      |      |      | Y      |      |                |      |        |      |            | Y        | Y      |
| <b>IMO Name—IIEEE802</b>       |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |
| VLAN Identification            |      | Y               | Y    | Y    | Y    | Y    | Y      | Y    | Y              | Y    | Y      |      |            | Y        | Y      |
| Binding Information            |      |                 |      |      |      |      |        |      |                |      |        |      |            |          |        |

**Table 6-75 Ethernet (IEEE 802.3) Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                        | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|----------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Binding Status                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                        |      |        | Y    | Y    | Y    | Y    | Y      | Y    | Y    |      |        |      |            | Y        | Y      |
| Containing CTPs                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IStpService</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpProtocol                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpMaxAge                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| StpHelloTime                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| StpBridgeForwardDelay            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| StpInstanceInfoTable             | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Same as ISystemService           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpUplinkFastState               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpBackboneFastState             | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpForwardDelay                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| StpBridgeMaxAge                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| StpBridgeHelloTime               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| <b>IMO Name—IMstService</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MstProperties                    |      |        |      |      |      | Y    |        |      |      |      |        | Y    |            |          |        |
| Same as IStpService              |      |        |      |      |      | Y    |        |      |      |      |        | Y    |            |          |        |
| <b>IMO Name—IPvstpService</b>    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| UpLinkFast                       | Y    | Y      | Y    | Y    | Y    |      | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| BackboneFast                     | Y    | Y      | Y    | Y    | Y    |      | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IMstProperties</b>   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MstForceVersion                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MstCfgIdFmtSel                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MstExternalRootCost              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MstMaxInstances                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MstCfgIdName                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MstCfgIdRevLevel                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IStpInstanceInfo</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Object Identification            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpBridgeId                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| BridgePriority                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |

**Table 6-75 Ethernet (IEEE 802.3) Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                          | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Designated Parent and Root Bridges | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpRootCost                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| IsRoot                             | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpRootPort                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpPortInfoTable                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| STP Instance Id                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Vlan Id                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpDesignatedBridge                | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpDesignatedRoot                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IMstInstanceInfo</b>   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MstVlanIds                         | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Same as IStpInstanceInfo           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IPvstpInstanceInfo</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Protocol Type                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpBridgeMaxAge                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpBridgeHelloTime                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpBridgeForwardDelay              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpProtocolSpecification           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpVlanId                          | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpForwardDelay                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| StpMaxAge                          | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IRstpInstanceInfo</b>  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpForceVersion                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Same as IStpInstanceInfo           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| <b>IMO Name—IStpPortInfo</b>       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| StpPort                            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortPriority                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortState                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortPathCost                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortEdgePort                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortPointToPoint                | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortRole                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpDesignatedPortIdentifier        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |

**Table 6-75 Ethernet (IEEE 802.3) Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                        | 2900            | ME3400 | 3500 | 3550            | 3560            | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|----------------------------------|-----------------|--------|------|-----------------|-----------------|------|--------|------|------|------|--------|------|------------|----------|--------|
| StpDesignatedBridge              | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortIdentifier                | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortBpduGuardState            | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| StpPortBpduFilterState           | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| <b>IMO Name—IMstPortInfo</b>     |                 |        |      |                 |                 |      |        |      |      |      |        |      |            |          |        |
| MstPortHelloTime                 | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      |            | Y        |        |
| Same as IStpPortInfo             | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| <b>IMO Name—IPvstpPortInfo</b>   |                 |        |      |                 |                 |      |        |      |      |      |        |      |            |          |        |
| PvstpPortFastState               | Y               | Y      | Y    | Y               | Y               | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        |        |
| <b>IMO Name—IEthernetChannel</b> |                 |        |      |                 |                 |      |        |      |      |      |        |      |            |          |        |
| Group Number                     | Y <sup>11</sup> | Y      | Y    | Y <sup>12</sup> | Y <sup>13</sup> | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Bandwidth                        | Y <sup>14</sup> | Y      | Y    | Y               | Y <sup>15</sup> | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Aggregation Protocol             | Y <sup>16</sup> | Y      | Y    | Y <sup>17</sup> | Y <sup>18</sup> | Y    | Y      | Y    | Y    | Y    |        |      | Y          | Y        | Y      |
| IANA Type                        | Y <sup>19</sup> | Y      | Y    | Y <sup>20</sup> | Y <sup>21</sup> | Y    | Y      | Y    | Y    | Y    |        |      | Y          | Y        | Y      |
| Containing CTPs                  |                 |        |      |                 |                 |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                   |                 |        |      |                 |                 |      |        |      |      |      |        |      |            |          |        |
| Mac Address                      |                 |        |      |                 |                 |      | Y      |      |      |      |        |      |            |          |        |
| Admin Status                     |                 |        |      |                 |                 |      | Y      |      |      |      |        |      | Y          |          |        |
| Oper Status                      |                 |        |      |                 |                 |      | Y      |      |      |      |        |      | Y          |          |        |

<sup>1, 2, 3, 4</sup>SNMP is supported on ANA 3.6.0 and later.

<sup>5, 6, 7, 8, 9, 10, 11, 12</sup>Supported on ME3400-E devices only.

<sup>13, 14, 15, 16, 17, 18, 19</sup>SNMP is supported on ANA 3.6.0 and later.

<sup>20, 21</sup>Supported for 12.2(25)EWA14 only.



# ATM

**Table 6-76** ATM Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                                  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IAtm</b>                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| ATM Address                                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Interface Type                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| VP and VC Ranges                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| VC Table                                   |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Cross-Connect Table                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                                  |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Containing CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Tx Allocated Bandwidth                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Tx Maximum Bandwidth                       |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Tx UBR Allocated Bandwidth                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Tx CBR Allocated Bandwidth                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Rx Allocated Bandwidth                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Rx Maximum Bandwidth                       |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Rx UBR Allocated Bandwidth                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Rx CBR Allocated Bandwidth                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| <b>IMO Name—IAtmVc</b>                     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Channel Identifier                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Virtual Path Identifier                    |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Shaping Profile                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Discarded and Received Input Data Counters |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Dropped and Forward Output Data Counters   |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Ingress Traffic Descriptor                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Egress Traffic Descriptor                  |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Administrative Status                      |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Operational Status                         |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| IANA Type                                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Containing CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

**Table 6-76** ATM Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute                                          | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|----------------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IAtmTrafficDescriptor</b>              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Traffic Descriptor Type                            |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Service Category                                   |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Cell Loss Priority                                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Cell Delay Variation                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Cell Delay Variation Tolerance                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Maximum High Priority and Aggregate Cell Rates     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Minimum High Priority and Aggregate Cell Rates     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Sustainable High Priority and Aggregate Cell Rates |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Peak High Priority and Aggregate Cell Rates        |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Name                                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Index                                              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IAtmTrafficShapingDescriptor</b>       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Maximum Burst Size                                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Sustainable and Peak Cell Rates                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Cell Delay Variation                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| State                                              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Buffer Size                                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Cell Loss Priority Discarded Size                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Name                                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Index                                              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IAtmTrunk</b>                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Same as IAtm                                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IAtmLogicalPort/Trunk</b>              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Resource Management Cell Termination               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Resource Management Cell Generation                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Effective Check Input and Output Capacities        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Admin Status                                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

**Table 6-76** ATM Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute                   | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Oper Status                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Same as IAtm                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IAtmTrunkVc</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Destination Description     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Same as IAtmVc              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IIMAGroup</b>   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| AdminStatus                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| OperStatus                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| GroupNumber                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| ImaVersion                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Speed                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| ConfiguredBandwidth         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| NumberOfLinks               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| NumberOfActiveLinks         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MinimumNumberOfTxLinks      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MinimumNumberOfRxLinks      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| ClockMode                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| FrameLength                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| interfaceName               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| groupStatus                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

# Frame Relay

**Table 6-77** Frame Relay Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                                    | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|----------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IframeRelay/IFrTrunk</b>         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Protocol Type                                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| VC Table                                     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Cross-Connect Table                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Containing CTPs                              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IFrVc</b>                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Data Link Connection Identifier              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Traffic Descriptor                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Discard and Received Input Data Counters     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Dropped and Forward Output Data Counters     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Ingress Traffic Descriptor                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Egress Traffic Descriptor                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Administrative Status                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Operational Status                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Containing CTPs                              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IFRTrafficDescriptor</b>         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Committed Rate                               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Excess Burst Rate                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Name                                         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Index                                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IFrameRelayLogicalPort/Trunk</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Admin Status                                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Oper Status                                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Same as IFrameRelay                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IFrTrunkVc</b>                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Destination Description                      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

**Table 6-77** *Frame Relay Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)*

| Attribute                      | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Same as IFRvc                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IM0 Name—IEncapsulation</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Connection Interface   |      |        |      |      |      |      |        |      |      |      |        |      | Y          |          |        |
| Binding Information            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

## Point to Point

**Table 6-78** *Point to Point Attribute Support on Cisco Switches—Cisco ANA Version 3.7*

| Attribute                                 | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IM0 Name—IvcBasedEncapsulation</b>     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Connection                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Binding Information                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Binding Status                            |      |        |      |      |      |      |        |      |      |      |        |      | Y          |          |        |
| IANA Type                                 |      |        |      |      |      |      |        |      |      |      |        |      | Y          |          |        |
| Containing CTPs                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IM0 Name—Iencapsulation (HDLC/PPP)</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Connection                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Binding Information                       |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Binding Status                            |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| IANA Type                                 |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Containing CTPs                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

## Physical Technologies

**Table 6-79** Physical Technologies Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                         | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IsonetSdh</b>         |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Specific Type                     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Loopback Type                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Scrambling Mode                   |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Same as IPhysicalLayer            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| TCAThresholdB1                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| TCAThresholdB2                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| TCAThresholdB3                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| clocking                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IDS0Bundle</b>        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Bundled Time Slots                |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Bundle Location                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                         |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Containing CTPs                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| AdminStatus                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| OperStatus                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IDS1Pdh / IDS3Pdh</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Framing Type                      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Cell Mapping Type                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Loopback Type                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Scrambling Mode                   |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        |        |
| Same as IPhysicalLayer            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| portDescription                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| internationalBit                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| nationalBits                      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| framing                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| lineCode                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| cableLength                       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| recoveredClockingId               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| clocking                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

**Table 6-79 Physical Technologies Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| loopback   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| alarmState |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

## MPLS

**Table 6-80 MPLS Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                       | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IMpls</b>           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Distribution Protocol           |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outer and Inner Labels          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Traffic Engineering Properties  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Resource reservation Properties |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IANA Type                       |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Containing CTPs                 |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—ILse</b>            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| MPLS Table                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| MPLS Aggregate Table            |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| MPLS Tunnel Segments            |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| LDP Service                     |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| Logical Sons                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—ILdpService</b>     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Local Identification Status     |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| LDP Peers                       |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—ILdpPeer</b>        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Peer Identification             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Transport Address               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Distribution Method             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Protocol Type                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| Path Vector Limit               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Session Status                  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |

**Table 6-80 MPLS Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                           | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Protocol Version Hold Time          |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        | Y      |
| Hold Time                           |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Keep Alive Time                     |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        | Y      |
| Peer Discovery Sources              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—ILdpDiscoverySource</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Interface Name                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Source Address                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Type                                |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMplsEntry</b>          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Incoming Label                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outgoing Interface and Label        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Switching Action                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Next Hop IP Address                 |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Destination Mask                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Destination address                 |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMplsAggregateEntry</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Routing Entity              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Incoming Label                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outgoing Interface and Label        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Switching Action                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Next Hop IP Address                 |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |



# MPLS TE

**Table 6-81 MPLS TE Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                                        | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IMplsTETunnel</b>                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Destination Address                              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outgoing Interface and Label                     |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| LSP Identification                               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Requested Bandwidth                              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Measured Average Burst and Peak Bandwidth        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Setup and Hold Priority                          |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Affinity Bits and Mask                           |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Automatic Route Announcement Status              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Optimization Lock Down Status                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Path Type                                        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Name                                             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Description                                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Administrative Status                            |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Operational Status                               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| IANA Type                                        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| is FRR Enabled                                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IMplsTEProperties</b>                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Administrative Weight                            |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Attributes Identifier                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          | Y      |
| Signaling Protocol                               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Available Physical and Reservable Bandwidth      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Reserved Bandwidth                               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMplsTEPropertiesAllocationEntry</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Priority Level                                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Allocated and Cumulative Bandwidth               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IMplsTESegment</b>                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Segment Type                                     |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |

**Table 6-81 MPLS TE Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                                 | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Measured Average Burst and Peak Bandwidth |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| LSP Identification                        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Name                                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| FRRTunnelName                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| FRRTunnelState                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| AverageBandwidth                          |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| In Interface                              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Out interface                             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| In Label                                  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Out Label                                 |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Source address                            |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Destination address                       |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |

## VPN

**Table 6-82 VPN Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                 | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IVrf</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Routing Table     |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Exported Route Targets    |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Imported Route Targets    |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Route Distinguisher       |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| ARP Entity                |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Name                      |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Logical Sons              |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Description               |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Import Route-Map          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Export Route-Map          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IVrfEntry</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Next Hop BGP Address      |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |

**Table 6-82 VPN Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                                  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Incoming and Outgoing Inner Label          |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outer Label                                |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Destination IP Subnet                      |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Next Hop IP Address                        |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Type                                       |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Routing Protocol Type                      |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outgoing Interface Name                    |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMpBgp</b>                     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| BGP Identifier                             |      |        |      |      | Y    |      | Y      |      | Y    | Y    | Y      |      |            | Y        | Y      |
| Local Autonomous System                    |      |        |      |      | Y    |      | Y      |      | Y    | Y    | Y      |      |            | Y        | Y      |
| Cross Virtual Routing Table                |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| BGP Neighbors                              |      |        |      |      | Y    |      | Y      |      | Y    | Y    | Y      |      |            |          | Y      |
| Logical Sons                               |      |        |      |      | Y    |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—ICrossVrf</b>                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Virtual Routing Entries                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| Virtual Routing Entity Name                |      |        |      |      |      |      | Y      |      |      |      |        |      |            |          |        |
| <b>IMO Name—ICrossVrfRoutingEntry</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Outgoing Virtual Routing Entity Identifier |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Incoming and Outgoing Virtual Routing Tags |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Destination IP Subnet                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Next Hop IP Address                        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Type                                       |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Routing Protocol Type                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Outgoing Interface Name                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

## PWE3

**Table 6-83** PWE3 Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                                  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IPTPLayer2MplsTunnel</b>       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Local and Remote Router Addresses          |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Local and Remote Virtual Connection Labels |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Tunnel Identification                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Tunnel Status                              |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Local and Remote Tunnel Interface          |      |        |      |      |      |      |        |      |      |      |        |      |            |          | Y      |
| IANA Type                                  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Containing CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| PsuedowireType                             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| PreferredPathTunnel                        |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| LocalMTU                                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| RemoteMTU                                  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| PeerStatus                                 |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| SignalingProtocol                          |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| VFIName                                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |

# ACL

**Table 6-84** ACL Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                          | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------------|------|--------|------|------|------|------|--------|------|-----------------|-----------------|--------|------|------------|----------|--------|
| <b>IMO Name—IAccessList</b>        |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Type                               |      | Y      |      |      |      |      | Y      |      | Y <sup>1</sup>  | Y <sup>2</sup>  | Y      |      |            | Y        | Y      |
| Access List Entries                |      | Y      |      |      |      |      | Y      |      | Y <sup>3</sup>  | Y <sup>4</sup>  | Y      |      |            | Y        | Y      |
| Name or Id                         |      | Y      |      |      |      |      | Y      |      | Y <sup>5</sup>  | Y <sup>6</sup>  | Y      |      |            | Y        | Y      |
| Index                              |      | Y      |      |      |      |      | Y      |      | Y <sup>7</sup>  | Y <sup>8</sup>  | Y      |      |            | Y        | Y      |
| <b>IMO Name—IAccessListEntry</b>   |      |        |      |      |      |      |        |      |                 |                 |        |      |            |          |        |
| Entry Identification               |      | Y      |      |      |      |      | Y      |      | Y <sup>9</sup>  | Y <sup>10</sup> | Y      |      |            | Y        | Y      |
| Action Logic                       |      | Y      |      |      |      |      | Y      |      | Y <sup>11</sup> | Y <sup>12</sup> | Y      |      |            | Y        | Y      |
| Source and Destination Address     |      | Y      |      |      |      |      | Y      |      | Y <sup>13</sup> | Y <sup>14</sup> | Y      |      |            | Y        | Y      |
| Source and Destination Wildcard    |      | Y      |      |      |      |      | Y      |      | Y <sup>15</sup> | Y <sup>16</sup> | Y      |      |            | Y        | Y      |
| Protocol Type                      |      | Y      |      |      |      |      | Y      |      | Y <sup>17</sup> | Y <sup>18</sup> | Y      |      |            | Y        | Y      |
| Source and Destination Port Ranges |      | Y      |      |      |      |      | Y      |      | Y <sup>19</sup> | Y <sup>20</sup> | Y      |      |            | Y        | Y      |
| Source and Destination Port Action |      | Y      |      |      |      |      | Y      |      | Y <sup>21</sup> | Y <sup>22</sup> | Y      |      |            | Y        | Y      |
| Protocol Specific Info             |      | Y      |      |      |      |      | Y      |      | Y <sup>23</sup> | Y <sup>24</sup> | Y      |      |            | Y        | Y      |
| Differential Services Code Points  |      | Y      |      |      |      |      | Y      |      | Y <sup>25</sup> | Y <sup>26</sup> | Y      |      |            | Y        | Y      |
| Type of Service                    |      | Y      |      |      |      |      | Y      |      | Y <sup>27</sup> | Y <sup>28</sup> | Y      |      |            | Y        | Y      |
| Precedence                         |      | Y      |      |      |      |      | Y      |      | Y <sup>29</sup> | Y <sup>30</sup> | Y      |      |            | Y        | Y      |
| Matches                            |      | Y      |      |      |      |      | Y      |      | Y <sup>31</sup> | Y <sup>32</sup> | Y      |      |            | Y        | Y      |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16Supported for 4503E, 4507RE, 4507, and 4506E only.

17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32Validated with 12.2(52)SG only.

# Physical Equipment

**Table 6-85** Physical Equipment Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                             | 2900 | ME3400         | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------------------|------|----------------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IChassis</b>              |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Description                           |      | Y <sup>1</sup> |      |      | Y    |      | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Equipment Holder Type                 |      |                | Y    |      |      |      | Y      | Y    | Y    |      |        |      |            |          | Y      |
| Contained Equipment Holders           |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained Equipments                  |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Serial Number                         | Y    | Y              | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| <b>IMO Name—IShelf</b>                |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Description                           |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Status                                |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Equipment Holder Type                 |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained Equipment Holders           |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained Equipments                  |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Serial Number                         |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IModule</b>               |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Module Name                           | Y    | Y              | Y    | Y    | Y    | Y    | Y      |      | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Module Description                    |      | Y              | Y    | Y    | Y    | Y    | Y      |      | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Software Version                      | Y    | Y              |      | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Operational Status                    | Y    | Y              | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Hardware Type + Version               | Y    | Y              | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Managed IP Address                    |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Redundant Equipment                   |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Configured Redundancy                 |      |                |      |      |      |      |        |      | Y    |      |        |      |            |          |        |
| Redundancy Status                     |      |                | Y    | Y    | Y    | Y    |        |      | Y    |      |        |      |            | Y        | Y      |
| Operational Status Last Changed       |      | Y              | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      |            | Y        | Y      |
| Supported Physical Termination Points |      | Y              |      |      |      |      |        |      | Y    | Y    | Y      |      |            | Y        | Y      |
| Serial Number (soft property)         | Y    | Y              |      | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Slots Number                          |      |                |      |      |      |      |        |      |      |      |        |      |            |          |        |

<sup>1</sup>Supported for 12.2(50)SE only.

## Base Logical Components

**Table 6-86** Base Logical Components Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                             | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IManagedElement</b>       |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IP Address                            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Communication State                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Investigation State                   | Y    | Y      | Y    | Y    | Y    |      | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Element Category                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Element Type and Key                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Device Name                           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| System Name                           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| System Description                    | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Up Time                               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Software Version                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Vendor Identity                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Memory and CPU Usage                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| DRAM Free                             | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| DRAM Used                             | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Flash Device Size                     | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| NVRAM Size                            | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Processor DRAM                        | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Sys Contact                           | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Sys Location                          | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Serial Number                         | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| File Systems                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IMO Name—IContext</b>              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Name                                  |      |        |      | Y    | Y    |      | Y      |      |      |      |        |      |            |          | Y      |
| Bounded Connections                   |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| IP Address Pools                      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Forwarding Components List            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Traffic Descriptors List              |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Tunnel Containers List                |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Data Link Aggregation Containers List |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |

**Table 6-86** Base Logical Components Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute               | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| IMO Name—ISystemService |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Type                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Status                  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Up Time                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    |      |        |      | Y          | Y        | Y      |

## Common

**Table 6-87** Common Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                                  | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| IMO Name—IPhysicalLayer                    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Media Type                                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y    |      | Y      | Y    | Y          | Y        | Y      |
| Clocking Source                            |      |        |      |      |      |      |        |      |      |      |        |      |            | Y        | Y      |
| Maximum Speed                              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Is Internal Port                           | Y    | Y      | Y    | Y    | Y    | Y    | Y      |      | Y    |      |        |      | Y          | Y        | Y      |
| Discarded Bandwidth                        |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Dropped Bandwidth                          |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Input Bandwidth                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Output Bandwidth                           |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Discarded and Received Input Data Counters | Y    |        | Y    | Y    | Y    | Y    | Y      | Y    | Y    |      |        |      | Y          | Y        | Y      |
| Dropped and Forward Output Data Counters   | Y    |        | Y    | Y    | Y    | Y    | Y      | Y    | Y    |      |        |      | Y          | Y        | Y      |
| Administrative Status                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Operational Status                         | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Last Changed                               | Y    |        | Y    | Y    | Y    | Y    | Y      | Y    | Y    |      |        | Y    | Y          | Y        | Y      |
| IANA Type                                  | Y    |        | Y    | Y    | Y    | Y    | Y      |      | Y    |      |        |      | Y          | Y        | Y      |
| Containing CTPs                            |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Contained CTPs                             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Port Alias                                 | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Location                                   | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Sending Alarms                             | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Connector Description                      | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |



**Table 6-87 Common Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute                    | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| Part ID                      | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Connector Serial Num         | Y    | Y      | Y    |      | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Product                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Status                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Managed                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| <b>IM0 Name—IBridge</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Bridge Table                 | Y    | Y      |      | Y    | Y    |      |        | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Type                         | Y    | Y      |      | Y    | Y    |      |        |      | Y    | Y    | Y      |      | Y          | Y        | Y      |
| MAC Address                  | Y    | Y      |      | Y    | Y    |      |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| IP Interface                 | Y    |        |      | Y    | Y    |      |        | Y    | Y    |      |        | Y    |            | Y        | Y      |
| Name                         | Y    | Y      |      | Y    | Y    |      |        | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| Logical Sons                 | Y    | Y      |      | Y    | Y    |      |        | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Vlan Type                    |      | Y      |      |      |      |      |        |      |      |      |        |      |            |          |        |
| <b>IM0 Name—IBridgeEntry</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Destination MAC              | Y    | Y      |      | Y    | Y    |      |        | Y    | Y    | Y    | Y      |      | Y          | Y        | Y      |
| Outgoing Interface           |      | Y      |      |      |      |      |        |      |      | Y    | Y      |      | Y          | Y        | Y      |

## Additional Technologies

**Table 6-88 Additional Technologies Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute           | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IM0 Name—POS</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| POS                 |      | Y      |      | Y    | Y    |      | Y      |      |      | Y    | Y      |      |            | Y        | Y      |

## Local Switching

**Table 6-89** Local Switching Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                             | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|---------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—ILocalSwitchingEntity</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| LocalSwitchingTable                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| <b>IMO Name—ILocalSwitchingEntry</b>  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Local Switching Entry Key             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Local Switching Entry Status          |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 1                             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 1 Port Name                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 1 Status                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 2                             |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 2 Port Name                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Segment 2 Status                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |

## BFD

**Table 6-90** BFD Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                   | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IBfdService</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Status                      |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| <b>IMO Name—IBfdSession</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| SourceIp                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| DestinationIp               |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Interval                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Multiplier                  |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Protocol                    |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| State                       |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Interface                   |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| Process                     |      |        |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |

# Carrier Ethernet

**Table 6-91** Carrier Ethernet Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                             | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000           | 6500 CatOS | 6500 IOS       | 6524ME |
|---------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|----------------|------------|----------------|--------|
| <b>IMO Name—IVsi</b>                  |      |        |      |      |      |      |        |      |      |      |        |                |            |                |        |
| vsiInstanceName                       |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| vpnId                                 |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| discoveryMode                         |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| vsiMode                               |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| Operational state                     |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| Administrative state                  |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              | Y      |
| <b>IMO Name—IPseudowireProperties</b> |      |        |      |      |      |      |        |      |      |      |        |                |            |                |        |
| isSplitHorizonEnabled                 |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| isAutoDiscovered                      |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| <b>IMO Name—IVLANTaggedInterface</b>  |      |        |      |      |      |      |        |      |      |      |        |                |            |                |        |
| InterfaceName                         |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| Inner Vlan Id                         |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| Outer Vlan Id                         |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| Encap Type                            |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| Operational state                     |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| Administrative state                  |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| ConfiguredDescription                 |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| <b>IMO Name—IEfp</b>                  |      |        |      |      |      |      |        |      |      |      |        |                |            |                |        |
| EfpId                                 |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>1</sup> |        |
| RewriteParams                         |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>2</sup> |        |
| EncapsParams                          |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>3</sup> |        |
| AdminStatus                           |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>4</sup> |        |
| OperStatus                            |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>5</sup> |        |
| SplitHorizonGroup                     |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>6</sup> |        |
| MatchCriteria                         |      |        |      |      |      |      |        |      |      |      |        | Y <sup>7</sup> |            |                |        |
| ConfiguredDescription                 |      |        |      |      |      |      |        |      |      |      |        |                |            | Y              |        |
| GetServiceInstanceId                  |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>8</sup> |        |
| SetServiceInstanceId                  |      |        |      |      |      |      |        |      |      |      |        |                |            | Y <sup>9</sup> |        |
| matchCriteria                         |      |        |      |      |      |      |        |      |      |      |        |                |            |                |        |

1, 2, 3, 4, 5, 6, 7, 8, 9SNMP is used with versions greater than SRD.

## LLDP

**Table 6-92** LLDP Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                    | 2900            | ME3400          | 3500 | 3550 | 3560 | 3750 | 3750ME          | 4000 | 4500            | 4900            | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME          |
|------------------------------|-----------------|-----------------|------|------|------|------|-----------------|------|-----------------|-----------------|--------|------|------------|----------|-----------------|
| <b>IMO Name—ILDPService</b>  |                 |                 |      |      |      |      |                 |      |                 |                 |        |      |            |          |                 |
| status                       | Y <sup>1</sup>  | Y <sup>2</sup>  |      |      |      | Y    | Y <sup>3</sup>  |      | Y <sup>4</sup>  | Y <sup>5</sup>  | Y      |      |            |          | Y <sup>6</sup>  |
| lldpAdvertisementsInterval   | Y <sup>7</sup>  | Y <sup>8</sup>  |      |      |      | Y    | Y <sup>9</sup>  |      | Y <sup>10</sup> | Y <sup>11</sup> | Y      |      |            |          | Y <sup>12</sup> |
| lldpHoldTime                 | Y <sup>13</sup> | Y <sup>14</sup> |      |      |      | Y    | Y <sup>15</sup> |      | Y <sup>16</sup> | Y <sup>17</sup> | Y      |      |            |          | Y <sup>18</sup> |
| lldpReinitialisationDelay    | Y <sup>19</sup> | Y <sup>20</sup> |      |      |      | Y    | Y <sup>21</sup> |      | Y <sup>22</sup> | Y <sup>23</sup> | Y      |      |            |          | Y <sup>24</sup> |
| localChassisID               | Y <sup>25</sup> | Y <sup>26</sup> |      |      |      | Y    | Y <sup>27</sup> |      | Y <sup>28</sup> | Y <sup>29</sup> | Y      |      |            |          | Y <sup>30</sup> |
| localSystemName              | Y <sup>31</sup> | Y <sup>32</sup> |      |      |      | Y    | Y <sup>33</sup> |      | Y <sup>34</sup> | Y <sup>35</sup> | Y      |      |            |          | Y <sup>36</sup> |
| <b>IMO Name—ILDPNeighbor</b> |                 |                 |      |      |      |      |                 |      |                 |                 |        |      |            |          |                 |
| localPortName                | Y <sup>37</sup> | Y <sup>38</sup> |      |      |      | Y    | Y <sup>39</sup> |      | Y <sup>40</sup> | Y <sup>41</sup> | Y      |      |            |          | Y <sup>42</sup> |
| remotePortDesc               | Y <sup>43</sup> | Y <sup>44</sup> |      |      |      | Y    | Y <sup>45</sup> |      | Y <sup>46</sup> | Y <sup>47</sup> | Y      |      |            |          | Y <sup>48</sup> |
| remoteChassisId              | Y <sup>49</sup> | Y <sup>50</sup> |      |      |      | Y    | Y <sup>51</sup> |      | Y <sup>52</sup> | Y <sup>53</sup> | Y      |      |            |          | Y <sup>54</sup> |
| remoteManagementIP           | Y <sup>55</sup> | Y <sup>56</sup> |      |      |      | Y    | Y <sup>57</sup> |      | Y <sup>58</sup> | Y <sup>59</sup> | Y      |      |            |          | Y <sup>60</sup> |
| localPortId                  | Y <sup>61</sup> | Y <sup>62</sup> |      |      |      | Y    | Y <sup>63</sup> |      | Y <sup>64</sup> | Y <sup>65</sup> | Y      |      |            |          | Y <sup>66</sup> |
| remotePortId                 | Y <sup>67</sup> | Y <sup>68</sup> |      |      |      | Y    | Y <sup>69</sup> |      | Y <sup>70</sup> | Y <sup>71</sup> | Y      |      |            |          | Y <sup>72</sup> |
| remoteDeviceId               | Y <sup>73</sup> | Y <sup>74</sup> |      |      |      | Y    | Y <sup>75</sup> |      | Y <sup>76</sup> | Y <sup>77</sup> | Y      |      |            |          | Y <sup>78</sup> |

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78<sup>1</sup>LLDP links are not modeled properly on IOS version 12.2(51) and earlier IOS versions that support LLDP. This is because the IOS displays the port description in place of local port ID in LLDP Neighbor Table.

## CDP

**Table 6-93** CDP Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                    | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—ICdpService</b>  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| cdpHoldtime                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| cdpMessageInterval           | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| cdpDeviceId                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| cdpState                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| cdpVersion                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| <b>IMO Name—ICdpNeighbor</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| remoteDeviceId               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| remotePortId                 | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| remoteIpAddress              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| localPortId                  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |

## Discovery Protocol

**Table 6-94** Discovery Protocol Attribute Support on Cisco Switches—Cisco ANA Version 3.7

| Attribute                          | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IDiscoveryProtocol</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| DiscoveryProtocolType              | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| Info                               | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |

## VTP

**Table 6-95 VTP Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                   | 2900 | ME3400       | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------|------|--------------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IVtpService</b> |      |              |      |      |      |      |        |      |      |      |        |      |            |          |        |
| Version                     | Y    | <sup>1</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| OperatingMode               | Y    | <sup>2</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| DomainName                  | Y    | <sup>3</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| ConfigurationRevision       | Y    | <sup>4</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| isPruningEnabled            | Y    | <sup>5</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |
| isAuthenticationEnabled     | Y    | <sup>6</sup> | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    | Y          | Y        | Y      |

<sup>1, 2, 3, 4, 5, 6</sup>The MIB provides data by default, but the device does not support VTP.

## REP

**Table 6-96 REP Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                      | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|--------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—IRESERVICE</b>     |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| version                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| administrativeVlan             | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| notificationEnabled            | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| <b>IMO Name—IRESegmentInfo</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| segmentId                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| segmentComplete                | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| <b>IMO Name—IRESPPortInfo</b>  |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| portName                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| portKey                        | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| segmentId                      | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| portType                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| portRole                       | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| operStatus                     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| blockedVlans                   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |

**Table 6-96 REP Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)**

| Attribute        | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| preemptTimer     | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| lslAgeoutTimer   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| remoteDeviceName | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| remoteDeviceMac  | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |
| remotePortName   | Y    | Y      | Y    | Y    | Y    | Y    | Y      | Y    | Y    | Y    | Y      | Y    |            | Y        | Y      |

## CFM

**Table 6-97 CFM Attribute Support on Cisco Switches—Cisco ANA Version 3.7**

| Attribute                               | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| <b>IMO Name—ICfmService</b>             |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| cacheSize                               |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maximumCacheSize                        |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| holdTime                                |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| version                                 |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceIntermediatePointsTable      |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceDomain                       |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMaintenanceDomain</b>      |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| name                                    |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| level                                   |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Id                                      |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceAssociation                  |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMaintenanceEndPoint</b>    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| macAddress                              |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Interface                               |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| continuityCheckStatus                   |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| direction                               |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMaintenanceAssociation</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| name                                    |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| associationType                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |

**Table 6-97** CFM Attribute Support on Cisco Switches—Cisco ANA Version 3.7 (continued)

| Attribute                                     | 2900 | ME3400 | 3500 | 3550 | 3560 | 3750 | 3750ME | 4000 | 4500 | 4900 | 4924ME | 5000 | 6500 CatOS | 6500 IOS | 6524ME |
|-----------------------------------------------|------|--------|------|------|------|------|--------|------|------|------|--------|------|------------|----------|--------|
| maximalMeps                                   |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| continuityCheckInterval                       |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| continuityCheckEnable                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| crossCheckEnable                              |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| direction                                     |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| bridge                                        |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceEndPoint                           |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        |        |
| cfmRemoteMaintenanceEndPoint                  |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IMaintenanceIntermediatePoint</b> |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| level                                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| cfmInterface                                  |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| isAutocreated                                 |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| Vlans                                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| macAddress                                    |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| <b>IMO Name—IRemoteMaintenanceEndPoint</b>    |      |        |      |      |      |      |        |      |      |      |        |      |            |          |        |
| mepId                                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| macAddress                                    |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| level                                         |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceEndPointStatus                     |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |
| maintenanceEndPointOid                        |      | Y      |      |      |      |      | Y      |      |      |      |        |      |            | Y        | Y      |





## CHAPTER 7

# Support Information for Generic Devices

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This chapter contains support information for Virtual Network Elements (VNEs) that manage Generic devices in Cisco ANA Version 3.7. For more information about the objects and attributes described in this chapter, see Part 2, Technology Support and Information Objects.

This chapter contains the following topics:

- [Understanding the Generic VNE, page 7-1](#)
- [Supported Technologies on Generic Devices, page 7-5](#)

## Understanding the Generic VNE

The generic VNE can be used to model any NE that is not currently supported by Cisco ANA. The generic VNE provides a basic level of network management that provides information such as the physical interfaces available on the device and their status, rudimentary logical modeling, and parsing of basic traps.

The generic VNE models NEs using SNMP MIB2, which is the most generic and widely used management interface. The generic VNE does not consider the device vendor, device type, or software version of the NE that it models.

- [Physical Inventory Model, page 7-2](#)
- [Logical Inventory Model, page 7-2](#)
- [Generic VNE—Supported Traps, page 7-3](#)
- [Generic VNE—Supported Events, page 7-4](#)
- [Limitations, page 7-4](#)
- [Generic VNE—Supported Topologies, page 7-4](#)
- [Generic VNE—Supported Technologies, page 7-4](#)
- [Generic VNE—Supported Service Events, page 7-5](#)

## Physical Inventory Model

The generic VNE uses a static model for the device chassis. The rest of the physical inventory is modeled using the ifTable. Since modules are not modeled, the generic VNE creates a single generic module on which all of the physical interfaces reside.

Table 7-1 describes which MIB tables are used to model the physical inventory components that are supported by the generic VNE.

**Table 7-1** *MIBs Used for Physical Inventory Model of Generic VNE—Cisco ANA 3.7*

| Logical Component | MIB Table | Columns/Tables Used For Modeling                                                                |
|-------------------|-----------|-------------------------------------------------------------------------------------------------|
| Interfaces        | ifTable   | <ul style="list-style-type: none"> <li>ifDescr</li> <li>ifType</li> <li>ifOperStatus</li> </ul> |
| Ports             |           | <ul style="list-style-type: none"> <li>ifOperStatus and ifAdminStatus</li> </ul>                |
| Port status       | ifTable   | <ul style="list-style-type: none"> <li>ifSpeed</li> </ul>                                       |
| Port speed        | ifTable   | <ul style="list-style-type: none"> <li>ifPhysAddress (Ethernet ports)</li> </ul>                |
| MAC address       | ifTable   |                                                                                                 |



### Note

Certain general properties on the managed element, such as system description, are modeled using the system MIB.

## Logical Inventory Model

Table 7-2 describes which MIB tables are used to model the logical inventory components that are supported by the generic VNE.

**Table 7-2** *MIBs Used for Logical Inventory Model of Generic VNE—Cisco ANA 3.7*

| Logical Component | MIB Table         | Columns/Tables Used For Modeling                                                                                                                        |
|-------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP Interfaces     | ipAddrTable       | <ul style="list-style-type: none"> <li>ipAdEntIfIndex</li> <li>ipAdEntNetMask</li> </ul>                                                                |
| ARP table         | ipNetToMediaTable | <ul style="list-style-type: none"> <li>ipNetToMediaPhysAddress</li> <li>ipNetToMediaType</li> </ul>                                                     |
| Routing table     | ipRouteTable      | <ul style="list-style-type: none"> <li>ipRouteDest</li> <li>ipRouteIfIndex</li> <li>ipRouteNextHop</li> <li>ipRouteType</li> <li>ipRouteMask</li> </ul> |

**Table 7-2** MIBs Used for Logical Inventory Model of Generic VNE—Cisco ANA 3.7 (continued)

| Logical Component | MIB Table       | Columns/Tables Used For Modeling                                                                |
|-------------------|-----------------|-------------------------------------------------------------------------------------------------|
| Bridging table    | dot1dTpFdbTable | —                                                                                               |
| Default bridge    | dot1dBridge     | <ul style="list-style-type: none"> <li>dot1dBaseBridgeAddress</li> <li>dot1dBaseType</li> </ul> |

## Generic VNE—Supported Traps

The generic VNE can parse the standard MIB2 traps listed in [Table 7-3](#).

**Table 7-3** Supported Traps for Generic VNE—Cisco ANA 3.7

|                                          |                           |
|------------------------------------------|---------------------------|
| authenticationFailure                    | mplsTunnelReoptimized     |
| bgpBackwardTransition                    | mplsTunnelRerouted        |
| bgpEstablished                           | mplsTunnelUp              |
| coldStart                                | ospfIfAuthFailure         |
| entConfigChange                          | ospfIfConfigError         |
| linkDown                                 | ospfIfRxBadPacket         |
| linkUp                                   | ospfIfStateChange (down)  |
| mplsL3VpnVrfDown                         | ospfIfStateChange (up)    |
| mplsL3VpnVrfNumVrfRouteMaxThreshExceeded | ospfMaxAgeLsa             |
| mplsL3VpnVrfRouteMidThreshExceeded       | ospfNbrStateChange (down) |
| mplsL3VpnVrfUp                           | ospfNbrStateChange (up)   |
| mplsLdpInitSessionThresholdExceeded      | ospf-if-packet-retransmit |
| mplsLdpSessionDown                       | ospfOriginateLsa          |
| mplsLdpSessionUp                         | ospfTxRetransmit          |
| mplsTunnelDown                           | warmStart                 |

The generic VNE can identify traps, but it cannot correlate them. This is because the generic VNE does not include the model entities required by higher trap parsing levels.

For example, if Cisco ANA receives an mplsTunnelDown trap from a device modeled with the generic VNE, Cisco ANA can identify the Tunnel Down trap, but it cannot perform correlation on the trap. The reason is that the generic VNE does not investigate tunnels, which means that there is no Device Component in the model to which Cisco ANA can attach a correlation flow.

## Generic VNE—Supported Events

The generic VNE supports the service events listed in [Table 7-4](#).

**Table 7-4** Supported Service Events for Generic VNE—Cisco ANA 3.7

| Event Name         | ANA Version | Expedited |
|--------------------|-------------|-----------|
| Device Unreachable | 3.6.0       | N         |
| Discard Packets    | 3.6.0       | N         |
| Dropped Packets    | 3.6.0       | N         |
| Port Down          | 3.6.0       | N         |

## Limitations

The generic VNE uses MIB2 to cover the widest possible range of NEs. Although MIB2 is a widely accepted industry standard, most network equipment vendors augment MIB2 with other Management Interfaces such as private MIBs, Telnet, XML, and so on. In addition, different vendors sometimes have different implementations of standard MIBs. As a result, even the limited model created by the generic VNE is dependent on the vendor's adherence to general network management standards.

## Generic VNE—Supported Topologies

**Table 7-5** Supported Topologies for Generic VNE—Cisco ANA Version 3.7

| Topology Type | Link Type | ANA Version |
|---------------|-----------|-------------|
| ATM           | ATM       |             |

## Generic VNE—Supported Technologies

The following technologies are supported by the generic VNE in Cisco ANA Version 3.7:

- [IP, page 7-5](#)
- [Ethernet \(IEEE 802.3\), page 7-8](#)
- [Base Logical Components, page 7-12](#)
- [Common, page 7-13](#)

## Generic VNE—Supported Service Events

**Table 7-6** Supported Service Events for Generic VNE—Cisco ANA Version 3.7

| Event Name         | ANA Version | Expedited |
|--------------------|-------------|-----------|
| Device Unreachable | 3.6.0       | N         |
| Discard Packets    | 3.6.0       | N         |
| Dropped Packets    | 3.6.0       | N         |
| Port Down          | 3.6.0       | N         |

## Supported Technologies on Generic Devices

The following sections list the objects and attributes that are supported on Generic devices in Cisco ANA Version 3.7 per technology:

- [IP, page 7-5](#)
- [Ethernet \(IEEE 802.3\), page 7-8](#)
- [Base Logical Components, page 7-12](#)
- [Common, page 7-13](#)

### IP

**Table 7-7** IP Attribute Support on Generic Devices—Cisco ANA Version 3.7

| Attribute                    | Generic |
|------------------------------|---------|
| <b>IMO Name—IPIInterface</b> |         |
| IP Address                   | Y       |
| Subnetwork Mask              | Y       |
| IP Interface Addresses Array |         |
| Interface Name               |         |
| Interface Description        | Y       |
| IP Interface State           | Y       |
| OSPF Interface Cost          |         |
| Broadcast Address            |         |
| MTU                          |         |
| Lookup Method                |         |
| Address Resolution Type      |         |
| ARP Timeout                  |         |

**Table 7-7 IP Attribute Support on Generic Devices—Cisco ANA Version 3.7 (continued)**

| Attribute                      | Generic |
|--------------------------------|---------|
| ARP Timeout                    |         |
| Secured ARP                    |         |
| ICMP Mask Reply                |         |
| IGMP Proxy                     |         |
| HSRP Groups                    |         |
| IP Multiplexing Table          |         |
| IANA Type                      |         |
| Containing CTPs                |         |
| Contained CTPs                 |         |
| <b>IMO Name—IIPMuxEntry</b>    |         |
| Termination Point              |         |
| Destination IP Subnet          |         |
| <b>IMO Name—IRoutingEntity</b> |         |
| Routing Table                  | Y       |
| ARP Entity                     | Y       |
| Routing Table Changes          |         |
| Name                           | Y       |
| Logical Sons                   | Y       |
| <b>IMO Name—IRoutingEntry</b>  |         |
| Destination IP Subnet          | Y       |
| Next Hop IP Address            | Y       |
| Type                           | Y       |
| Routing Protocol Type          | Y       |
| Outgoing Interface Name        | Y       |
| <b>IMO Name—IARPEntity</b>     |         |
| ARP Table                      | Y       |
| <b>IMO Name—IARPEntity</b>     |         |
| IP Address                     | Y       |
| MAC Address                    | Y       |
| Port                           | Y       |
| Entry Type                     | Y       |
| <b>IMO Name—IIPPool</b>        |         |
| IP Address Pool Entries        |         |
| Name                           |         |
| Index                          |         |

**Table 7-7 IP Attribute Support on Generic Devices—Cisco ANA Version 3.7 (continued)**

| Attribute                                 | Generic |
|-------------------------------------------|---------|
| <b>IMO Name—IIPRangeBasedIPPoolEntry</b>  |         |
| Start IP Address                          |         |
| End IP Address                            |         |
| Unused Addresses                          |         |
| Used Addresses                            |         |
| Reserved Addresses                        |         |
| <b>IMO Name—IIPSubnetBasedIPPoolEntry</b> |         |
| IP Subnet                                 |         |
| Unused Addresses                          |         |
| Used Addresses                            |         |
| Reserved Addresses                        |         |
| <b>IMO Name—HSRPGroupEntry</b>            |         |
| Group Number                              |         |
| Port Description                          |         |
| Priority                                  |         |
| Coupled Router                            |         |
| State                                     |         |
| Tracking Interfaces                       |         |
| Virtual IP Address                        |         |
| Virtual MAC Address                       |         |
| <b>IMO Name—ITunnelGRE</b>                |         |
| Name                                      |         |
| Tunnel Destination and Source             |         |
| IP Address                                |         |
| IP Interface State                        |         |
| IANA Type                                 |         |
| Containing CTPs                           |         |
| Contained CTPs                            |         |
| Keep Alive Time                           |         |
| Keep Alive Retry                          |         |

## Ethernet (IEEE 802.3)

**Table 7-8 Ethernet (IEEE 802.3) Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute                                  | Generic |
|--------------------------------------------|---------|
| <b>IM0</b>                                 |         |
| <b>Name—ILinkAggregationGroup802dot3ad</b> |         |
| dot3adAggMACAddress                        |         |
| dot3adAggActorSystemPriority               |         |
| dot3adAggActorSystemID                     |         |
| dot3adAggActorAdminKey                     |         |
| dot3adAggActorOperKey                      |         |
| dot3adAggPartnerSystemID                   |         |
| dot3adAggPartnerSystemPriority             |         |
| dot3adAggPartnerOperKey                    |         |
| dot3adAggCollectorMaxDelay                 |         |
| GroupNumber                                |         |
| AggregationProtocolType                    |         |
| MacAddress                                 |         |
| ChannelAdminStatus                         |         |
| ChannelOperStatus                          |         |
| <b>IM0 Name—IEthernet</b>                  |         |
| MAC Address                                | Y       |
| Duplex Mode                                |         |
| Output Flow Control                        |         |
| Input Flow Control                         |         |
| IANA Type                                  |         |
| Containing CTPs                            |         |
| Contained CTPs                             |         |
| Port Type                                  |         |
| <b>IM0 Name—IVlanInterface</b>             |         |
| Mode                                       |         |
| Native VLAN Identification                 |         |
| Virtual LAN Table                          |         |
| IANA Type                                  |         |
| Containing CTPs                            |         |
| Contained CTPs                             |         |



**Table 7-8 Ethernet (IEEE 802.3) Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute                     | Generic |
|-------------------------------|---------|
| vlanAdminType                 |         |
| vlanencapType                 |         |
| getAccess                     |         |
| Allowed Vlans                 |         |
| <b>IMO Name—IVlanEncapMux</b> |         |
| IANA Type                     |         |
| Containing CTPs               |         |
| Contained CTPs                |         |
| <b>IMO Name—IVlanMapping</b>  |         |
| direction                     |         |
| vlanMatchCriteria             |         |
| vlanRewriteDefinition         |         |
| Drop                          |         |
| Vlan                          |         |
| innerVlan                     |         |
| translatedVlan                |         |
| translatedInnerVlan           |         |
| <b>IMO Name—IIEEE802</b>      |         |
| VLAN Identification           |         |
| Binding Information           |         |
| Binding Status                |         |
| IANA Type                     |         |
| Containing CTPs               |         |
| Contained CTPs                |         |
| <b>IMO Name—IStpService</b>   |         |
| StpProtocol                   |         |
| StpMaxAge                     |         |
| StpHelloTime                  |         |
| StpBridgeForwardDelay         |         |
| StpInstanceInfoTable          |         |
| Same as ISystemService        |         |
| StpUplinkFastState            |         |
| StpBackboneFastState          |         |
| StpForwardDelay               |         |
| StpBridgeMaxAge               |         |

**Table 7-8 Ethernet (IEEE 802.3) Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute                          | Generic |
|------------------------------------|---------|
| StpBridgeHelloTime                 |         |
| <b>IMO Name—IMstService</b>        |         |
| MstProperties                      |         |
| Same as IStpService                |         |
| <b>IMO Name—IPvstpService</b>      |         |
| UpLinkFast                         |         |
| BackboneFast                       |         |
| <b>IMO Name—IMstProperties</b>     |         |
| MstForceVersion                    |         |
| MstCfgIdFmtSel                     |         |
| MstExternalRootCost                |         |
| MstMaxInstances                    |         |
| MstCfgIdName                       |         |
| MstCfgIdRevLevel                   |         |
| <b>IMO Name—IStpInstanceInfo</b>   |         |
| Object Identification              |         |
| StpBridgeId                        |         |
| BridgePriority                     |         |
| Designated Parent and Root Bridges |         |
| StpRootCost                        |         |
| IsRoot                             |         |
| StpRootPort                        |         |
| StpPortInfoTable                   |         |
| STP Instance Id                    |         |
| Vlan Id                            |         |
| StpDesignatedBridge                |         |
| StpDesignatedRoot                  |         |
| <b>IMO Name—IMstInstanceInfo</b>   |         |
| MstVlanIds                         |         |
| Same as IStpInstanceInfo           |         |
| <b>IMO Name—IPvstpInstanceInfo</b> |         |
| Protocol Type                      |         |
| StpBridgeMaxAge                    |         |
| StpBridgeHelloTime                 |         |

**Table 7-8 Ethernet (IEEE 802.3) Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute                         | Generic |
|-----------------------------------|---------|
| StpBridgeForwardDelay             |         |
| StpProtocolSpecification          |         |
| StpVlanId                         |         |
| StpForwardDelay                   |         |
| StpMaxAge                         |         |
| <b>IMO Name—IRstpInstanceInfo</b> |         |
| StpForceVersion                   |         |
| Same as IStpInstanceInfo          |         |
| <b>IMO Name—IStpPortInfo</b>      |         |
| StpPort                           |         |
| StpPortPriority                   |         |
| StpPortState                      |         |
| StpPortPathCost                   |         |
| StpPortEdgePort                   |         |
| StpPortPointToPoint               |         |
| StpPortRole                       |         |
| StpDesignatedPortIdentifier       |         |
| StpDesignatedBridge               |         |
| StpPortIdentifier                 |         |
| StpPortBpduGuardState             |         |
| StpPortBpduFilterState            |         |
| <b>IMO Name—IMstPortInfo</b>      |         |
| MstPortHelloTime                  |         |
| Same as IStpPortInfo              |         |
| <b>IMO Name—IPvstpPortInfo</b>    |         |
| PvstpPortFastState                |         |
| <b>IMO Name—IEthernetChannel</b>  |         |
| Group Number                      |         |
| Bandwidth                         |         |
| Aggregation Protocol              |         |
| IANA Type                         |         |
| Containing CTPs                   |         |
| Contained CTPs                    |         |
| Mac Address                       |         |
| Admin Status                      |         |

**Table 7-8 Ethernet (IEEE 802.3) Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute   | Generic |
|-------------|---------|
| Oper Status |         |

## Base Logical Components

**Table 7-9 Base Logical Components Attribute Support on Generic Devices—Cisco ANA Version 3.7**

| Attribute                       | Generic |
|---------------------------------|---------|
| <b>IMO Name—IManagedElement</b> |         |
| IP Address                      | Y       |
| Communication State             | Y       |
| Investigation State             | Y       |
| Element Category                | Y       |
| Element Type and Key            | Y       |
| Device Name                     | Y       |
| System Name                     | Y       |
| System Description              | Y       |
| Up Time                         | Y       |
| Software Version                | Y       |
| Vendor Identity                 |         |
| Memory and CPU Usage            |         |
| DRAM Free                       |         |
| DRAM Used                       |         |
| Flash Device Size               |         |
| NVRAM Size                      |         |
| Processor DRAM                  |         |
| Sys Contact                     |         |
| Sys Location                    |         |
| Serial Number                   |         |
| File Systems                    |         |
| <b>IMO Name—IContext</b>        |         |
| Name                            |         |
| Bounded Connections             |         |
| IP Address Pools                |         |

**Table 7-9**      *Base Logical Components Attribute Support on Generic Devices—Cisco ANA Version 3.7 (continued)*

| Attribute                             | Generic |
|---------------------------------------|---------|
| Forwarding Components List            |         |
| Traffic Descriptors List              |         |
| Tunnel Containers List                |         |
| Data Link Aggregation Containers List |         |
| <b>IMO Name—ISystemService</b>        |         |
| Type                                  |         |
| Status                                |         |
| Up Time                               |         |

## Common

**Table 7-10**      *Common Attribute Support on Generic Devices—Cisco ANA Version 3.7*

| Attribute                                  | Generic |
|--------------------------------------------|---------|
| <b>IMO Name—IPhysicalLayer</b>             |         |
| Media Type                                 |         |
| Clocking Source                            |         |
| Maximum Speed                              | Y       |
| Is Internal Port                           |         |
| Discarded Bandwidth                        |         |
| Dropped Bandwidth                          |         |
| Input Bandwidth                            |         |
| Output Bandwidth                           |         |
| Discarded and Received Input Data Counters | Y       |
| Dropped and Forward Output Data Counters   | Y       |
| Administrative Status                      | Y       |
| Operational Status                         | Y       |
| Last Changed                               | Y       |
| IANA Type                                  |         |
| Containing CTPs                            |         |
| Contained CTPs                             |         |

**Table 7-10** Common Attribute Support on Generic Devices—Cisco ANA Version 3.7 (continued)

| Attribute                    | Generic |
|------------------------------|---------|
| Port Alias                   |         |
| Location                     |         |
| Sending Alarms               |         |
| Connector Description        |         |
| Part ID                      |         |
| Connector Serial Num         |         |
| Product                      |         |
| Status                       |         |
| Managed                      |         |
| <b>IMO Name—IBridge</b>      |         |
| Bridge Table                 |         |
| Type                         |         |
| MAC Address                  |         |
| IP Interface                 |         |
| Name                         |         |
| Logical Sons                 |         |
| Vlan Type                    |         |
| <b>IMO Name—IBridgeEntry</b> |         |
| Destination MAC              | Y       |
| Outgoing Interface           | Y       |



## **PART 2**

### **Technology Support and Information Model Objects**







## CHAPTER 8

# Technology Support Introduction

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Part 2—Technology Support and Information Model Objects outlines the level of functionality that Cisco ANA provides for each technology it supports. This chapter covers the following topics:

- [Supported Technologies, page 8-1](#)
- [Networking-Related IMOs, page 8-4](#)
- [Scheme Values, page 8-6](#)
- [Polling Interval Values, page 8-6](#)



**Note**

Part 2 describes *general* Cisco ANA capabilities for each technology covered. The specific level of support provided for a particular technology on an individual Cisco ANA Virtual Network Element (VNEs) can vary. For details on technology support on individual VNEs, see Part 1—Cisco VNEs.

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## Supported Technologies

[Table 8-1](#) lists the technologies supported in this version of the product.

Cisco ANA provides different levels of support for each technology. The fact that a specific technology is listed in [Table 8-1](#) does not imply that every aspect of every relevant standard is represented and supported. For details on the level of support provided for each technology, see the description for that technology in the chapter listed in the “Chapter Reference” column.

In addition to supporting specific technologies, Cisco ANA:

- Relies on several abstract modeling components used throughout product. For details, see [Chapter 34, “Common Components.”](#)
- Uses common approaches to discovering and modeling network topologies. For details, see [Chapter 35, “Cisco ANA VNE Topology.”](#)

**Table 8-1**      **Supported Technologies**

| Technology Family                             | Technology Group  | Technology                                                                            | Chapter Reference                                                               |
|-----------------------------------------------|-------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Network (Layer 3)                             | IP                | IP (including IPv6)                                                                   | <a href="#">Chapter 9, “Internet Protocol”</a>                                  |
|                                               |                   | Address Resolution Protocol (ARP)                                                     |                                                                                 |
|                                               |                   | Hot Standby Router Protocol (HSRP)                                                    |                                                                                 |
|                                               |                   | Generic Routing Encapsulation (GRE)                                                   |                                                                                 |
|                                               |                   | 6vPE                                                                                  |                                                                                 |
|                                               | Routing Protocols | Border Gateway Protocol (BGP), Multiprotocol extensions (MP-BGP), external BGP (eBGP) | <a href="#">Chapter 10, “Routing Protocols”</a>                                 |
|                                               |                   | Open Shortest Path First (OSPF)                                                       |                                                                                 |
|                                               |                   | Enhanced Interior Gateway Routing Protocol (EIGRP)                                    |                                                                                 |
|                                               |                   | Routing Information Protocol (RIP)                                                    |                                                                                 |
|                                               |                   | Intermediate System to Intermediate System (IS-IS)                                    |                                                                                 |
|                                               | VRF               | Virtual Routing and Forwarding (VRF)                                                  | <a href="#">Chapter 11, “Virtual Routing and Forwarding”</a>                    |
|                                               |                   | VRF-Lite (Multi-VRF)                                                                  |                                                                                 |
|                                               | BFD               | Bidirectional Forwarding Detection                                                    | <a href="#">Chapter 12, “Bidirectional Forwarding Detection”</a>                |
|                                               | SBC               | Session Border Controller                                                             | <a href="#">Chapter 13, “Session Border Controller”</a>                         |
| Hybrid Network/<br>Data Link (Layers 3 and 2) | MPLS              | Multiprotocol Label Switching (MPLS)                                                  | <a href="#">Chapter 14, “Multiprotocol Label Switching”</a>                     |
|                                               |                   | Label Distribution Protocol (LDP)                                                     |                                                                                 |
|                                               | MPLS TE           | Multiprotocol Label Switching Traffic Engineering (MPLS TE)                           | <a href="#">Chapter 15, “Multiprotocol Label Switching Traffic Engineering”</a> |
|                                               |                   | MPLS TE Fast Reroute (MPLS TE FRR)                                                    |                                                                                 |
|                                               | PWE3              | Pseudowire Emulation Edge to Edge (PWE3)                                              | <a href="#">Chapter 16, “Pseudowire Emulation Edge to Edge”</a>                 |
|                                               |                   | TDM PW                                                                                |                                                                                 |
|                                               |                   | ATM over Pseudowire (ATM PW)                                                          |                                                                                 |
|                                               |                   | PW-to-TE Tunnel Mapping                                                               |                                                                                 |

**Table 8-1**      **Supported Technologies (continued)**

| Technology Family       | Technology Group | Technology                                 | Chapter Reference                                                 |
|-------------------------|------------------|--------------------------------------------|-------------------------------------------------------------------|
| Data Link/MAC (Layer 2) | Ethernet         | Ethernet (IEEE 802.3)                      | <a href="#">Chapter 17, “Ethernet (IEEE 802.3)”</a>               |
|                         |                  | VLAN (IEEE 802.1Q)                         |                                                                   |
|                         |                  | QinQ (IEEE 802.1ad)                        |                                                                   |
|                         |                  | LAG (IEEE 802.3ad)                         |                                                                   |
|                         |                  | Ethernet Channel                           |                                                                   |
|                         |                  | STP (IEEE 802.1D)                          |                                                                   |
|                         |                  | RSTP (IEEE 802.1w)                         |                                                                   |
|                         |                  | PvSTP                                      |                                                                   |
|                         |                  | MST (IEEE 802.1s)                          |                                                                   |
|                         |                  | SVI                                        |                                                                   |
|                         |                  | VTP                                        |                                                                   |
|                         |                  | REP                                        |                                                                   |
|                         |                  | CFM                                        |                                                                   |
|                         |                  | VPLS                                       |                                                                   |
|                         |                  | H-VPLS                                     |                                                                   |
|                         | ATM              | ATM                                        | <a href="#">Chapter 18, “Asynchronous Transfer Mode”</a>          |
|                         |                  | IMA                                        |                                                                   |
|                         |                  | IP over ATM (MPoA 1483R)                   |                                                                   |
|                         |                  | Ethernet over ATM (MPoA 1483B)             |                                                                   |
|                         | Frame Relay      | Frame Relay                                | <a href="#">Chapter 19, “Frame Relay”</a>                         |
|                         | ISDN             | Integrated Services Digital Network (ISDN) | <a href="#">Chapter 20, “Integrated Services Digital Network”</a> |
|                         | PPP              | Point To Point Protocol (PPP)              | <a href="#">Chapter 21, “Point-to-Point Protocol”</a>             |
|                         | HDLC             | High-Level Data Link Control (HDLC)        | <a href="#">Chapter 22, “High-Level Data Link Control”</a>        |
|                         | L2TP             | Layer 2 Tunnel Protocol (L2TP)             | <a href="#">Chapter 23, “Layer 2 Tunnel Protocol”</a>             |
|                         | CDP              | Cisco Discovery Protocol                   | <a href="#">Chapter 24, “Discovery Protocols”</a>                 |
|                         | LLDP             | Link Layer Discovery Protocol              |                                                                   |
|                         | Local Switching  | Local Switching                            | <a href="#">Chapter 25, “Local Switching”</a>                     |

**Table 8-1**      **Supported Technologies (continued)**

| Technology Family        | Technology Group | Technology                                                        | Chapter Reference                                                                     |
|--------------------------|------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Physical Layer (Layer 1) | xDSL             | Digital Subscriber Line (xDSL)                                    | <a href="#">Chapter 26, “Digital Subscriber Line”</a>                                 |
|                          | IPoDWDM          | Internet Protocol over Dense Wave Division Multiplexing (IPoDWDM) | <a href="#">Chapter 27, “Internet Protocol Over Dense Wave Division Multiplexing”</a> |
|                          | SONET/SDH        | SONET/SDH                                                         | <a href="#">Chapter 28, “SONET/SDH”</a>                                               |
|                          | TDM/DSx          | TDM                                                               | <a href="#">Chapter 29, “TDM/DSx”</a>                                                 |
|                          |                  | DSx                                                               |                                                                                       |
|                          |                  | T3/E3                                                             |                                                                                       |
|                          |                  | Channelized T3, OC3, DS3 interface                                |                                                                                       |
|                          |                  | 1588 Clocking                                                     |                                                                                       |
|                          |                  | SyncE Clocking                                                    |                                                                                       |
|                          | Serial           | Serial                                                            | <a href="#">Chapter 30, “Serial”</a>                                                  |
| Other                    | Security         | Access Control Lists (ACLs)                                       | <a href="#">Chapter 31, “Access Control Lists”</a>                                    |
|                          | Hardware         | Physical Containment                                              | <a href="#">Chapter 32, “Physical Components”</a>                                     |
|                          |                  | Logical Containment                                               | <a href="#">Chapter 33, “Logical Components”</a>                                      |

## Networking-Related IMOs

Networking-related Information Model Objects (IMOs) represent the networking aspects of a network element (NE). The two major categories of IMOs are termination points and forwarding components.

### Termination Points

Termination points represent the endpoints of a connection. A termination point may represent a physical endpoint (for example, a port connector) or a connection endpoint (such as an ATM layer of a port). A connection endpoint can also be called a network interface.

Termination points are related by containment. The following attributes express those containment relationships:

- Contained Connection Termination Point—Points to all upper-layer termination points bound to this termination point.
- Containing Termination Points—Points to all lower-layer termination points to which this termination point is bound.

The relation between termination points may represent one of the following:

- Type of hardware. For example:

A SONET/SDH port with a fiber-optic connector is represented by two IMOs:

- Port Connector IMO—Represents the fiber-optic connector.
- SonetSdh IMO—Represents the SONET/SDH port.

The Port Connector IMO contains the SonetSdh IMO. This containment relationship is represented as follows:

- The Port Connector IMO points to the SonetSdh IMO with the Contained Connection Termination Point attribute.
  - The SonetSdh IMO points to the Port Connector IMO with the Containing Termination Point attribute.
- Configuration. For example:

An Ethernet port configured with an IP address (and, optionally, other network-layer attributes) is represented by two IMOs:

- Ethernet Interface IMO—Represents the Ethernet layer of the port.
- IP Interface IMO—Represents the network-layer aspect, including the IP address configured on the port.

The Ethernet Interface IMO contains the IP Interface IMO. This containment relationship is represented as follows:

- The Ethernet Interface IMO points to the IP Interface IMO with the Contained Connection Termination Point attribute.
  - The IP Interface IMO points to the Ethernet Interface IMO with the Containing Termination Point attribute.
- State. For example:

An active PPP connection running on top of ATM VC is represented by two IMOs:

- Atm Vc IMO—Represents the ATM VC.
- Vc Based Encapsulation IMO—Represents the PPPoA encapsulation.

The Atm Vc IMO contains the Vc Based Encapsulation IMO. This containment relationship is represented as follows:

- The Atm Vc IMO points to the IP Vc Based Encapsulation IMO with the Contained Connection Termination Point attribute.
- The Vc Based Encapsulation IMO points to the Atm Vc IMO with the Containing Termination Point attribute.

**Note**

The relationship between termination points may be restricted to specific termination point types, based on how the technology is implemented. For example, a physical layer IMO may not contain an IP Interface IMO, which represents the network layer interface.

## Forwarding Components

Forwarding components represent components that perform some type of forwarding function between termination points. Among other things, forwarding components can represent routing, bridging, and switching components in the NE.

Each forwarding component has a logical association with the termination points for which it does the forwarding. This relationship is expressed by the logical associations attribute of the forwarding component IMO. An example of such a relationship would be the logical association between an IVcSwitchingEntity IMO representing the ATM/FR switching fabric and the IAtm/IFrameRelay IMOs representing the relevant ATM/FR ports.

**Note**

The support level of each network technology can be varied. The support level is reflected in its related IMOs with their attributes, network topology, and fault and alarm correlation, as described in each of this Guide's technology chapters and in the Common Components chapter.

The polling intervals for the relationship between the termination points, as well as between them and the various forwarding components, are more complex than can be uniformly expressed, so they are marked as Not Applicable (N/A) in their corresponding Polling Interval columns. This applies to Containing Termination Points, Contained Connection Termination Points, and Logical Sons attributes of an IMO.

## Scheme Values

The Scheme column of each IMO table can have the following values:

- IPCore
- Product
- Any
- N/A—This value is populated as part of the creation of the IMO, not by polling the device.

## Polling Interval Values

The Polling Interval column of each IMO table can have the following values:

- Status
- Configuration
- System
- Topology Layer 1 (Topology L1)
- Topology Layer 2 (Topology L2)
- N/A—Not every property has a polling interval. Some properties are created from the results of multiple queries, and there is no specific polling for them.

For more information about polling intervals, see the [Cisco Active Network Abstraction 3.7 Administrator Guide](#).



## CHAPTER 9

# Internet Protocol

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This chapter describes the level of support that Cisco ANA provides for IP, as follows:

- [Technology Description, page 9-1](#)
- [Information Model Objects \(IMOs\), page 9-3](#)
- [Network Topology, page 9-10](#)
- [Service Alarms, page 9-10](#)

## Technology Description

### IP

IP is a network layer (Layer 3) protocol that contains addressing information and some control information that enables packets to be routed. IP is documented in RFC 791 and is the primary network layer protocol in the Internet protocol suite. Along with TCP, IP represents the heart of the Internet protocols. IP has two primary responsibilities: providing connectionless, best-effort delivery of datagrams through an internetwork; and providing fragmentation and reassembly of datagrams to support data links with different maximum transmission unit (MTU) sizes.

### ARP

Address Resolution Protocol (ARP) is a protocol for mapping an IP address to a physical machine address (a MAC address) that is recognized in the local network. For example, in IP version 4 (IPv4), the most common level of IP in use today, an address is 32 bits long. In an Ethernet LAN, however, addresses for attached devices are 48 bits long. A table, usually called the ARP cache, is used to maintain a correlation between each MAC address and its corresponding IP address. ARP provides the protocol rules for making this correlation and providing address conversion in both directions.

## HSRP

Hot Standby Router Protocol (HSRP) is a routing protocol that provides automatic router backup by allowing host computers on the Internet to use multiple routers that act as a single virtual router, maintaining connectivity even if the first hop router fails, because other routers are on hot standby and ready to go. The protocol is fully compatible with Novell's Internetwork Packet Exchange (IPX), AppleTalk, and Banyan VINES, and (in some configurations) with Xerox Network Systems (XNS) and DECnet.

Developed by Cisco and specified in RFC 2281, HSRP ensures that only a single router (called the active router) is forwarding packets on behalf of the virtual router at any given time. A standby router is chosen to be ready to become the active router, in the event that the current active router fails. HSRP defines a mechanism used to determine active and standby routers by referring to their IP addresses. Once these are determined, the failure of an active router will not cause any significant interruption of connectivity.

On any given LAN, there may be multiple, possibly overlapping, hot standby groups, each with a single MAC address and IP address. The IP address should belong to the primary subnet, but must be different from any actual or virtual addresses allocated to any routers or hosts on the network.

## GRE

Generic Routing Encapsulation (GRE) is a tunneling protocol, originated by Cisco Systems and standardized in RFC 2784. It was designed to encapsulate a wide variety of network layer packets inside IP tunneling packets. The original packet is the payload for the final packet. The protocol is used on the Internet to secure VPNs.

## IPv6

IP version 6 (also known as IPv6, specified in RFC 2373, "IP Version 6 Addressing Architecture") is the successor to IPv4. The changes from IPv4 to IPv6 fall primarily into these categories:

- **Expanded Addressing Capabilities**—IPv6 increases the IP address size from 32 bits to 128 bits, supporting more levels of addressing hierarchy, a much greater number of addressable nodes, and simpler auto-configuration of addresses. It improves scalability of multicast routing by adding a scope field to multicast addresses. It also defines a new type of "anycast" address, used to send a packet to any one of a group of nodes.
- **Header Format Simplification**—Some IPv4 header fields have been dropped or made optional, to reduce the common-case processing cost of packet handling and to limit the bandwidth cost of the IPv6 header.
- **Improved Support for Extensions and Options**—Changes in the way IP header options are encoded allows for more efficient forwarding, less stringent limits on the length of options, and greater flexibility for introducing new options in the future.
- **Flow Labeling Capability**—This new capability enables the labeling of packets belonging to particular traffic flows for which the sender requests special handling, such as non default quality of service or real-time service.



Currently, Cisco ANA support for IPv6 has the following limitations:

- ANA does not support native IPv6 devices; this implies use of dual stack on all devices.
- ANA implementation of IPv6 is limited to discovery and display of IPv6-enabled interfaces and IPv6-enabled VPNs.
- Fault management of IPv6-enabled interfaces and VPN is limited to parsing and displaying the events reported for those interfaces and VPNs. ANA does not correlate or otherwise process these events.
- None of the routing protocols are supported for IPv6-enabled interfaces. To get topology links among IPv6-enabled interfaces, Cisco Discovery Protocol (CDP) must be enabled.

## 6VPE

IPv6 on VPN to Provider Edge (6VPE, RFC 2547) permits IPv6 domains to communicate with each other over an IPv4 core network, without explicit tunnel setup, requiring only one IPv4 address per IPv6 domain. 6VPE operates much like a normal IPv4 MPLS VPN provider edge, but with the addition of IPv6 support within VRF. It lets service providers support IPv6 over operational IPv4 MPLS backbones without requiring dual-stacking within the MPLS core, representing a large cost savings over core re-engineering. Only PE equipment must be dual-stack, to support awareness of both IPv4 and IPv6 access devices. 6VPE provides logically separate routing table entries for VPN member devices.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [IP Interface \(IIPInterface\)](#)
- [IP Multiplexer Entry \(IIPMuxEntry\)](#)
- [IP Interface Address \(IIPInterfaceAddress\)](#)
- [IP Subnetwork \(IPSubnet\)](#)
- [Routing Entity \(IRoutingEntity\)](#)
- [Equivalent Routing Entry \(IRoutingEntries\)](#)
- [Routing Entry \(IRoutingEntry\)](#)
- [ARP Entity \(IARPEntity\)](#)
- [ARP Entry \(IARPEntity\)](#)
- [IP Address Pool \(IIPPool\)](#)
- [IP Range-Based Address Pool Entry \(IIPRangeBasedIPPoolEntry\)](#)
- [IP Subnet-Based Address Pool Entry \(IIPSubnetBasedIPPoolEntry\)](#)
- [Hot Standby Router Protocol \(HSRP\) Group Entry \(IHSRPGroupEntry\)](#)
- [Generic Routing Encapsulation \(GRE\) Tunnel Interface \(ITunnelGRE\)](#)

## IP Interface

The network layer [IP Interface](#) IMO represents the IP-level functionality of an interface configuration in a network element. Its Containing Termination Points attribute is its primary binding to a data link layer interface object. It is accessed primarily by a [Routing Entity](#).

**Table 9-1** *IP Interface (IIPIInterface)*

| Attribute Name                          | Attribute Description                                                                                                       | Scheme  | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| IP Address                              | IP addresses (including IPv6)                                                                                               | Product | Configuration    |
| Subnetwork Mask                         | IP subnetwork masks (including IPv6)                                                                                        | Product | Configuration    |
| IP Interface Addresses Array            | Array of all <a href="#">IP Interface Addresses</a> (including IPv6)                                                        | Product | Configuration    |
| Interface Name                          | Interface name                                                                                                              | Product | Configuration    |
| Interface Description                   | Interface description                                                                                                       | Product | Configuration    |
| IP Interface State                      | IP interface state ( <i>Unknown, Up, Down</i> )                                                                             | Product | Configuration    |
| OSPF Interface Cost                     | $2 \times 10^9 / \langle \text{interface speed in BPS} \rangle$                                                             | Any     | Configuration    |
| Broadcast Address                       | The broadcast address of the subnetwork                                                                                     | Any     | Configuration    |
| MTU                                     | Maximum transmit units                                                                                                      | Any     | Configuration    |
| Lookup Method                           | Lookup method ( <i>Route Table First, Host Table First</i> )                                                                | Any     | Configuration    |
| Address Resolution Type                 | Address resolution type                                                                                                     | Any     | Configuration    |
| ARP Timeout                             | ARP table entry aging timeout                                                                                               | Any     | Configuration    |
| Secured ARP                             | Secured ARP settings ( <i>Enable, Disable</i> )                                                                             | Any     | Configuration    |
| ICMP Mask Reply                         | Control message mask reply                                                                                                  | Any     | Configuration    |
| IGMP Proxy                              | Group management proxy                                                                                                      | Any     | Configuration    |
| HSRP Groups                             | Arrays of <a href="#">Hot Standby Router Protocol (HSRP) Group Entry</a> (valid only for Cisco routers that implement HSRP) | Any     | Configuration    |
| IP Multiplexing Table                   | Array of <a href="#">IP Multiplexing Entries</a>                                                                            | Any     | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                                             | N/A     | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                                                                      | Any     | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                                                                         | Any     | N/A              |

## IP Multiplexer Entry

The [IP Multiplexer Entry](#) IMO represents an entry in the IP Multiplexing Table of an [IP Interface](#) object. It is used when an [IP Interface](#) is bound to multiple virtual connection-based data link layer interfaces (such as [ATM Interface](#) and [Frame Relay Interface](#)) in order to map a destination IP subnet to a specific virtual connection.

**Table 9-2** *IP Multiplexer Entry (IPMuxEntry)*

| Attribute Name        | Attribute Description                 | Scheme | Polling Interval |
|-----------------------|---------------------------------------|--------|------------------|
| Termination Point     | Virtual data link layer encapsulation | Any    | Configuration    |
| Destination IP Subnet | Destination IP subnet                 | Any    | Configuration    |

## IP Interface Address

The [IP Interface Address](#) IMO represents one of several possible IP addresses and their subnetwork masks that can be assigned to an [IP Interface](#) using an [IP Subnetwork](#) IMO. It indicates whether it is the primary or a secondary address.

**Table 9-3** *IP Interface Address (IPInterfaceAddress)*

| Attribute Name | Attribute Description                                                                                                                                                 | Scheme | Polling Interval |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Type           | IP address type (for IPv4: <i>Primary</i> , <i>Secondary</i> ; for IPv6, <i>IPv6 Link-local</i> , <i>IPv6 Unicast</i> , <i>IPv6 Anycast</i> , <i>IPv6 Multicast</i> ) | Any    | Configuration    |
| IP Subnet      | IP subnetwork (supports IPv6)                                                                                                                                         | Any    | Configuration    |

## IP Subnetwork

The [IP Subnetwork](#) type (it is not an IMO) describes either an IP Subnetwork Address (with the host part zeroed) or, alternatively, a host IP address along with the IP subnetwork mask.

**Table 9-4** *IP Subnetwork (IPSubnet)*

| Attribute Name  | Attribute Description              | Scheme | Polling Interval |
|-----------------|------------------------------------|--------|------------------|
| IP Address      | IP address (supports IPv6)         | Any    | Configuration    |
| Subnetwork Mask | IP subnetwork mask (supports IPv6) | Any    | Configuration    |

## Address Family

The [Address Family](#) IMO represents the VRF route targets associated with IPv4 and IPv6 address family configurations.

**Table 9-5** *Address Family (IAddressFamily)*

| Attribute Name       | Attribute Description                                                   | Scheme | Polling Interval |
|----------------------|-------------------------------------------------------------------------|--------|------------------|
| Address family type  | Address family type ( <i>IPv4 address family, IPv6 address family</i> ) | Any    | Configuration    |
| Export route targets | List of export route targets                                            | Any    | Configuration    |
| Import route targets | List of import route targets                                            | Any    | Configuration    |

## Routing Entity

The [Routing Entity](#) IMO represents the routing and address resolution protocol-independent forwarding component of an IP router. It is bound by its Logical Sons attribute to all the network-layer [IP Interface](#) IMOs among which this Routing Entity is routing IP packets.

**Table 9-6** *Routing Entity (IRoutingEntity)*

| Attribute Name        | Attribute Description                                                                                                        | Scheme  | Polling Interval |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Routing Table         | Array of <a href="#">Equivalent (Shared Destination) Routing Entries</a>                                                     | Product | Configuration    |
| ARP Entity            | Address resolution entity ( <a href="#">ARP Entity</a> )                                                                     | Product | Configuration    |
| Routing Table Changes | Routing table changes count                                                                                                  | Any     | Configuration    |
| Name                  | Routing entity name                                                                                                          | Any     | Configuration    |
| Logical Sons          | Array of all <a href="#">IP Interfaces</a> which IP packets are being routed between, by this <a href="#">Routing Entity</a> | Any     | N/A              |

## Equivalent Routing Entry

The [Equivalent Routing Entry](#) and [Routing Entry](#) IMOs together describe a routing table's entries. Each routing table entry is an array of entries sharing a single [IP Subnetwork](#) destination. Based on their protocol type, some of a device's routing table entries which are not relevant to the Cisco ANA Information Model may be omitted from this table structure.

**Table 9-7** *Equivalent Routing Entry (IRoutingEntries)*

| Attribute Name  | Attribute Description                                                   | Scheme | Polling Interval |
|-----------------|-------------------------------------------------------------------------|--------|------------------|
| Routing Entries | Array of <a href="#">Routing Entries</a> (sharing a single destination) | Any    | Configuration    |

## Routing Entry

See the description for [Equivalent Routing Entry](#).

**Table 9-8** *Routing Entry (IRoutingEntry)*

| Attribute Name          | Attribute Description                                                                                                                                     | Scheme  | Polling Interval |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Destination IP Subnet   | Final destination IP subnet                                                                                                                               | Product | Configuration    |
| Next Hop IP Address     | Next hop IP address                                                                                                                                       | Product | Configuration    |
| Type                    | Routing entry type ( <i>Null, Other, Invalid, Direct, Indirect, Static</i> )                                                                              | Product | Configuration    |
| Routing Protocol Type   | Routing protocol type ( <i>Null, Other, Local, Network Managed, ICMP, EGP, GGP, Hello, RIP, IS-IS, ES-IS, Cisco IGRP, BBN SPF IGP, OSPF, BGP, EIGRP</i> ) | Product | Configuration    |
| Outgoing Interface Name | Outgoing IP interface name                                                                                                                                | Product | Configuration    |
| Prefix Length           | The number of bits set in the subnet mask (the shorthand way of expressing the subnet mask).                                                              | Product | Configuration    |

## ARP Entity

The [ARP Entity](#) IMO describes a domain-wide IP address to MAC Address Resolution Protocol (ARP) entity.

**Table 9-9** *ARP Entity (IARPEntity)*

| Attribute Name | Attribute Description                | Scheme  | Polling Interval |
|----------------|--------------------------------------|---------|------------------|
| ARP Table      | Array of <a href="#">ARP Entries</a> | Product | Configuration    |

## ARP Entry

The [ARP Entry](#) IMO describes a domain-wide IP address to MAC Address Resolution Protocol (ARP) table entry.

**Table 9-10** *ARP Entry (IARPEntity)*

| Attribute Name | Attribute Description                                           | Scheme  | Polling Interval |
|----------------|-----------------------------------------------------------------|---------|------------------|
| IP Address     | IP address                                                      | Product | Configuration    |
| MAC Address    | MAC address                                                     | Product | Configuration    |
| Port           | Data link layer (MAC) interface                                 | Product | Configuration    |
| Entry Type     | ARP entry type ( <i>Null, Other, Invalid, Dynamic, Static</i> ) | Product | Configuration    |

## IP Address Pool

The [IP Address Pool](#) IMO, with its associated [IP Range-Based Address Pool Entry](#) and [IP Subnet-Based Address Pool Entry](#) IMOs, describes an IP address pool of a gateway or router device. Protocols such as Dynamic Host Configuration Protocol (DHCP) and IP Control Protocol (IPCP) use these pools to distribute IP assignments to local and remote parties.

**Table 9-11** *IP Address Pool (IIPPool)*

| Attribute Name          | Attribute Description                                                                                                | Scheme | Polling Interval |
|-------------------------|----------------------------------------------------------------------------------------------------------------------|--------|------------------|
| IP Address Pool Entries | Array of <a href="#">IP Range Based Address Pool Entries</a> or <a href="#">IP Subnet Based Address Pool Entries</a> | Any    | Configuration    |
| Name                    | IP addresses pool name                                                                                               | Any    | Configuration    |
| Index                   | IP addresses pool index                                                                                              | Any    | Configuration    |

## IP Range-Based Address Pool Entry

See the description for [IP Address Pool](#).

**Table 9-12** *IP Range-Based Address Pool Entry (IIPRangeBasedIIPoolEntry)*

| Attribute Name     | Attribute Description                   | Scheme | Polling Interval |
|--------------------|-----------------------------------------|--------|------------------|
| Start IP Address   | Start IP address of the IP address pool | Any    | Configuration    |
| End IP Address     | End IP address of the IP address pool   | Any    | Configuration    |
| Unused Addresses   | Unused addresses count                  | Any    | Configuration    |
| Used Addresses     | Used addresses count                    | Any    | Configuration    |
| Reserved Addresses | Reserved addresses count                | Any    | Configuration    |

## IP Subnet-Based Address Pool Entry

See the description for [IP Address Pool](#).

**Table 9-13** *IP Subnet-Based Address Pool Entry (IIPSubnetBasedIIPoolEntry)*

| Attribute Name     | Attribute Description                                | Scheme | Polling Interval |
|--------------------|------------------------------------------------------|--------|------------------|
| IP Subnet          | <a href="#">IP Subnetwork</a> of the IP address pool | Any    | Configuration    |
| Unused Addresses   | Unused addresses count                               | Any    | Configuration    |
| Used Addresses     | Used addresses count                                 | Any    | Configuration    |
| Reserved Addresses | Reserved addresses count                             | Any    | Configuration    |

## Hot Standby Router Protocol (HSRP) Group Entry

The [Hot Standby Router Protocol \(HSRP\) Group Entry](#) IMO represents both the configuration and the result of running HSRP within a group of routers connected to the same segment of an Ethernet network. HSRP provides backup for router failures by presenting the group of routers to the LAN as a single virtual router with a single set of IP and MAC addresses.

**Table 9-14** Hot Standby Router Protocol (HSRP) Group Entry (*IHSRPGroupEntry*)

| Attribute Name      | Attribute Description                                                                               | Scheme  | Polling Interval |
|---------------------|-----------------------------------------------------------------------------------------------------|---------|------------------|
| Group Number        | Group number                                                                                        | Product | Configuration    |
| Port Description    | Port description                                                                                    | Product | Configuration    |
| Priority            | Priority from 0 ( <i>Lowest</i> ) to 255 ( <i>Highest</i> ) used for active router selection        | Product | Configuration    |
| Coupled Router      | Coupled active or standby router IP address (as the grouping is implemented using only two routers) | Product | Configuration    |
| State               | Protocol state ( <i>Disabled, Initial, Learn, Listen, Speak, Standby, Active</i> )                  | Product | Configuration    |
| Virtual IP Address  | Virtual IP address used by this group                                                               | Product | Configuration    |
| Virtual MAC Address | Virtual MAC address used by this group                                                              | Product | Configuration    |

## Generic Routing Encapsulation (GRE) Tunnel Interface

The network-layer [Generic Routing Encapsulation \(GRE\) Tunnel Interface](#) IMO represents a GRE tunnel interface configuration in a network element. It is accessed primarily by an [IP Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 9-15** Generic Routing Encapsulation (GRE) Tunnel Interface (*ITunnelGRE*)

| Attribute Name                           | Attribute Description                                                                                                               | Scheme  | Polling Interval |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Name                                     | Tunnel name                                                                                                                         | Product | Configuration    |
| Tunnel Destination and Source            | Tunnel destination and source IP addresses                                                                                          | Product | Configuration    |
| IP Address                               | Primary IP address                                                                                                                  | Product | Configuration    |
| IP Interface State                       | IP interface state ( <i>Unknown, Up, Down</i> )                                                                                     | Any     | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer                                                                     | N/A     | N/A              |
| Containing Connection Termination Points | Underlying termination points (connection or physical)                                                                              | Any     | N/A              |
| Contained Connection Termination Points  | Bound connection termination points                                                                                                 | Any     | N/A              |
| Keep Alive State                         | Indicates whether the GRE keep alive is <i>set</i> or <i>not set</i>                                                                | Any     | N/A              |
| Keep Alive Time                          | The interval at which GRE will try to send keepalive packets                                                                        | Any     | N/A              |
| Keep Alive Retry                         | Number of times the GRE will try to send keepalive packets without a response before bringing down the interface or tunnel protocol | Any     | N/A              |

# Network Topology

Discovery of the IP network layer is unsupported. However, IP addresses and subnets are used in signature and test of the underlying MPLS, PPP, and HDLC topology discovery when searching for the local IP address in any one-hop-away remote side's routing table. In particular, the local and remote IP addresses of [IP Interface](#) found under the same subnet are compared.

For more information, see [Chapter 14, “Multiprotocol Label Switching,”](#) [Chapter 21, “Point-to-Point Protocol,”](#) and [Chapter 22, “High-Level Data Link Control.”](#)

## Service Alarms

The following alarms are supported for this technology:

- All IP Interfaces Down/IP Interface Up
- GRE Tunnel Down/GRE Tunnel Up
- IP Interface Down/IP Interface Up
- HSRP Group Member Not Active/HSRP Group Member Active

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.6.7 User Guide](#).





# CHAPTER 10

## Routing Protocols

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This chapter describes the level of support that Cisco ANA provides for routing protocols, as follows:

- [Technology Description, page 10-1](#)
- [Information Model Objects \(IMOs\), page 10-3](#)
- [Vendor-Specific Inventory and IMOs, page 10-4](#)
- [Network Topology, page 10-4](#)
- [Service Alarms, page 10-4](#)

## Technology Description

### BGP

The Border Gateway Protocol (BGP) routes traffic between autonomous systems. An autonomous system is a network or group of networks under common administration and with common routing policies. BGP exchanges routing information for the Internet and is the protocol used between ISPs. Customer networks, such as universities and corporations, usually employ an Interior Gateway Protocol (IGP), such as RIP or OSPF, to exchange routing information within their networks. Customers connect to ISPs, and ISPs use BGP to exchange customer and ISP routes. When BGP is used between autonomous systems, the protocol is referred to as external BGP (eBGP). If a service provider is using BGP to exchange routes within an autonomous system, the protocol is referred to as interior BGP (iBGP).

BGP is a very robust and scalable routing protocol, as evidenced by the fact that it is the routing protocol employed on the Internet. To achieve scalability at this level, BGP uses many route parameters, called attributes, to define routing policies and maintain a stable routing environment. BGP neighbors exchange full routing information when the TCP connection between neighbors is first established. When changes to the routing table are detected, the BGP routers send to their neighbors only those routes that have changed. BGP routers do not send periodic routing updates, and BGP routing updates advertise only the optimal path to a destination network.

## MP-BGP

Multiprotocol BGP (MP-BGP) adds capabilities to BGP to enable multicast routing policy throughout the Internet and to connect multicast topologies within and between BGP autonomous systems. That is, MP-BGP is an enhanced BGP that carries IP multicast routes. BGP carries two sets of routes, one set for unicast routing and one set for multicast routing. The routes associated with multicast routing are used by the Protocol Independent Multicast (PIM) to build data distribution trees.

## eBGP/iBGP

As noted previously, BGP is an interautonomous system routing protocol. When BGP is used between autonomous systems (AS), the protocol is referred to as external BGP (eBGP). If a service provider is using BGP to exchange routes within an AS, then the protocol is referred to as interior BGP (iBGP).

## OSPF

Open Shortest Path First (OSPF) is a routing protocol developed for IP networks by the IGP working group of the Internet Engineering Task Force (IETF). It was derived from several research efforts, including a version of OSI's IS-IS routing protocol.

OSPF has two primary characteristics:

- It is an open protocol. Its specification is in the public domain (RFC 1247).
- It is based on the Shortest Path First (SPF) algorithm, sometimes known as the Dijkstra algorithm.

OSPF is a link-state routing protocol that calls for the sending of link-state advertisements (LSAs) to all other routers within the same hierarchical area. Information on attached interfaces, metrics used, and other variables are included in OSPF LSAs. As OSPF routers accumulate link-state information, they use the SPF algorithm to calculate the shortest path to each node.

## EIGRP

Enhanced Interior Gateway Routing Protocol (EIGRP) is Cisco's proprietary routing protocol, based on IGRP. EIGRP is a distance-vector routing protocol, with optimizations to minimize routing instability incurred after topology changes, and the use of bandwidth and processing power in the router. Routers that support EIGRP will automatically redistribute route information to IGRP neighbors by converting the 32-bit EIGRP metric to the 24-bit IGRP metric. Most of the routing optimizations are based on the Diffusing Update Algorithm (DUAL), which guarantees loop-free operation and provides fast router convergence.

## RIP

The Routing Information Protocol (RIP) is one of the oldest routing protocols still in wide use. Today's open standard version of RIP, sometimes referred to as IP RIP, is formally defined in RFC 1058 and in STD 56. RIP is a distance-vector routing protocol that uses hop count as a metric. RIP prevents routing loops by implementing a limit on the number of hops allowed in source/destination paths, and also implements split horizon, route poisoning and holddown mechanisms to prevent incorrect routing information from being propagated.

## IS-IS

Intermediate system to intermediate system (IS-IS) is a link-state routing protocol. It operates by reliably flooding topology information throughout a network of routers. Each router then builds its own picture of the network's topology. Packets or datagrams are forwarded based on the best topological path through the network; IS-IS uses Dijkstra's algorithm for computing best paths. IS-IS was first defined in ISO/IEC 10589:2002 and was republished in RFC 1142 for the Internet community. IS-IS is an IGP, intended for use within one administrative domain or network only.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [BGP Neighbor Entry \(IBgpNeighbourEntry\)](#)
- [OSPF Entry \(IOspfEntry\)](#)

## BGP Neighbor Entry

The [BGP Neighbor Entry](#) IMO represents both the configuration and the outcome of running the Border Gateway Protocol (BGP) within a group of participating routers in a BGP neighborhood. It contains information about the connection with a remote BGP peer. It is the entry of the BGP Neighbors Table attribute of the [Multi Protocol BGP Entity](#) object (see [Virtual Routing and Forwarding](#)), representing the BGP routing service concept in the IMO.

**Table 10-1** *BGP Neighbor Entry (IBgpNeighbourEntry)*

| Attribute Name           | Attribute Description                                                               | Scheme  | Polling Interval |
|--------------------------|-------------------------------------------------------------------------------------|---------|------------------|
| Remote Identifier        | Identifier of the remote peer ( <i>IP Address</i> )                                 | Product | Configuration    |
| Neighbor Type            | Neighbor type ( <i>Null, Client, Non Client</i> )                                   | Any     | Configuration    |
| Distributing Interface   | Distributing IP interface                                                           | Any     | Configuration    |
| Remote Address           | Remote peer IP address                                                              | Product | Configuration    |
| Remote Autonomous System | Remote peer autonomous system                                                       | Product | Configuration    |
| Status                   | Status ( <i>Null, Idle, Connect, Active, Open Sent, Open Confirm, Established</i> ) | Product | Configuration    |
| Hold Time                | Established hold time in seconds                                                    | Product | Configuration    |
| Keep Alive Time          | Established keepalive time in seconds                                               | Product | Configuration    |

## OSPF Entry

The [OSPF Entry](#) IMO represents both the configuration and the outcome of running a single Open Shortest Path First (OSPF) protocol interface within a group of participating OSPF routers. It is aggregated by a [Traffic Descriptor Container](#) object (see [Common Components](#)).

**Table 10-2**      **OSPF Entry (IOspfEntry)**

| Attribute Name        | Attribute Description                                                                                                                              | Scheme  | Polling Interval |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Area Identifier       | Area identifier ( <i>IP address</i> )                                                                                                              | Product | Configuration    |
| IP Address            | IP address                                                                                                                                         | Product | Configuration    |
| Type                  | OSPF type ( <i>Null, Broadcast, NBMA, Point-to-Point, Point-to-Multipoint</i> )                                                                    | Product | Configuration    |
| Administrative Status | Administrative status ( <i>Null, Enabled, Disabled</i> )                                                                                           | Product | Status           |
| Operational Status    | Operational status ( <i>Null, Down, Loop Back, Waiting, Point-to-Point, Designated Router, Backup Designated Router, Other Designated Router</i> ) | Product | Status           |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Discovery of BGP neighborhood topology is done by comparing BGP router parameters on either side of potential BGP neighbors. In particular, the local and remote BGP router identification and autonomous system, as well as the connection states on both sides, are compared.

## Service Alarms

The following alarms are supported for this technology:

- BGP Neighbor Loss/BGP Neighbor Found
- BGP Process Down/BGP Process Up
- BGP Link Down/BGP Link Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



# CHAPTER 11

## Virtual Routing and Forwarding

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This chapter describes the level of support that Cisco ANA provides for Virtual Routing and Forwarding (VRF), as follows:

- [Technology Description, page 11-1](#)
- [Information Model Objects \(IMOs\), page 11-2](#)
- [Vendor-Specific Inventory and IMOs, page 11-4](#)
- [Network Topology, page 11-4](#)
- [Service Alarms, page 11-5](#)

## Technology Description

### VRF

Virtual Routing and Forwarding (VRF) is an IP technology that allows multiple instances of a routing table to coexist on the same router at the same time. Because the routing instances are independent, the same or overlapping IP addresses can be used without conflict. “VRF” is also used to refer to a routing table instance that can exist in one or multiple instances per each VPN on a Provider Edge (PE) router.

### VRF-Lite (Multi-VRF)

VRF-Lite is an application based on VRF that extends the concept of VRF to the Customer Edge (CE) router on the customer’s premises. It supports multiple, overlapping, independent routing and forwarding tables per customer.

Any routing protocol supported by normal VRF can be used in a VRF-Lite CE implementation. The CE supports traffic separation between customer networks. As there is no MPLS functionality on the CE, no label exchange happens between the CE and PE.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [Virtual Routing Forwarding \(VRF\) Entity \(IVrf\)](#)
- [Equivalent Routing Entry \(IRoutingEntries\)](#)
- [Virtual Routing Entry \(IVrfEntry\)](#)
- [Multi Protocol BGP Entity \(IMpBgp\)](#)
- [Equivalent Cross Virtual Routing Entry \(ICrossVrf\)](#)
- [Cross Virtual Routing Entry \(ICrossVrfRoutingEntry\)](#)

## Virtual Routing Forwarding (VRF) Entity

The [Virtual Routing Forwarding \(VRF\) Entity](#) object describes the routing and address resolution protocols' independent forwarding component of a MPLS-BGP based VPN router. It is bound by its Logical Sons attribute to all the Network layer [IP Interface](#) objects among which it is routing IP packets.

**Table 11-1** *Virtual Routing Forwarding (VRF) Entity (IVrf)*

| Attribute Name         | Attribute Description                                                                                                                     | Scheme | Polling Interval |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Virtual Routing Table  | Array of <a href="#">Equivalent Routing Entries</a>                                                                                       | IPCore | Configuration    |
| Exported Route Targets | Array of route target identifiers                                                                                                         | IPCore | Configuration    |
| Imported Route Targets | Array of route target identifiers                                                                                                         | IPCore | Configuration    |
| Address Families       | List of the address families (IPv4, IPv6, or both)                                                                                        | IPCore | Configuration    |
| Route Distinguisher    | Route distinguisher                                                                                                                       | IPCore | Configuration    |
| ARP Entity             | Address Resolution Entity ( <a href="#">ARP Entity</a> ) (see <a href="#">Internet Protocol</a> )                                         | IPCore | Configuration    |
| Name                   | VRF name                                                                                                                                  | IPCore | Configuration    |
| Logical Sons           | Array of all <a href="#">IP Interfaces</a> among which this <a href="#">Virtual Routing Forwarding (VRF) Entity</a> is routing IP packets | IPCore | N/A              |
| Description            | Description of the VRF                                                                                                                    | IPCore | Configuration    |
| Import Route-map       | Name of the VRF import route map used to import IP prefixes into the VRF.                                                                 | IPCore | Configuration    |
| Export Route-map       | Name of the VRF export route map used to export IP prefixes from the VRF.                                                                 | IPCore | Configuration    |

## Equivalent Routing Entry

The [Equivalent Routing Entry](#) and [Virtual Routing Entry](#) objects describe a routing table's entries. Each is an array of [Virtual Routing Entries](#) sharing a single [IP Subnetwork](#) destination.

**Table 11-2** *Equivalent Routing Entry (IRoutingEntries)*

| Attribute Name  | Attribute Description                                                         | Scheme | Polling Interval |
|-----------------|-------------------------------------------------------------------------------|--------|------------------|
| Routing Entries | Array of <a href="#">Virtual Routing Entries</a> sharing a single destination | IPCore | Configuration    |

## Virtual Routing Entry

**Table 11-3** *Virtual Routing Entry (IVrfEntry)*

| Attribute Name                    | Attribute Description                                                                                                                                     | Scheme | Polling Interval |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Next Hop BGP Address              | Next hop BGP IP address                                                                                                                                   | IPCore | Configuration    |
| Incoming and Outgoing Inner Label | Incoming and outgoing inner MPLS label                                                                                                                    | IPCore | Configuration    |
| Outer Label                       | Outer MPLS label                                                                                                                                          | IPCore | Configuration    |
| Destination IP Subnet             | Final destination IP subnet                                                                                                                               | IPCore | Configuration    |
| Next Hop IP Address               | Next hop IP address                                                                                                                                       | IPCore | Configuration    |
| Type                              | Route entry type ( <i>Null, Other, Invalid, Direct, Indirect, Static</i> )                                                                                | IPCore | Configuration    |
| Routing Protocol Type             | Routing protocol type ( <i>Null, Other, Local, Network Managed, ICMP, EGP, GGP, Hello, RIP, IS-IS, ES-IS, Cisco IGRP, BBN SPF IGP, OSPF, BGP, EIGRP</i> ) | IPCore | Configuration    |
| Outgoing Interface Name           | Outgoing IP interface name                                                                                                                                | IPCore | Configuration    |

## Multi Protocol BGP Entity

The [Multi Protocol BGP Entity](#) object describes the BGP component of a MPLS-BGP based VPN router. It is bound by its Logical Sons attribute to all [Virtual Routing Forwarding \(VRF\) Entity](#) objects among which it is routing IP packets.

**Table 11-4** *Multi Protocol BGP Entity (IMpBgp)*

| Attribute Name              | Attribute Description                                                                                                                                         | Scheme | Polling Interval |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| BGP Identifier              | Border Gateway Protocol (BGP) identifier                                                                                                                      | IPCore | Configuration    |
| Local Autonomous System     | Local peer autonomous system                                                                                                                                  | IPCore | Configuration    |
| Cross Virtual Routing Table | Array of <a href="#">Equivalent Cross Virtual Routing Entry</a>                                                                                               | IPCore | Configuration    |
| BGP Neighbors               | Array of BGP neighbor entries (see <a href="#">Routing Protocols</a> )                                                                                        | IPCore | Configuration    |
| Logical Sons                | Array of all <a href="#">Virtual Routing Forwarding (VRF) Entity</a> objects among which this <a href="#">Multi Protocol BGP Entity</a> is routing IP packets | IPCore | N/A              |

## Equivalent Cross Virtual Routing Entry

The [Equivalent Cross Virtual Routing Entry](#) and [Cross Virtual Routing Entry](#) objects describe the first dimension of a cross virtual routing table, as an array of [Cross Virtual Routing Entry](#) objects sharing a single [Virtual Routing Forwarding \(VRF\) Entity](#) destination.

**Table 11-5** *Equivalent Cross Virtual Routing Entry (ICrossVrf)*

| Attribute Name              | Attribute Description                                                                     | Scheme | Polling Interval |
|-----------------------------|-------------------------------------------------------------------------------------------|--------|------------------|
| Virtual Routing Entries     | Array of <a href="#">Cross Virtual Routing Entry</a> objects sharing a single destination | IPCore | Configuration    |
| Virtual Routing Entity Name | Virtual Routing Entity (VRF) name                                                         | IPCore | Configuration    |

## Cross Virtual Routing Entry

**Table 11-6** *Cross Virtual Routing Entry (ICrossVrfRoutingEntry)*

| Attribute Name                             | Attribute Description                                                                                                                                     | Scheme | Polling Interval |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Outgoing Virtual Routing Entity Identifier | Outgoing virtual routing entity Object Identifier (OID)                                                                                                   | IPCore | Configuration    |
| Incoming and Outgoing Virtual Routing Tags | Incoming and outgoing virtual routing tags                                                                                                                | IPCore | Configuration    |
| Destination IP Subnet                      | Final destination IP subnet                                                                                                                               | IPCore | Configuration    |
| Next Hop IP Address                        | Next hop IP address                                                                                                                                       | IPCore | Configuration    |
| Type                                       | Route entry type ( <i>Null, Other, Invalid, Direct, Indirect, Static</i> )                                                                                | IPCore | Configuration    |
| Routing Protocol Type                      | Routing protocol type ( <i>Null, Other, Local, Network Managed, ICMP, EGP, GGP, Hello, RIP, IS-IS, ES-IS, Cisco IGRP, BBN SPF IGP, OSPF, BGP, EIGRP</i> ) | IPCore | Configuration    |
| Outgoing Interface Name                    | Outgoing IP interface name                                                                                                                                | IPCore | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA discovers MPLS-BGP-based VPN network topology by searching for the existence of the local [Virtual Routing Forwarding \(VRF\) Entity](#)'s imported route targets in any remote side's VRF entity exported route targets.



# Service Alarms

The following alarm is supported for this technology:

- Duplicate IP on VPN Found/Duplicate IP on VPN Fixed. This alarm is disabled by default.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





## CHAPTER 12

# Bidirectional Forwarding Detection

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This chapter describes the level of support that Cisco ANA provides for Bidirectional Forwarding Detection (BFD), as follows:

- [Technology Description, page 12-1](#)
- [Information Model Objects \(IMOs\), page 12-2](#)
- [Vendor-Specific Inventory and IMOs, page 12-2](#)
- [Network Topology, page 12-2](#)
- [Service Alarms, page 12-3](#)

## Technology Description

### BFD

BFD provides rapid failure detection between forwarding engines while maintaining low overhead. It also provides a single, standardized method of link, device, or protocol failure detection at any protocol layer and over any media.

BFD can be used with the following protocols:

- BGP
- IS-IS
- EIGRP
- MPLS TE
- OSPF

However, Cisco ANA at present supports BFD only when used in conjunction with BGP and OSPF.

# Information Model Objects (IMOs)

This section includes the following IMOs:

- [BFD Service](#)
- [BFD Session](#)

## BFD Service

The [BFD Service](#) IMO contains a list of [BFD Session](#) objects.

**Table 12-1** *BFD Service (IBfdService)*

| Attribute Name | Attribute Description                | Scheme | Polling Interval |
|----------------|--------------------------------------|--------|------------------|
| Sessions       | Returns a set of IBfdSession objects | Any    | Configuration    |

## BFD Session

The BFD Session IMO describes a single BFD session entry.

**Table 12-2** *BFD Session (IBfdSession)*

| Attribute Name | Attribute Description                                | Scheme  | Polling Interval |
|----------------|------------------------------------------------------|---------|------------------|
| Source IP      | Source IP address of the session                     | Product | Configuration    |
| Destination IP | Destination IP address of the session                | Product | Configuration    |
| Interval       | The value of the requested interval                  | Product | Configuration    |
| Multiplier     | The value of the multiplier                          | Product | Configuration    |
| Protocol       | The routing protocol, such as OSPF or BGP            | Product | Configuration    |
| State          | The state of the session ( <i>Up</i> , <i>Down</i> ) | Product | Configuration    |
| Interface      | OID of the physical interface                        | Product | Configuration    |
| Process        | Process ID of the session                            | Product | Configuration    |

# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA discovers BFD topology by comparing the session parameters of potential BFD neighbors. In particular, it compares the source IP address and the destination IP address on both sides.

# Service Alarms

The following alarms are supported for this technology:

- BFD Connectivity Down/BFD Connectivity Up
- BFD Neighbor Loss/BFD Neighbor Found

The BFD Connectivity Down alarm is cleared by the BFD Connectivity Up alarm. The BFD Neighbor Loss alarm is cleared by the BFD Neighbor Found alarm.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 13

## Session Border Controller

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This chapter describes the level of support that Cisco ANA provides for Session Border Controller (SBC), as follows:

- [Technology Description, page 13-1](#)
- [Information Model Objects \(IMOs\), page 13-2](#)
- [Vendor-Specific Inventory and IMOs](#)
- [Network Topology, page 13-20](#)
- [Service Alarms, page 13-20](#)

## Technology Description

### SBC

Session Border Control (SBC) is an IP multimedia security and operational enhancement function for session-oriented IP services, based on SIP/H.323/H.248 signaling. It enables direct IP-to-IP interconnect between multiple administrative domains for session-based services, providing protocol interworking, security, admission control, and management. It enables direct IP-to-IP peering between service providers, and between service providers and their business and residential customers.

The most common SBC deployment is Voice over IP (VoIP) peering between service providers. Up until now, this kind of peering was done by converting IP to public switched telephone network (PSTN) and using existing PSTN peering infrastructure, but the SBC approach has experienced phenomenal growth because it saves up to 75 percent in capital expenses.

Other important SBC services include:

- **Security**—Includes topology and address hiding, theft of service prevention, protocol normalization, and Denial of Service (DoS) protection.
- **Quality of Service (QoS) demarcation**—Allows inter-service-provider service level agreements.
- **Network Address Translation (NAT) traversal**—Required in service-provider-to-enterprise scenarios.
- **Billing**—Provides enhanced current accounting records with session information such as QoS, codecs used, and so on.

SBC controls the signaling and media traffic generated during the setup, conduct, and teardown of interactive media communications. Each of its terms, in this context, has a special meaning:

- **Session**—In VoIP, a *session* is the same as a call. Each call consists of exchanges of control signals, and one or more media streams and associated data. This data can include audio, video, and other data, as well as call statistics, QoS data, and information needed for control signaling. It is this session that the SBC controls.
- **Border**—The demarcation point between one part of a network and another. One example is the firewall separating a corporate LAN from the rest of the Internet. Other example are the filtering routers, security servers, and other network elements that can separate one department within a large corporation from others in the same corporation. The SBC controls the flow of session data across these borders.
- **Controller**—The administrative functions that the SBC performs on the session data streams as they cross the borders between parts of the network. In addition to basic control functions, an SBC can provide metrics, access security, and data conversion services.

**Note**

Cisco ANA currently provides SBC support on ASR 1000 routers only.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [SBC Service \(ISbcService\)](#)
- [Service Border Element \(ISBE\)](#)
- [Data Border Element \(IDBE\)](#)
- [DBE Media Interface \(IDbeMediaInterface\)](#)
- [SBC Account \(ISbcAccount\)](#)
- [SBE AAA Interface \(ISbeAaaInterface\)](#)
- [SBE Billing Properties \(ISbeBillingProperties\)](#)
- [SBE Billing Instance Properties \(ISbeBillingInstanceProperties\)](#)
- [SBE RADIUS Client Properties \(ISbeRadiusClientProperty\)](#)
- [SBE RADIUS Server Properties \(ISbeRadiusServerProperties\)](#)
- [SBC Adjacency Endpoint \(ISbcAdjacencyEnd\)](#)
- [SBC Adjacency Group \(ISbcAdjacencyGroup\)](#)
- [SBC SIP Adjacency Endpoint \(ISbcSipAdjacencyEnd\)](#)
- [SBC SIP Adjacency Endpoint Authorization Realm \(ISbcSipAdjacencyEndAuthRealm\)](#)
- [SBE Configured BlackList \(ISbeConfiguredBlackList\)](#)
- [SBE Configured BlackList Entry \(ISbeConfiguredBlackListEntry\)](#)
- [SBE Current BlackList Listing \(ISbeCurrentBlacklisting\)](#)
- [SBE Codec List \(ISbeCodecList\)](#)
- [SBE Code List Entry \(ISbeCodecListEntry\)](#)
- [SBE Media Gateway \(ISbeMediaGateway\)](#)



- DBE Media Gateway Controller (IDbeMGC)
- SBC H248 Control Interface (ISbcH248ControlInterface)
- SBE Global Hunting Trigger List (ISbeGlobalHuntingTriggerList)
- SBE CAC Policy Set (ISbeCacPolicySet)
- SBE CAC Policy Table (ISbeCacPolicyTable)
- SBE CAC Rule Entry (ISbeCacRuleEntry)
- SBE Call Policy Set (ISbeCallPolicySet)
- SBE Call Policy Table (ISbeCallPolicyTable)
- SBE Call Policy Entry (ISbeCallRuleEntry)
- SBE Policy Set (ISbePolicySet)
- SBE Policy Table (ISbePolicyTable)
- SBE Rule Entry (ISbeRuleEntry)
- SBE SDP Match Table (ISbeSdpMatchTable)
- SBE SDP Policy Table (ISbeSdpPolicyTable)
- SBE QOS Profile (ISbeQosProfile)
- SBE SIP Header Profile (ISbeSipHeaderProfile)
- SBE SIP Header Profile Entry (ISbeSipHeaderProfileEntry)
- SBE SIP Header Profile Header (ISbeSipHeaderProfileHeader)
- SBE SIP Method Profile (ISbeSipMethodProfile)
- SBE SIP Method Profile Method (ISbeSipMethodProfileMethod)
- SBE SIP Option Profile (ISbeSipOptionProfile)
- SBE SIP Parameter Profile (ISbeSipParameterProfile)
- SBE SIP Profile (ISbeSipProfile)
- SBE SIP Timer Properties (ISbeSipTimerProperties)

## SBC Service

The **SBC Service** object represents the SBC service function running on the physical network element (usually a router service card).

**Table 13-1 SBC Service (ISbcService)**

| Attribute Name      | Attribute Description                                                                               | Scheme | Polling Interval |
|---------------------|-----------------------------------------------------------------------------------------------------|--------|------------------|
| SBC Mode            | The mode of the configured SBC service ( <i>UM, DM, UM-HA</i> )                                     | IPCore | Configuration    |
| Release Version     | The SBC release version (for example, Release 3.0.00)                                               | IPCore | Configuration    |
| Application Version | The SBC application version                                                                         | IPCore | Configuration    |
| HA Status           | The redundancy (high availability) status of the configured SBC service ( <i>primary, standby</i> ) | IPCore | Configuration    |

## Service Border Element

The [Service Border Element](#) object represents the SBE (also known as the signaling proxy) that controls access to the network core by VoIP signaling messages. The SBE does this by acting as a Session Initiation Protocol (SIP) back-to-back user agent (B2BUA) or H.323 gateway, handling all call processing through one of these protocols. There can be only one signaling agent per service card, and the SBE will typically control one or more media gateways.

**Table 13-2**      **Service Border Element (ISBE)**

| Attribute Name      | Attribute Description                                                                                                                                 | Scheme | Polling Interval |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Call Redirect Limit | Maximum number of redirections performed before the call fails (2 is default, range is 0-100)                                                         | IPCore | Configuration    |
| Onhold Timeout      | Time the SBE will wait after receiving a media timeout notification from the <a href="#">Data Border Element</a> before tearing down an on-hold call. | IPCore | Configuration    |

## Data Border Element

The [Data Border Element](#) object represents the DBE (also known as a media control proxy) that controls access to media packets on the network by acting as an RTP proxy.

**Table 13-3**      **Data Border Element (IDBE)**

| Attribute Name  | Attribute Description                                                   | Scheme | Polling Interval |
|-----------------|-------------------------------------------------------------------------|--------|------------------|
| DBE Location ID | The unique location ID configured on each vDBE within a UM DBE service. | IPCore | Configuration    |
| DBE Type        | The type of DBE ( <i>DBE</i> , <i>vDBE</i> )                            | IPCore | Configuration    |

## DBE Media Interface

The [DBE Media Interface](#) object represents either the pool of IPv4 network addresses that can be used by the DBE as local media addresses, or an interface defined on the DBE that is used for RTP packets.

**Table 13-4**      **DBE Media Interface (IDbeMediaInterface)**

| Attribute Name   | Attribute Description                                                                                                                                         | Scheme | Polling Interval |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Address Range    | The defined range of addresses in the pool.                                                                                                                   | IPCore | Status           |
| VRF Name         | The VRF to which this interface is assigned.                                                                                                                  | IPCore | Status           |
| Managed By       | The unit managing this media interface, DBE or Media Gateway Controller.                                                                                      | IPCore | Status           |
| Port Range Upper | The upper port range for the interface.                                                                                                                       | IPCore | Status           |
| Port Range Lower | The lower port range for the interface.                                                                                                                       | IPCore | Status           |
| Service Class    | The class of service (CoS) affinity for the port range. The set of CoS is consistent with those used for QoS packet marking, and consists of voice and video. | IPCore | Status           |
| Status           | Status of the interface ( <i>active</i> , <i>inactive</i> ).                                                                                                  | IPCore | Status           |

**Table 13-4** DBE Media Interface (*IDbeMediaInterface*) (continued)

| Attribute Name | Attribute Description                                                                                    | Scheme | Polling Interval |
|----------------|----------------------------------------------------------------------------------------------------------|--------|------------------|
| NAT Mode       | The configured traversal mode for network address and port translation ( <i>twice-napt, twice-nat</i> ). | IPCore | Status           |
| Termination    | The ID of the interface termination point.                                                               | IPCore | Status           |

## SBC Account

The [SBC Account](#) object represents the service relationship with the remote organization on the SBE, with which the SBC interacts.

**Table 13-5** SBC Account (*ISbcAccount*)

| Attribute Name | Attribute Description                                                                                    | Scheme | Polling Interval |
|----------------|----------------------------------------------------------------------------------------------------------|--------|------------------|
| Name           | The SBC account name.                                                                                    | IPCore | Configuration    |
| Adjacency List | User-defined signaling adjacencies which connect the SBC to devices within the remote-side organization. | IPCore | Configuration    |

## SBE AAA Interface

The [SBE AAA Interface](#) object represents the SBE interface used to supply authentication, authorization, and accounting (AAA) subscriber services to the SBC.

**Table 13-6** SBE AAA Interface (*ISbeAaaInterface*)

| Attribute Name | Attribute Description                                  | Scheme | Polling Interval |
|----------------|--------------------------------------------------------|--------|------------------|
| Network ID     | The arbitrary SBE interface identifier (from 0-99999). | IPCore | Status           |
| VRF            | The VRF to which this SBE interface is assigned.       | IPCore | Status           |
| AAA Address    | IP address of the AAA interface.                       | IPCore | Configuration    |
| instanceName   | Name of this AAA interface.                            | IPCore | Configuration    |

## SBE Billing Properties

The [SBE Billing Properties](#) object represents all billing properties for an [SBC Account](#).

**Table 13-7** *SBE Billing Properties (ISbeBillingProperties)*

| Attribute Name        | Attribute Description                                                                                                                        | Scheme | Polling Interval |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Check Time            | The local time of day (up to 23:59) at which to run the long-duration record check for 24-hour billing reporting.                            | IPCore | Configuration    |
| Administrative Status | Administrative status ( <i>Unknown, Up, Down</i> )                                                                                           | IPCore | Configuration    |
| Operational Status    | Operational status ( <i>Unknown, Up, Down</i> )                                                                                              | IPCore | Configuration    |
| instanceName          | Name of this billing instance.                                                                                                               | IPCore | Configuration    |
| Local Billing Address | The IP address of the local SBE billing address. This can be different from the AAA local address. It is the address stored in bill records. | IPCore | Configuration    |

## SBE Billing Instance Properties

The [SBE Billing Instance Properties](#) object represents a single SBE billing record.

**Table 13-8** *SBE Billing Instance Properties (ISbeBillingInstanceProperties)*

| Attribute Name        | Attribute Description                                                                                                                        | Scheme | Polling Interval |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Instance Number       | ID number of the billing instance.                                                                                                           | IPCore | Configuration    |
| Billing Method        | The billing method.                                                                                                                          | IPCore | Configuration    |
| Local Billing Address | The IP address of the local SBE billing address. This can be different from the AAA local address. It is the address stored in bill records. | IPCore | Configuration    |
| Check Time            | The local time of day (up to 23:59) at which to run the long-duration record check for 24-hour billing reporting.                            | IPCore | Configuration    |
| Batch Size            | Batch size.                                                                                                                                  | IPCore | Configuration    |
| Batch Time            | Batch time.                                                                                                                                  | IPCore | Configuration    |
| Deactivation Mode     | Description of how this billing instance is to be deactivated (for example, <i>normal</i> ).                                                 | IPCore | Configuration    |
| RADIUS Client         | The name of the configured RADIUS accounting client for this billing instance.                                                               | IPCore | Configuration    |
| Active Calls          | The number of currently active calls logged against the billing instance..                                                                   | IPCore | Configuration    |
| Operational Status    | Operational status ( <i>Unknown, Up, Down</i> )                                                                                              | IPCore | Configuration    |
| Transport Status      | Transport status                                                                                                                             | IPCore | Configuration    |
| Administrative Status | Administrative status ( <i>Unknown, Up, Down</i> )                                                                                           | IPCore | Configuration    |

## SBE RADIUS Client Properties

The [SBE RADIUS Client Properties](#) object stores the properties associated with the RADIUS client which the SBE uses to access AAA services.

**Table 13-9** SBE RADIUS Client Properties (*ISbeRadiusClientProperty*)

| Attribute Name               | Attribute Description                                                       | Scheme | Polling Interval |
|------------------------------|-----------------------------------------------------------------------------|--------|------------------|
| Name                         | Name of the RADIUS accounting client.                                       | IPCore | Configuration    |
| SBE Retry Interval           | Interval at which the SBE resends accounting requests to the RADIUS server. | IPCore | Configuration    |
| Client Type                  | The type of RADIUS client ( <i>accounting, authentication</i> )             | IPCore | Configuration    |
| SBE Concurrent Request Limit | Total number of concurrent client requests configured.                      | IPCore | Configuration    |
| SBE Retry Limit              | Total number of retries for a single accounting request.                    | IPCore | Configuration    |

## SBE RADIUS Server Properties

The [SBE RADIUS Server Properties](#) object stores properties associated with the RADIUS server as viewed by the AAA client.

**Table 13-10** SBE RADIUS Server Properties (*ISbeRadiusServerProperties*)

| Attribute Name      | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                             | Scheme | Polling Interval |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Server Priority     | The priority of the accounting server. The priority determines which of the configured servers is selected as the default server and where all requests are sent. A RADIUS client contacts the RADIUS servers sequentially, in order of priority, to establish an active RADIUS session. Each RADIUS client sends call detail records to the currently active RADIUS server. The priority must be in the range 1-10 (highest to lowest priority). | IPCore | Configuration    |
| Server Key          | The RADIUS accounting server authentication key or shared secret.                                                                                                                                                                                                                                                                                                                                                                                 | IPCore | Configuration    |
| Port Number         | The port number on which the server connects to the RADIUS server.                                                                                                                                                                                                                                                                                                                                                                                | IPCore | Configuration    |
| RADIUS Mode         | The RADIUS mode ( <i>remote, local</i> ).                                                                                                                                                                                                                                                                                                                                                                                                         | IPCore | Configuration    |
| Remote Access Point | The IP address of the remote RADIUS server.                                                                                                                                                                                                                                                                                                                                                                                                       | IPCore | Configuration    |

## SBC Adjacency Endpoint

The [SBC SIP Adjacency Endpoint](#) object represents a signaling relationship between a local and a remote call agent. There is one adjacency defined per call agent. The adjacency defines protocol-specific parameters as well as admission control and routing policy. The SBC adjacency includes SIP and H.323 adjacencies (R4 supports SIP adjacencies only).

**Table 13-11** *SBC Adjacency Endpoint (ISbcAdjacencyEnd)*

| Attribute Name           | Attribute Description                                                                                                     | Scheme | Polling Interval |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Description              | Description of this adjacency.                                                                                            | IPCore | Configuration    |
| Subnet Restriction       | The configured IP address prefix restricting the set of remote signaling peers that can be contacted over this adjacency. | IPCore | Configuration    |
| Media Passthrough        | Permit media traffic to bypass the DBE ( <i>true, false</i> ).                                                            | IPCore | Configuration    |
| Hunting Trigger Disabled | Enables or disables the hunting trigger on this adjacency.                                                                | IPCore | Configuration    |
| Hunting Triggers         | The list of hunting triggers associated with this adjacency.                                                              | IPCore | Configuration    |
| VRF                      | The VRF with which this adjacency is associated.                                                                          | IPCore | Configuration    |
| Local Signaling Address  | The logical IP address of this adjacency.                                                                                 | IPCore | Configuration    |
| Remote Signaling Address | The signaling peer.                                                                                                       | IPCore | Configuration    |
| Local Signaling Port     | The port used by this adjacency.                                                                                          | IPCore | Configuration    |
| Remote Signaling Port    | The port of the signaling peer.                                                                                           | IPCore | Configuration    |
| Operational Status       | Operational status of the adjacency ( <i>attach, detach</i> ).                                                            | IPCore | Configuration    |
| SBC Account              | The <a href="#">SBC Account</a> associated with this adjacency.                                                           | IPCore | Configuration    |
| Instance Name            | The name of this adjacency.                                                                                               | IPCore | Configuration    |
| Transport Protocol       | The Layer 4 protocol this adjacency uses.                                                                                 | IPCore | Configuration    |

## SBC Adjacency Group

The [SBC Adjacency Group](#) object represents a list of adjacencies. Adjacency groups permit operators to enable and disable features on a group basis instead of per adjacency.

**Table 13-12** *SBC Adjacency Group (ISbcAdjacencyGroup)*

| Attribute Name | Attribute Description                       | Scheme | Polling Interval |
|----------------|---------------------------------------------|--------|------------------|
| Name           | The name of the adjacency group.            | IPCore | Configuration    |
| Adjacency List | The list of adjacencies in the named group. | IPCore | Configuration    |

## SBC SIP Adjacency Endpoint

The [SBC SIP Adjacency Endpoint](#) object represents the same relationship as [SBC Adjacency Endpoint](#) but for a SIP adjacency only.

**Table 13-13** *SBC SIP Adjacency Endpoint (ISbcSipAdjacencyEnd)*

| Attribute Name              | Attribute Description                                                                                                  | Scheme | Polling Interval |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Preferred Transport         | The preferred transport to use. If the preferred transport is not available, another supported transport will be used. | IPCore | Configuration    |
| Registration Target Address | The IP address of the SIP register server.                                                                             | IPCore | Configuration    |
| Registration Target Port    | The port number of the SIP register server.                                                                            | IPCore | Configuration    |

## SBC SIP Adjacency Endpoint Authorization Realm

The [SBC SIP Adjacency Endpoint Authorization Realm](#) object represents a set of authentication credentials for a specified domain and adjacency.

**Table 13-14** *SBC SIP Adjacency Endpoint Authorization Realm (ISbcSipAdjacencyEndAuthRealm)*

| Attribute Name | Attribute Description                                                      | Scheme | Polling Interval |
|----------------|----------------------------------------------------------------------------|--------|------------------|
| Domain         | The name of the domain for which the authentication credentials are valid. | IPCore | Status           |
| Username       | The username that identifies the SBC in the specified domain.              | IPCore | Status           |
| Password       | The password used to authenticate the username in the specified domain.    | IPCore | Status           |

## SBE Configured BlackList

The [SBE Configured BlackList](#) object represents a source to which one or more instances of [SBE Configured BlackList Entry](#) applies. The source can be broad or narrow, depending on the defined combination of IP address, port, VPN, and port type.

**Table 13-15** *SBE Configured BlackList (ISbeConfiguredBlackList)*

| Attribute Name  | Attribute Description                               | Scheme | Polling Interval |
|-----------------|-----------------------------------------------------|--------|------------------|
| Black List Type | The type of source to which this blacklist applies. | IPCore | Configuration    |
| Instance Name   | The name of this source.                            | IPCore | Configuration    |

## SBE Configured BlackList Entry

The [SBE Configured BlackList Entry](#) object represents a set of specific blacklisting actions that are taken when events of a specified type are received from sources defined in one or more instances of [SBE Configured BlackList](#).

**Table 13-16** SBE Configured BlackList Entry (*ISbeConfiguredBlackListEntry*)

| Attribute Name              | Attribute Description                                                                                                                         | Scheme | Polling Interval |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Event Type                  | The type of event to which this limit applies.                                                                                                | IPCore | Configuration    |
| Trigger Size                | The number of events from the specified source that are allowed before blacklisting is triggered and all packets from the source are blocked. | IPCore | Configuration    |
| Trigger Period              | The period of time during which events will be considered as candidates for blacklisting triggers.                                            | IPCore | Configuration    |
| Blacklisting Period         | The length of time during which packets from the source are blocked after the configured limits are exceeded.                                 | IPCore | Configuration    |
| Default Blacklisting Period | Identifies whether the specified blacklisting period is the default.                                                                          | IPCore | Configuration    |
| Default Trigger Size        | Identifies whether the specified trigger size is the default.                                                                                 | IPCore | Configuration    |
| Default Trigger Period      | Identifies whether the specified trigger period is the default.                                                                               | IPCore | Configuration    |

## SBE Current BlackList Listing

The [SBE Current BlackList Listing](#) object represents a set of limits currently in effect against one or more blacklisted sources defined in one or more instances of [SBE Configured BlackList](#).

**Table 13-17** SBE Current BlackList Listing (*ISbeCurrentBlacklisting*)

| Attribute Name       | Attribute Description                                                                                                        | Scheme | Polling Interval |
|----------------------|------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Source Address       | The IP address of a blacklisted source.                                                                                      | IPCore | Configuration    |
| All Source Addresses | Indicates whether Source Address applies to only one or to all sources. If <i>true</i> , ignore the value in Source Address. | IPCore | Configuration    |
| Source Port Type     | The port type of the blacklisted sources.                                                                                    | IPCore | Configuration    |
| Source Port Number   | The port number of the blacklisted sources.                                                                                  | IPCore | Configuration    |
| Time Remaining       | The time remaining until the blacklist will be removed ( <i>hh:mm:ss</i> ).                                                  | IPCore | Configuration    |
| Event Type           | The type of blacklisted event.                                                                                               | IPCore | Configuration    |
| Blacklist Type       | The type of source to which this blacklist applies.                                                                          | IPCore | Configuration    |



## SBE Codec List

The [SBE Codec List](#) object defines a list of allowed codecs (a whitelist) that can be applied via a Call Admission Control (CAC) policy.

**Table 13-18** *SBE Codec List (ISbeCodecList)*

| Attribute Name | Attribute Description                   | Scheme | Polling Interval |
|----------------|-----------------------------------------|--------|------------------|
| Name           | The name of the list of allowed codecs. | IPCore | Configuration    |

## SBE Codec List Entry

The [SBE Codec List Entry](#) object represents an entry in the [SBE Codec List](#).

**Table 13-19** *SBE Code List Entry (ISbeCodecListEntry)*

| Attribute Name         | Attribute Description                                                            | Scheme | Polling Interval |
|------------------------|----------------------------------------------------------------------------------|--------|------------------|
| minPacketizationPeriod | The minimum packetization period.                                                | IPCore | Configuration    |
| codecName              | The name of the allowed codec to which the minimum packetization period applies. | IPCore | Configuration    |

## SBE Media Gateway

The [SBE Media Gateway](#) object represents properties for the SBC/SBE side of the H.248 interface.

**Table 13-20** *SBE Media Gateway (ISbeMediaGateway)*

| Attribute Name | Attribute Description                                       | Scheme | Polling Interval |
|----------------|-------------------------------------------------------------|--------|------------------|
| codecList      | Comma-separated list of codecs supported on the H.248 link. | IPCore | Configuration    |
| ipAddress      | IP address                                                  | IPCore | Configuration    |

## DBE Media Gateway Controller

The [DBE Media Gateway Controller](#) object represents properties for the DBE side of the H.248 interface.

**Table 13-21** *DBE Media Gateway Controller (IDbeMGC)*

| Attribute Name | Attribute Description                                            | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------|--------|------------------|
| remoteIP       | The remote IP address.                                           | IPCore | Configuration    |
| remotePort     | The remote port number.                                          | IPCore | Configuration    |
| transport      | The transport protocol used.                                     | IPCore | Configuration    |
| Index          | Identifies the index number of the DBE Media Gateway Controller. | IPCore | Configuration    |

## SBC H248 Control Interface

The [SBC H248 Control Interface](#) object represents the H.248 interface used for signaling between the SBE and DBE in distributed mode, and between an SBE and a transcoding media gateway.

**Table 13-22** *SBC H248 Control Interface (ISbcH248ControllInterface)*

| Attribute Name | Attribute Description                                                                                     | Scheme | Polling Interval |
|----------------|-----------------------------------------------------------------------------------------------------------|--------|------------------|
| ipAddress      | IP address of the remote Media Gateway for an SBE, and the associated Media Gateway Controller for a DBE. | IPCore | Configuration    |
| transport      | The transport protocol used.                                                                              | IPCore | Configuration    |
| port           | The port number.                                                                                          | IPCore | Configuration    |
| Association    | The media gateway associated with this H.248 control interface.                                           | IPCore | Configuration    |

## SBE Global Hunting Trigger List

The [SBE Global Hunting Trigger List](#) object represents a list of hunting triggers defined globally for SBCs. Hunting triggers enable SBCs to hunt for other route or destination adjacencies when normal routes fail.

**Table 13-23** *SBE Global Hunting Trigger List (ISbeGlobalHuntingTriggerList)*

| Attribute Name  | Attribute Description         | Scheme | Polling Interval |
|-----------------|-------------------------------|--------|------------------|
| huntingMode     | SIP hunting triggers.         | IPCore | Status           |
| huntingTriggers | The list of hunting triggers. | IPCore | Status           |

## SBE CAC Policy Set

The [SBE CAC Policy Set](#) object represents a set of SBE Call Admission Control (CAC) policy rules. These rules permit application-level policy control over how VoIP call admission requests are processed.

**Table 13-24** *SBE CAC Policy Set (ISbeCacPolicySet)*

| Attribute Name | Attribute Description                                         | Scheme | Polling Interval |
|----------------|---------------------------------------------------------------|--------|------------------|
| firstScope     | First call table scope of this policy set.                    | IPCore | Configuration    |
| firstTable     | The first CAC table used by this policy set.                  | IPCore | Configuration    |
| Description    | Description of the policy set.                                | IPCore | Configuration    |
| Status         | Status of the policy set ( <i>active</i> , <i>inactive</i> ). | IPCore | Configuration    |

## SBE CAC Policy Table

The [SBE CAC Policy Table](#) object represents a table containing instances of [SBE CAC Rule Entry](#).

**Table 13-25** SBE CAC Policy Table (*ISbeCacPolicyTable*)

| Attribute Name      | Attribute Description           | Scheme | Polling Interval |
|---------------------|---------------------------------|--------|------------------|
| instanceName        | Name of the table               | IPCore | Configuration    |
| instanceDescription | Description of the table        | IPCore | Configuration    |
| matchType           | List of event types to match on | IPCore | Configuration    |

## SBE CAC Rule Entry

The [SBE CAC Rule Entry](#) object represents an entry in a [SBE CAC Policy Table](#).

**Table 13-26** SBE CAC Rule Entry (*ISbeCacRuleEntry*)

| Attribute Name  | Attribute Description                                   | Scheme | Polling Interval |
|-----------------|---------------------------------------------------------|--------|------------------|
| scope           | The scope of the entry.                                 | IPCore | Configuration    |
| nextPolicyTable | The next CAC policy table to be evaluated in the chain. | IPCore | Configuration    |

## SBE Call Policy Set

The [SBE Call Policy Set](#) object represents a set of SBE call policy rules. These rules permit application-level policy control over how in-call VoIP signaling and media are processed.

**Table 13-27** SBE Call Policy Set (*ISbeCallPolicySet*)

| Attribute Name  | Attribute Description                                             | Scheme | Polling Interval |
|-----------------|-------------------------------------------------------------------|--------|------------------|
| isActive        | Indicates if the policy set is <i>active</i> or <i>inactive</i> . | IPCore | Configuration    |
| policySetNumber | The ID number of the policy set.                                  | IPCore | Configuration    |
| name            | The name of the policy set.                                       | IPCore | Configuration    |
| description     | The description of the policy set.                                | IPCore | Configuration    |
| firstCallTable  | The first call table used by this policy set.                     | IPCore | Configuration    |

## SBE Call Policy Table

The [SBE Call Policy Table](#) object represents a table containing instances of [SBE Call Policy Entry](#).

**Table 13-28** *SBE Call Policy Table (ISbeCallPolicyTable)*

| Attribute Name      | Attribute Description                 | Scheme | Polling Interval |
|---------------------|---------------------------------------|--------|------------------|
| instanceName        | Name of the call policy table.        | IPCore | Configuration    |
| instanceDescription | Description of the call policy table. | IPCore | Configuration    |
| matchType           | The type of call events to match on.  | IPCore | Configuration    |

## SBE Call Policy Entry

The [SBE Call Policy Entry](#) object represents an entry in a [SBE CAC Policy Table](#).

**Table 13-29** *SBE Call Policy Entry (ISbeCallRuleEntry)*

| Attribute Name | Attribute Description               | Scheme | Polling Interval |
|----------------|-------------------------------------|--------|------------------|
| entryNumber    | ID number of the Call policy entry. | IPCore | Configuration    |
| action         | Action to be taken on a match.      | IPCore | Configuration    |
| matchValue     | The event to match on.              | IPCore | Configuration    |
| entryCategory  | The policy entry category.          | IPCore | Configuration    |

## SBE Policy Set

The [SBE Policy Set](#) object represents a group of policies that can be active on the SBC at any one time.

**Table 13-30** *SBE Policy Set (ISbePolicySet)*

| Attribute Name  | Attribute Description                                   | Scheme | Polling Interval |
|-----------------|---------------------------------------------------------|--------|------------------|
| isActive        | Indicates whether the policy set is active or inactive. | IPCore | Configuration    |
| policySetNumber | ID number of the SBE policy set.                        | IPCore | Configuration    |
| name            | Name of the SBE policy set.                             | IPCore | Configuration    |
| description     | Description of the SBE policy set.                      | IPCore | Configuration    |

## SBE Policy Table

The [SBE Policy Table](#) object represents a table of instances of [SBE Rule Entry](#). It is an abstract class that contains attributes common to both call policy and CAC policy rules.

**Table 13-31** *SBE Policy Table (ISbePolicyTable)*

| Attribute Name | Attribute Description                                                         | Scheme | Polling Interval |
|----------------|-------------------------------------------------------------------------------|--------|------------------|
| matchType      | The criteria used to select an <a href="#">SBE Rule Entry</a> from the table. | IPCore | Configuration    |
| name           | The name of the SBE policy table.                                             | IPCore | Configuration    |
| description    | Description of the SBE policy table.                                          | IPCore | Configuration    |

## SBE Rule Entry

The [SBE Rule Entry](#) object represents an entry in [SBE Policy Table](#). It is abstract class that contains attributes common to both Call and CAC policy rules.

**Table 13-32** *SBE Rule Entry (ISbeRuleEntry)*

| Attribute Name      | Attribute Description                                                                                                | Scheme | Polling Interval |
|---------------------|----------------------------------------------------------------------------------------------------------------------|--------|------------------|
| entryNumber         | The entry's ID number in the <a href="#">SBE Policy Table</a> .                                                      | IPCore | Configuration    |
| action              | The action to be performed if the entry's matchValue matches the matchType in the <a href="#">SBE Policy Table</a> . | IPCore | Configuration    |
| matchValue          | The value to be matched against the matchType in the <a href="#">SBE Policy Table</a> .                              | IPCore | Configuration    |
| entryCategory       | The category of the entry in the number analysis table.                                                              | IPCore | Configuration    |
| instanceName        | The name of this entry.                                                                                              | IPCore | Configuration    |
| dstAdjacency        | The destination adjacency of this entry.                                                                             | IPCore | Configuration    |
| matchAdjacency      | The adjacency to which this entry relates.                                                                           | IPCore | Configuration    |
| SbeAccount          | The account to which this entry relates.                                                                             | IPCore | Configuration    |
| MatchAdjacencyGroup | The adjacency group to which this entry relates.                                                                     | IPCore | Configuration    |

## SBE SDP Match Table

The [SBE SDP Match Table](#) object represents a table of strings used in event and policy matching.

**Table 13-33** *SBE SDP Match Table (ISbeSdpMatchTable)*

| Attribute Name | Attribute Description            | Scheme | Polling Interval |
|----------------|----------------------------------|--------|------------------|
| tableType      | The type of table.               | IPCore | Status           |
| matchStrings   | The list of strings to match on. | IPCore | Status           |

## SBE SDP Policy Table

The [SBE SDP Policy Table](#) object represents a table of the SBE/SBC policies.

**Table 13-34** *SBE SDP Policy Table (ISbeSdpPolicyTable)*

| Attribute Name | Attribute Description    | Scheme | Polling Interval |
|----------------|--------------------------|--------|------------------|
| name           | Name of the policy table | IPCore | Status           |

## SBE QOS Profile

The [SBE QOS Profile](#) object represents a defined quality-of-service profile used by CAC policies. These policies are used exclusively for marking packets.

**Table 13-35** *SBE QOS Profile (ISbeQosProfile)*

| Attribute Name | Attribute Description                                                                                                                   | Scheme | Polling Interval |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| classOfService | The type of call to which this QoS profile will be applied (for example, <i>voice</i> , <i>video</i> , <i>fax</i> , <i>signaling</i> ). | IPCore | Configuration    |
| markingType    | The type of marking: DSCP or IP precedence.                                                                                             | IPCore | Configuration    |
| dscp           | DSCP value.                                                                                                                             | IPCore | Configuration    |
| ipPrecedence   | IP precedence value.                                                                                                                    | IPCore | Configuration    |
| tos            | Terms of Service (ToS) value.                                                                                                           | IPCore | Configuration    |

## SBE SIP Header Profile

The [SBE SIP Header Profile](#) object represents an instance of a SIP header profile, used to control which SIP message requests are accepted (whitelist) or rejected (blacklist) on the SBE.

**Table 13-36** *SBE SIP Header Profile (ISbeSipHeaderProfile)*

| Attribute Name | Attribute Description                                                      | Scheme | Polling Interval |
|----------------|----------------------------------------------------------------------------|--------|------------------|
| instanceName   | Name of the SIP header profile.                                            | IPCore | Configuration    |
| isInUse        | Flag indicating whether the profile is in use.                             | IPCore | Configuration    |
| profileType    | The profile type ( <i>blacklist</i> ; profiles are whitelists by default). | IPCore | Configuration    |
| description    | Description of the profile.                                                | IPCore | Configuration    |

## SBE SIP Header Profile Entry

The [SBE SIP Header Profile Entry](#) object represents an entry in the [SBE SIP Header Profile](#).

**Table 13-37** SBE SIP Header Profile Entry (*ISbeSipHeaderProfileEntry*)

| Attribute Name   | Attribute Description                                                    | Scheme | Polling Interval |
|------------------|--------------------------------------------------------------------------|--------|------------------|
| entryNr          | ID number of the entry                                                   | IPCore | Configuration    |
| action           | The action to be taken when there is a match on the value and conditions | IPCore | Configuration    |
| value            | Value in the SIP message to be matched on                                | IPCore | Configuration    |
| conditions       | Condition in the SIP message to be matched on                            | IPCore | Configuration    |
| parameterProfile | Parameter profile                                                        | IPCore | Configuration    |

## SBE SIP Header Profile Header

The [SBE SIP Header Profile Header](#) object is an abstract class representing a header on the [SBE SIP Header Profile](#).

**Table 13-38** SBE SIP Header Profile Header (*ISbeSipHeaderProfileHeader*)

| Attribute Name | Attribute Description                              | Scheme | Polling Interval |
|----------------|----------------------------------------------------|--------|------------------|
| name           | Name of the <a href="#">SBE SIP Header Profile</a> | IPCore | Configuration    |

## SBE SIP Method Profile

The [SBE SIP Method Profile](#) object specifies how methods for the corresponding [SBE SIP Header Profile](#) will be applied.

**Table 13-39** SBE SIP Method Profile (*ISbeSipMethodProfile*)

| Attribute Name | Attribute Description                                                                                                                                                                                            | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| isPassthrough  | If <i>true</i> , permits message bodies to be passed through for non vital messages accepted by the profile. If <i>false</i> , strips the message body out of any non vital SIP messages matched by the profile. | IPCore | Configuration    |

## SBE SIP Method Profile Method

The [SBE SIP Method Profile](#) object stores the method strings that form the whitelist or blacklist [SBE SIP Header Profile](#).

**Table 13-40** *SBE SIP Method Profile Method (ISbeSipMethodProfileMethod)*

| Attribute Name   | Attribute Description                                                        | Scheme | Polling Interval |
|------------------|------------------------------------------------------------------------------|--------|------------------|
| instanceName     | Name of the method.                                                          | IPCore | Configuration    |
| action           | The action to be performed by the method strings.                            | IPCore | Configuration    |
| mapStatusCode    | The map status code.                                                         | IPCore | Configuration    |
| headerProfile    | The corresponding <a href="#">SBE SIP Header Profile</a> for this method.    | IPCore | Configuration    |
| parameterProfile | The corresponding <a href="#">SBE SIP Parameter Profile</a> for this method. | IPCore | Configuration    |

## SBE SIP Option Profile

The [SBE SIP Option Profile](#) object stores the option strings that form a SIP Option profile whitelist or blacklist.

**Table 13-41** *SBE SIP Option Profile (ISbeSipOptionProfile)*

| Attribute Name | Attribute Description                                    | Scheme | Polling Interval |
|----------------|----------------------------------------------------------|--------|------------------|
| options        | The option strings that form the whitelist or blacklist. | IPCore | Configuration    |

## SBE SIP Parameter Profile

The [SBE SIP Parameter Profile](#) object stores the parameters that form a SIP parameter profile whitelist or blacklist.

**Table 13-42** *SBE SIP Parameter Profile (ISbeSipParameterProfile)*

| Attribute Name | Attribute Description                                       | Scheme | Polling Interval |
|----------------|-------------------------------------------------------------|--------|------------------|
| parameters     | The parameter strings that form the whitelist or blacklist. | IPCore | Configuration    |

## SBE SIP Profile

The [SBE SIP Profile](#) is an abstract class representing SIP Header, Option, and Method profiles.

**Table 13-43** *SBE SIP Profile (ISbeSipProfile)*

| Attribute Name | Attribute Description                 | Scheme | Polling Interval |
|----------------|---------------------------------------|--------|------------------|
| instanceName   | Name of the profile.                  | IPCore | Configuration    |
| isInUse        | Flag indicating whether it is in use. | IPCore | Configuration    |
| profileType    | The profile type.                     | IPCore | Configuration    |
| description    | Profile description.                  | IPCore | Configuration    |



## SBE SIP Timer Properties

The [SBE SIP Timer Properties](#) object represents a SIP Timer. Users can configure SIP timers to permit performance tuning of network elements participating in SBC traffic.

**Table 13-44** *SBE SIP Timer Properties (ISbeSipTimerProperties)*

| Attribute Name             | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Scheme | Polling Interval |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| tcpConnectTimeout          | Time (in milliseconds) the SBC waits for a SIP TCP connection to a remote peer to complete before failing the connection. The default is 1000.                                                                                                                                                                                                                                                                                                                                                          | IPCore | Configuration    |
| tcpIdleTimeout             | Minimum time (in milliseconds) a TCP socket must remain open while not processing traffic. If the socket remains idle after that time, it can be closed. The default is two seconds.                                                                                                                                                                                                                                                                                                                    | IPCore | Configuration    |
| tlsIdleTimeout             | Transport Layer Security (TLS) idle timeout.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IPCore | Configuration    |
| inviteTimeout              | Time (in milliseconds) the SBC waits for a final response to an outbound SIP INVITE request. The default is 180 seconds. If no response is received during that time, an internal Request Timeout response is generated and returned to the caller.                                                                                                                                                                                                                                                     | IPCore | Configuration    |
| udpFirstRetransmitInterval | Time (in milliseconds) the SBC waits for a UDP response or ACK before sending the first retransmission of the relevant signal. If the SBC keeps getting no responses, it doubles subsequent retransmission intervals each time until it reaches the udp-max-retransmit-interval duration. It will cease retransmitting the request and timeout the signal if 64 times this duration passes without the receipt of a response or ACK. The default first UDP retransmission interval is 500 milliseconds. | IPCore | Configuration    |
| udpMaxRetransmitInterval   | Maximum interval (in milliseconds) after which SBC will retransmit. The default interval is four seconds.                                                                                                                                                                                                                                                                                                                                                                                               | IPCore | Configuration    |
| tcpConnectTimeout          | Time interval (in milliseconds) over which SBC will retain negative UDP responses to INVITE requests. All subsequent retransmitted responses received within this interval will be answered with a negative ACK. Thereafter, any further retransmitted responses are ignored. The default UDP response linger period is 32 seconds.                                                                                                                                                                     | IPCore | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of Network layer topology.

## Service Alarms

There are no service alarms specific to this technology.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



## CHAPTER 14

# Multiprotocol Label Switching

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This chapter describes the level of support that Cisco ANA provides for MPLS, as follows:

- [Technology Description, page 14-1](#)
- [Information Model Objects \(IMOs\), page 14-2](#)
- [Vendor-Specific Inventory and IMOs](#)
- [Network Topology, page 14-6](#)
- [Service Alarms, page 14-6](#)

## Technology Description

### MPLS

MPLS was originally presented as a way of improving the forwarding speed of routers. It is now emerging as a crucial standard technology that offers new capabilities for large-scale IP networks. Traffic engineering (TE), the ability of network operators to dictate the path that traffic takes through the network, and VPN support, are examples of two key applications where MPLS is superior to any currently available IP technology. It integrates Layer 2 information about network links (bandwidth, latency, utilization) into Layer 3 (IP) within a particular autonomous system, or ISP, in order to simplify and improve IP packet exchange. It also gives network operators a great deal of flexibility in how they divert and route traffic around link failures, congestion, and bottlenecks.

When packets enter an MPLS-based network, label edge routers (LERs) give them a label identifier. These labels not only contain information based on the routing table entries (for example, destination, bandwidth, delay, and other metrics), but also refer to the IP header field (source IP address), Layer 4 socket number information, and differentiated service. Once this classification is complete and mapped, different packets are assigned to corresponding label switched paths (LSPs), where label switch routers (LSRs) place outgoing labels on the packets.

## LDP

Label Distribution Protocol (LDP) enables neighboring provider or provider-edge routers acting as LSRs in an MPLS-aware network to exchange label prefix binding information, which is required for forwarding traffic. The LSRs discover potential peers in the network with which they can establish LDP sessions in order to negotiate and exchange the labels (addresses) to be used for forwarding packets.

LDP supports two types of peer discovery:

- Basic discovery—Used to discover directly connected LDP LSRs. An LSR sends hello messages to the “all routers on this subnet” multicast address, on interfaces for which LDP has been configured.
- Extended discovery—Used between indirectly connected LDP LSRs. An LSR sends targeted hello messages to specific IP addresses. Targeted sessions must be configured since the routers are not physically connected and broadcasting would not reach the peers. The IP addresses of both peers are required for extended discovery.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [MPLS Interface \(IMpls\)](#)
- [Label Switching Entity \(ILse\)](#)
- [Equivalent Label Switching Entry \(ILSEEntries\)](#)
- [MPLS Entry \(IMplsEntry\)](#)
- [MPLS Aggregate Entry \(IMplsAggregateEntry\)](#)
- [LDP Service \(ILdpService\)](#)
- [LDP Peer \(ILdpPeer\)](#)
- [LDP Peer Discovery Source \(ILdpPeerDiscoverySource\)](#)

## MPLS Interface

The network/data link layer [MPLS Interface](#) object represents an MPLS configuration in a router interface. It is bound by its Containing Termination Points attribute to a data link layer interface object, and is accessed primarily by the Network layer [IP Interface](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Label Switching Entity](#).

**Table 14-1** *MPLS Interface (IMpls)*

| Attribute Name                  | Attribute Description                                                 | Scheme | Polling Interval |
|---------------------------------|-----------------------------------------------------------------------|--------|------------------|
| Distribution Protocol           | Distribution protocol ( <i>Null, LDP, TDP, RSVP, TDP and LDP</i> )    | IPCore | Configuration    |
| Outer and Inner Labels          | Outer and inner labels for Path Tracer                                | IPCore | Configuration    |
| Traffic Engineering Properties  | Traffic engineering properties ( <a href="#">MPLS TE Properties</a> ) | IPCore | Configuration    |
| Resource Reservation Properties | Resource Reservation Protocol properties                              | IPCore | Configuration    |

**Table 14-1** *MPLS Interface (IMpls) (continued)*

| Attribute Name                          | Attribute Description                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------|--------|------------------|
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)          | IPCore | N/A              |
| Contained Connection Termination Points | Bound connection termination points                             | IPCore | N/A              |

## Label Switching Entity

The [Label Switching Entity](#) object describes the protocol-independent forwarding component of an LSR. It is bound by its Logical Sons attribute to all the network or data link layer [MPLS Interface](#) objects among which this [Label Switching Entity](#) is switching IP packets.

**Table 14-2** *Label Switching Entity (ILse)*

| Attribute Name       | Attribute Description                                                                                                          | Scheme | Polling Interval |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| MPLS Table           | Array of <a href="#">Equivalent Label Switching Entries</a> between MPLS interfaces                                            | IPCore | Configuration    |
| MPLS Aggregate Table | Array of <a href="#">Equivalent Label Switching Entries</a> from MPLS interfaces into VRF tables                               | IPCore | Configuration    |
| MPLS Tunnel Segments | Array of switched MPLS TE tunnel segments (GUI usage) (see <a href="#">Multiprotocol Label Switching Traffic Engineering</a> ) | IPCore | Configuration    |
| LDP Service          | <a href="#">LDP Service</a> which holds the <a href="#">LDP Peers</a>                                                          | IPCore | Configuration    |
| Logical Sons         | Array of all <a href="#">MPLS Interfaces</a> among which this <a href="#">Label Switching Entity</a> is switching IP packets   | IPCore | N/A              |

## Equivalent Label Switching Entry

The [Equivalent Label Switching Entry](#), [MPLS Entry](#), and [MPLS Aggregate Entry](#) objects describe an MPLS Label Switching table's entries. Each is an array of [MPLS Entries](#) or [MPLS Aggregate Entries](#) sharing a single ingress label.

**Table 14-3** *Equivalent Label Switching Entry (ILSEEntries)*

| Attribute Name          | Attribute Description                                                                                                   | Scheme | Polling Interval |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Label Switching Entries | Array of either <a href="#">MPLS Entries</a> or <a href="#">MPLS Aggregate Entries</a> (sharing a single ingress label) | IPCore | Configuration    |

## MPLS Entry

**Table 14-4** *MPLS Entry (IMplsEntry)*

| Attribute Name               | Attribute Description                                                      | Scheme | Polling Interval |
|------------------------------|----------------------------------------------------------------------------|--------|------------------|
| Incoming Label               | Incoming label                                                             | IPCore | Configuration    |
| Outgoing Interface and Label | Outgoing interface and label                                               | IPCore | Configuration    |
| Switching Action             | Switching action ( <i>Null, Pop, Swap, Aggregate, Untagged, Pop, Act</i> ) | IPCore | Configuration    |
| Next Hop IP Address          | Next hop IP address                                                        | IPCore | Configuration    |
| Destination Mask             | IP subnet mask of the destination                                          | IPCore | Configuration    |
| Destination Address          | Destination IP address                                                     | IPCore | Configuration    |

## MPLS Aggregate Entry

**Table 14-5** *MPLS Aggregate Entry (IMplsAggregateEntry)*

| Attribute Name               | Attribute Description                                                      | Scheme | Polling Interval |
|------------------------------|----------------------------------------------------------------------------|--------|------------------|
| Virtual Routing Entity       | Virtual Routing and Forwarding (VRF) entity                                | IPCore | Configuration    |
| Incoming Label               | Incoming label                                                             | IPCore | Configuration    |
| Outgoing Interface and Label | Outgoing interface and label                                               | IPCore | Configuration    |
| Switching Action             | Switching action ( <i>Null, Pop, Swap, Aggregate, Untagged, Pop, Act</i> ) | IPCore | Configuration    |
| Next Hop IP Address          | Next hop IP address                                                        | IPCore | Configuration    |

## LDP Service

The [LDP Service](#) object, which is used in MPLS network environments, describes the main attributes of the LDP service. It is accessed only by the [Label Switching Entity](#)'s LDP Service attribute.

**Table 14-6** *LDP Service (ILdpService)*

| Attribute Name       | Attribute Description                            | Scheme | Polling Interval |
|----------------------|--------------------------------------------------|--------|------------------|
| Local Identification | Local LDP identifier                             | IPCore | Configuration    |
| Status               | Service status ( <i>Unknown, Running, Down</i> ) | IPCore | Configuration    |
| LDP Peers            | Array of <a href="#">LDP Peers</a>               | IPCore | Configuration    |

## LDP Peer

The [LDP Peer](#) object describes a remote LDP entity that currently has an LDP session with the Local [LDP Service](#). The LDP Peer is bound to the LDP Service by the latter's LDP Peer attribute.

**Table 14-7** *LDP Peer (ILdpPeer)*

| Attribute Name         | Attribute Description                                                                            | Scheme | Polling Interval |
|------------------------|--------------------------------------------------------------------------------------------------|--------|------------------|
| Peer Identification    | Peer LDP identifier                                                                              | IPCore | Configuration    |
| Transport Addresses    | Peer transport IP addresses                                                                      | IPCore | Configuration    |
| Distribution Method    | Label distribution method ( <i>Unknown, Downstream, Downstream On Demand</i> )                   | IPCore | Configuration    |
| Protocol Type          | Peer protocol type ( <i>Unknown, LDP, TDP</i> )                                                  | IPCore | Configuration    |
| Path Vector Limit      | Path vector limit for loop detection                                                             | IPCore | Configuration    |
| Session Status         | LDP session status type ( <i>Transient, Initialized, Open Received, Open Sent, Operational</i> ) | IPCore | Configuration    |
| Protocol Version       | LDP session protocol version                                                                     | IPCore | Configuration    |
| Hold Time              | Hold time for maintaining the session without receiving traffic or keepalive                     | IPCore | Configuration    |
| Hello Time Interval    | Time interval at which hello ( <i>Keep Alive</i> ) packets should be sent                        | IPCore | Configuration    |
| Peer Discovery Sources | Array of <a href="#">LDP Peer Discovery Sources</a>                                              | IPCore | Configuration    |

## LDP Peer Discovery Source

The [LDP Peer Discovery Source](#) object describes the discovery source of the LDP Peer. Identification of the Peer is done using broadcast on [MPLS Interfaces](#) and a hello message exchanged between LSRs.

**Table 14-8** *LDP Peer Discovery Source (ILdpPeerDiscoverySource)*

| Attribute Name   | Attribute Description                                     | Scheme | Polling Interval |
|------------------|-----------------------------------------------------------|--------|------------------|
| Interface Name   | MPLS interface name on which the peer was discovered      | IPCore | Configuration    |
| Source Addresses | Source IP addresses from which the hello message was sent | IPCore | Configuration    |
| Type             | Discovery type ( <i>Link, Targeted</i> )                  | IPCore | Configuration    |

# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA discovers MPLS network layer topology by searching for the existence of the local IP subnet in any one-hop-away remote side's [MPLS Interface](#). In particular, it compares the local and remote IP subnets gathered from the upper IP network layers.

## Service Alarms

The following alarms are supported for this technology:

- Broken LSP Discovered
- MPLS Black Hole Found/MPLS Black Hole Cleared
- MPLS Interface Removed/MPLS Interface Added
- LDP Neighbor Down/LDP Neighbor Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 15

## Multiprotocol Label Switching Traffic Engineering

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This chapter describes the level of support that Cisco ANA provides for Multiprotocol Label Switching Traffic Engineering (MPLS TE), as follows:

- [Technology Description, page 15-1](#)
- [Information Model Objects \(IMOs\), page 15-2](#)
- [Vendor-Specific Inventory and IMOs](#)
- [Network Topology, page 15-4](#)
- [Service Alarms, page 15-5](#)

### Technology Description

#### MPLS TE

MPLS TE software enables an MPLS backbone to replicate and expand upon the traffic engineering capabilities of Layer 2 ATM and Frame Relay networks. MPLS TE is in wide use on service-provider backbone networks where extreme levels of efficient resource usage and failure recovery are essential.

MPLS TE lets network operators route traffic using *constraint-based routing*. In this type of routing, the path for traffic flow is the shortest path that meets the resource requirements (or constraints) of the traffic flow. These constraints can include bandwidth requirements, media requirements, priority versus other flows, and so on. MPLS TE gracefully recovers from link or node failures that change the topology of the backbone by adapting to the new set of constraints.

MPLS TE is founded on the MPLS integration of Layer 2 and Layer 3 technologies. By making traditional Layer 2 features available to Layer 3, MPLS enables traffic engineering. Providers can offer in a one-tier network what could be achieved otherwise only by overlaying a Layer 3 network on a Layer 2 network.

MPLS TE tunnel paths are calculated at the tunnel head based on a fit between required and available resources (constraint-based routing). The IGP automatically routes the traffic into these tunnels. Typically, a packet crossing the MPLS traffic engineering backbone travels on a single tunnel that connects the ingress point to the egress point.

## MPLS TE FRR

MPLS TE FRR protects the functionality of MPLS networks by permitting fast rerouting of traffic to a backup LSP whenever a link or node along an LSP fails.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [MPLS TE Tunnel Interface \(IMplsTETunnel\)](#)
- [MPLS TE Properties \(IMplsTEProperties\)](#)
- [MPLS TE Allocation Entry \(IMplsTEPropertiesAllocationEntry\)](#)
- [MPLS TE Tunnel Segment \(IMplsTESegment\)](#)

## MPLS TE Tunnel Interface

The network/data link layer [MPLS TE Tunnel Interface](#) object is bound by its Containing Termination Points attribute to a data link layer interface object. It is accessed primarily by the Network layer [IP Interface](#) object bound by its Contained Connection Termination Points attribute. It is also accessed by the [Label Switching Entity](#).

**Table 15-1** *MPLS TE Tunnel Interface (IMplsTETunnel)*

| Attribute Name                             | Attribute Description                                                                | Scheme | Polling Interval |
|--------------------------------------------|--------------------------------------------------------------------------------------|--------|------------------|
| Destination Address                        | Destination IP address                                                               | IPCore | Configuration    |
| Outgoing Interface and Label               | Outgoing interface and label                                                         | IPCore | Configuration    |
| LSP Identification                         | Label Switching Path (LSP) identifier                                                | IPCore | Configuration    |
| Requested Bandwidth                        | Requested bandwidth                                                                  | IPCore | Configuration    |
| Measured Average, Burst and Peak Bandwidth | Measured average, burst, and peak bandwidth                                          | IPCore | Configuration    |
| Setup and Hold Priority                    | Setup and hold priority of the tunnel                                                | IPCore | Configuration    |
| Affinity Bits and Mask                     | Required traffic engineering affinity bits and mask attributes of the tunnel's links | IPCore | Configuration    |
| Automatic Route Announcement Status        | Automatic route announcement status ( <i>Enable, Disable</i> )                       | IPCore | Configuration    |
| Optimization Lock Down Status              | Label switching path optimization lock down status ( <i>Enable, Disable</i> )        | IPCore | Configuration    |
| Path Option                                | Label switching path option ( <i>Explicit, Dynamic</i> )                             | IPCore | Configuration    |
| Name                                       | Interface name                                                                       | IPCore | Configuration    |
| Description                                | Interface description                                                                | IPCore | Configuration    |
| Administrative Status                      | Administrative status ( <i>Unknown, Up, Down</i> )                                   | IPCore | Status           |
| Operational Status                         | Operational status ( <i>Unknown, Up, Down</i> )                                      | IPCore | Status           |

**Table 15-1 MPLS TE Tunnel Interface (IMplsTETunnel) (continued)**

| Attribute Name                          | Attribute Description                                                                                  | Scheme | Polling Interval |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------|--------|------------------|
| IsFRREnabled                            | Indicates whether Fast Reroute is enabled on this tunnel ( <i>true, false</i> )                        | IPCore | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                        | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points ( <a href="#">MPLS Interface</a> )                                       | IPCore | N/A              |
| Contained Connection Termination Points | Bound connection termination points ( <a href="#">IP Interface</a> or <a href="#">MPLS Interface</a> ) | IPCore | N/A              |

## MPLS TE Properties

The [MPLS TE Properties](#) object and its [MPLS TE Allocation Entry](#) objects describe the traffic engineering properties of an [MPLS Interface](#) object, to which they bound are by the [MPLS Interface](#) object's Traffic Engineering Properties attribute.

**Table 15-2 MPLS TE Properties (IMplsTEProperties)**

| Attribute Name                                | Attribute Description                                          | Scheme | Polling Interval |
|-----------------------------------------------|----------------------------------------------------------------|--------|------------------|
| Administrative Weight                         | Administrative weight                                          | IPCore | Configuration    |
| Attributes Identifier                         | Attributes list identifier                                     | IPCore | Configuration    |
| signaling Protocol                            | signaling protocol ( <i>None, RSVP, CR-LDP, Other</i> )        | IPCore | Configuration    |
| Available, Physical and Reserveable Bandwidth | Available, physical, and reserveable bandwidth                 | IPCore | Configuration    |
| Reserved Bandwidth                            | Array of instances of <a href="#">MPLS TE Allocation Entry</a> | IPCore | Configuration    |

## MPLS TE Allocation Entry

**Table 15-3 MPLS TE Allocation Entry (IMplsTEPropertiesAllocationEntry)**

| Attribute Name                     | Attribute Description                                                 | Scheme | Polling Interval |
|------------------------------------|-----------------------------------------------------------------------|--------|------------------|
| Priority Level                     | Allocation priority level ( <i>0-7</i> )                              | IPCore | Configuration    |
| Allocated and Cumulative Bandwidth | Allocated and cumulative bandwidth at, and up to, this priority level | IPCore | Configuration    |

## MPLS TE Tunnel Segment

The [MPLS TE Tunnel Segment](#) object describes the properties of a single segment of an MPLS TE Tunnel. Cisco ANA uses this object to help users visualize MPLS TE Tunnels networks, and it affects the VNE logic implementation. Tunnel segments are aggregated in the MPLS TE Tunnel Segments table of the Label Switching Entity.

**Table 15-4** *MPLS TE Tunnel Segment (IMplsTESegment)*

| Attribute Name                             | Attribute Description                                                                                                                                                                                                                                                             | Scheme | Polling Interval |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Segment Type                               | Segment type ( <i>Head, Intermediate, Tail</i> ).                                                                                                                                                                                                                                 | IPCore | Configuration    |
| Measured Average, Burst and Peak Bandwidth | Measured average, burst, and peak bandwidth.                                                                                                                                                                                                                                      | IPCore | Configuration    |
| LSP Identification                         | Label Switching Path (LSP) identifier.                                                                                                                                                                                                                                            | IPCore | Configuration    |
| Name                                       | Segment name.                                                                                                                                                                                                                                                                     | IPCore | Configuration    |
| FRRTunnelName                              | Name of the Fast Reroute backup TE tunnel for the given MPLS TE tunnel segment.                                                                                                                                                                                                   | IPCore | Configuration    |
| FRRTunnelState                             | Indicates the status of the Fast Reroute backup tunnel: <i>ready</i> when the primary tunnel is in working condition; <i>active</i> when there is a failure in the primary tunnel and the backup is in use; <i>not configured</i> if the primary has no designated backup tunnel. | IPCore | Configuration    |
| AverageBandwidth                           | The current bandwidth used to automatically allocate the tunnel's bandwidth.                                                                                                                                                                                                      | IPCore | Configuration    |
| In Interface                               | Incoming interface (if not a head segment).                                                                                                                                                                                                                                       | IPCore | Configuration    |
| In Label                                   | Incoming label (if not a head segment).                                                                                                                                                                                                                                           | IPCore | Configuration    |
| Out Interface                              | Outgoing interface (if not a tail segment).                                                                                                                                                                                                                                       | IPCore | Configuration    |
| Out Label                                  | Outgoing label (if not a tail segment).                                                                                                                                                                                                                                           | IPCore | Configuration    |
| Source Address                             | Source IP address of the tunnel.                                                                                                                                                                                                                                                  | IPCore | Configuration    |
| Destination Address                        | Destination IP address of the tunnel.                                                                                                                                                                                                                                             | IPCore | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of MPLS TE Network layer topology.

# Service Alarms

The following alarms are supported for this technology:

- MPLS TE Tunnel Down/MPLS TE Tunnel Up
- MPLS TE Tunnel Flapping/MPLS TE Tunnel Up or Down
- MPLS TE FRR State Changed to Active/ Ready

These alarms are disabled by default.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 16

## Pseudowire Emulation Edge to Edge

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This chapter describes the level of support that Cisco ANA provides for Pseudowire Emulation Edge to Edge (PWE3), as follows:

- [Technology Description, page 16-1](#)
- [Information Model Objects \(IMOs\), page 16-2](#)
- [Vendor-Specific Inventory and IMOs](#)
- [Network Topology, page 16-3](#)
- [Service Alarms, page 16-3](#)

## Technology Description

### PWE3

PWE3 provides methods for carrying networking services (such as ATM, Ethernet, TDM, and SONET/SDH) over a packet-switched network (PSN) as outlined in RFC 3985. It is a point-to-point connection between pairs of PE routers. It emulates services like Ethernet over an underlying core MPLS network through encapsulation into a common MPLS format, thus allowing carriers to converge their services with an MPLS network.

### TDM PW

TDM Pseudowire is a widely used method for carrying Time Division Multiplexed E1, T1, E3, or T3 circuits across PSNs. It enables:

- Enterprises to run voice, video, and legacy data over the PSN
- Service providers to provide revenue-generating legacy voice and data services over the PSN
- Data carriers to offer PSN-based leased and private lines

## ATM PW

ATM Pseudowire (RFC 4816) is a transparent cell transport service that allows migration of ATM services to a PSN without having to provision the ATM subscriber or CE devices. ATM CEs view the ATM transparent cell transport service as if they were directly connected via a TDM leased line. This service is used as an internal function in an ATM service provider's network as a way to connect existing ATM switches via a higher-speed PSN, or to provide ATM backhaul services for remote access to existing ATM networks.

## PW-to-TE Tunnel Mapping

PW-to-TE Tunnel Mapping (RFC 5602) permits operation of pseudowire services across MPLS PSNs by mapping pseudowires to MPLS TE tunnels.

## Information Model Objects (IMOs)

This section describes the following IMO:

- [PTP Layer 2 MPLS Tunnel Interface \(IPTPLayer2MplsTunnel\)](#)

## PTP Layer 2 MPLS Tunnel Interface

The network/data link layer [PTP Layer 2 MPLS Tunnel Interface](#) object is bound by its Containing Termination Points attribute to a data link layer interface object. It is accessed primarily by [Label Switching Entity](#).

**Table 16-1** *PTP Layer 2 MPLS Tunnel Interface (IPTPLayer2MplsTunnel)*

| Attribute Name                             | Attribute Description                                                              | Scheme | Polling Interval |
|--------------------------------------------|------------------------------------------------------------------------------------|--------|------------------|
| Local and Remote Router Addresses          | Local and remote router IP addresses                                               | IPCore | Configuration    |
| Local and Remote Virtual Connection Labels | Local and remote virtual connection labels                                         | IPCore | Configuration    |
| Tunnel Identification                      | Tunnel identifier                                                                  | IPCore | Configuration    |
| Tunnel Status                              | Tunnel status ( <i>Unknown</i> , <i>Up</i> , <i>Down</i> )                         | IPCore | Configuration    |
| Local and Remote Tunnel Interface          | Local and remote tunnel interface Object Identifier                                | IPCore | Configuration    |
| IANA Type                                  | Internet Assigned Numbers Authority (IANA) type of the sublayer                    | N/A    | N/A              |
| Containing Termination Points              | Underlying termination points (connection or physical)                             | IPCore | N/A              |
| Contained Connection Termination Points    | Bound connection termination points ( <a href="#">Tunnel Container</a> )           | IPCore | N/A              |
| Pseudowire Type                            | The MPLS pseudowire type (for example, <i>Ethernet</i> , <i>SAToP</i> , and so on) | IPCore | Configuration    |
| Preferred Path Tunnel                      | The Object Identifier of the preferred path                                        | IPCore | Configuration    |



**Table 16-1** PTP Layer 2 MPLS Tunnel Interface (IPTPLayer2MplsTunnel) (continued)

| Attribute Name     | Attribute Description        | Scheme | Polling Interval |
|--------------------|------------------------------|--------|------------------|
| Local MTU          | The local MTU                | IPCore | Configuration    |
| Remote MTU         | The remote MTU               | IPCore | Configuration    |
| Peer Status        | Status of the signaling peer | IPCore | Configuration    |
| Signaling Protocol | The signaling protocol       | IPCore | Configuration    |
| VFI Name           | The name of the VFI          | IPCore | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA discovers PWE3 Network layer topology by searching for matches between the local and remote router IP addresses in any one-hop-away remote side's [PTP Layer 2 MPLS Tunnel Interface](#). In particular, it compares the local and remote router IP addresses and tunnel identifications.

## Service Alarms

The following alarm is supported for this technology:

- Layer 2 Tunnel Down/Layer 2 Tunnel Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 17

## Ethernet (IEEE 802.3)

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This chapter describes the level of support that Cisco ANA provides for Ethernet, as follows:

- [Technology Description, page 17-1](#)
- [Information Model Objects \(IMOs\), page 17-6](#)
- [Vendor-Specific Inventory and IMOs, page 17-22](#)
- [Network Topology, page 17-24](#)
- [Service Alarms, page 17-25](#)

## Technology Description

### Ethernet (IEEE 802.3)

Ethernet refers to the family of LAN products covered by the IEEE 802.3 standard that defines the carrier sense multiple access collision detect (CSMA/CD) protocol. Four data rates are currently defined for operation over optical fiber and twisted-pair cables: 10Base-T Ethernet (10 Mb/s), Fast Ethernet (100 Mb/s), Gigabit Ethernet (1000 Mb/s) and 10-Gigabit Ethernet (10 Gb/s).

The IEEE 802.3 standard provides MAC (Layer 2) addressing, duplexing, differential services, and flow control attributes, and various physical (Layer 1) definitions, with media, clocking, and speed attributes. It also provides a [LAG](#) (similar to [EtherChannel](#)) definition for providing both higher link capacity and availability.

### VLAN (IEEE 802.1Q)

A virtual LAN (VLAN), is a logical group of hosts that communicate as if they were attached to the same network broadcast domain, even though they do not share the same physical location or network switch. Although much like a physical LAN, VLAN hosts can be grouped together even if they are not located on the same network switch. Because a VLAN is a logical entity, its creation and reconfiguration is done through software, rather than by physically locating devices.

IEEE 802.1Q, or VLAN Tagging, is an IEEE standard allowing multiple bridged networks to transparently share the same physical network link without leakage. IEEE 802.1Q (and its shortened form, dot1q) is used to refer to the encapsulation protocol used to implement this mechanism over Ethernet networks.

## QinQ (IEEE802.1ad)

QinQ (IEEE802.1) tagging (also known as dot1q tunneling) is a technology that allows the nesting of an additional VLAN tag on a packet, in addition to an existing one. According to the standard, either VLAN tag is an 802.1Q header.

QinQ allows service providers to use a single VLAN to support customers who have multiple VLANs. The core service-provider network carries traffic with double-tagged, stacked VLAN (802.1Q-in-Q) headers of multiple customers while maintaining the VLAN and Layer 2 protocol configurations of each customer and without affecting the traffic of other customers.

## LAG

A Link Aggregation Group (LAG) is a group of two or more network links bundled together to appear as a single link based on the IEEE 802.3ad standard. For instance, bundling two 100-Mb/s network interfaces into a single link creates one 200-Mb/s link. A LAG may include two or more network cards and two or more cables, but the software sees the link as one logical link.

A LAG provides capacity increase, load balancing, and higher link availability, which prevents the failure of any single component link leading to a disruption of the communications between the interconnected devices.

## EtherChannel

EtherChannel is Cisco's link aggregation port trunking technology. Like [LAG](#), it unifies physical Ethernet links into one link to provide high-speed links between switches, routers, and servers. An EtherChannel can be formed from two to eight active Fast Ethernet, Gigabit Ethernet, or 10 Gigabit Ethernet ports. It also provides fault tolerance in the form of from one to eight inactive failover ports, which can also be aggregated and which become active if the other active ports fail. EtherChannel is primarily a backbone network technology, providing up to 800 Mbps, 8 Gbps, or 80 Gbps of aggregate bandwidth depending on the speeds of the underlying links (100 Mbps, 1 Gbps, or 10 Gbps). Cisco's Virtual Switching System also provides Multichassis EtherChannel (MEC), in which ports can be aggregated toward different physical chassis, forming a single virtual switch.

## Metro Ethernet

A Metro Ethernet is a computer network based on Ethernet standards covering a metropolitan area. It is commonly used as a metropolitan access network (MAN) to connect subscribers and businesses to a WAN, such as the Internet. Large businesses can also use Metro Ethernet to connect branch offices to their intranets.

A typical service-provider Metro Ethernet network is a collection of Layer 2 or Layer 3 switches or routers, connected through optical fiber, with a ring, hub-and-spoke (star), full mesh, or partial mesh topology. The network will also have a hierarchy: core, distribution, and access. The core in most cases is an existing IP/MPLS backbone.

Ethernet on the MAN can be used as pure Ethernet, Ethernet over SDH, Ethernet over MPLS, or Ethernet over dense wavelength-division multiplexing (DWDM). Pure Ethernet deployments are cheap but less reliable and scalable, and thus are usually limited to small-scale or experimental deployments. SDH deployments are useful when there is an existing SDH infrastructure already in place, its main

shortcoming being the loss of flexibility in bandwidth management due to the rigid hierarchy imposed by the SDH network. MPLS deployments are costly but highly reliable and scalable, and are typically used by large service providers.

## STP

Spanning Tree Protocol (STP) is a Layer 2 link management protocol that provides path redundancy while preventing undesirable loops in the network. For a Layer 2 Ethernet network to function properly, only one active path can exist between any two devices.

STP defines a tree with a root bridge and a loop-free path from the root to all network devices in the Layer 2 network. STP forces redundant data paths into a standby (blocked) state. If a network segment in the spanning tree fails and a redundant path exists, the STP algorithm recalculates the spanning tree topology and activates the standby path.

Cisco ANA STP modeling supports devices that use the following STP variants:

- STP as defined in the 802.1D standard
- Rapid Spanning Tree Protocol (RSTP) as defined in the 802.1w standard
- Per-VLAN STP (PvSTP and PvSTP+), which are proprietary Cisco protocols, or any per-VLAN spanning tree protocol
- Multiple Spanning Tree protocol (MST) as defined in the 802.1s standard

Note that Cisco ANA does not support these STP modes when they are configured along with a bridge group.

## SVI

A switch virtual interface (SVI) is a VLAN of switch ports, represented by one interface to a routing or bridging system. There is no physical interface for the VLAN. The SVI provides the Layer 3 processing for packets from all switch ports associated with the VLAN.

There is one-to-one mapping between a VLAN and SVI. Only a single SVI can be mapped to a VLAN, and the SVI cannot be activated unless associated with a physical port.

SVIs simplify VLAN routing by providing default gateway for the VLAN. They also provide layer 3 switch connectivity to the switch, and provide fallback bridging when required for non routable protocols.

## VTP

VLAN Trunk (or Trunking) Protocol (VTP) is a Cisco proprietary Layer 2 messaging protocol that reduces administrative chores in a switched network by managing the addition, deletion, and renaming of VLANs on a network-wide basis. It permits configuration of VLANs on a single VTP server, with the VLAN distributed through all switches in the domain. To enable this, VTP carries VLAN information to all the switches in the VTP domain, using advertisements sent over Inter-Switch Link (ISL), 802.1q, IEEE 802.10 or LAN Emulation (LANE) trunks. VTP traffic is sent over the management VLAN (VLAN1), so all VLAN trunks must be configured to pass VLAN1.

## VPLS

Virtual Private LAN Services (VPLS) is a class of Layer 2 VPN that provides Ethernet-based multipoint-to-multipoint communication over MPLS networks. It allows geographically dispersed sites to share an Ethernet broadcast domain by connecting sites through pseudowires. The network then emulates the function of a LAN switch or bridge to connect the different LAN segments to create a single bridged (Ethernet) LAN.

VPLS uses the provider core to join multiple attachment circuits together to simulate a virtual bridge that connects the multiple attachment circuits together. From a customer point of view, there is no topology for VPLS. All of the CE devices appear to connect to a logical bridge emulated by the provider core. The logical bridge performs MAC address learning, just like a physical bridge.

The Virtual Switching Instance (VSI), also known as the Virtual Forwarding Instance (VFI), is the main component in the PE router which constructs the logical bridge. All VSIs which construct a provider logical bridge are connected with MPLS PWs.

Learning is done based on the customer Ethernet frame arriving at the VSI. A Forwarding Information Base (FIB) keeps track of the mapping of customer Ethernet frame addressing and the appropriate pseudowire to use.

## H-VPLS

Hierarchical VPLS (H-VPLS) improves the scalability characteristics of VPLS by reducing signaling overhead and packet replication requirements for the provider edge. Two types of provider edge devices are defined in this model:

- User-facing provider edge (u-PE)
- Network provider edge (n-PE)

Customer edge devices connect to u-PEs directly and aggregate VPLS traffic before it reaches the n-PE, where the VPLS forwarding takes place based on the VSI. In this hierarchical model, u-PEs are expected to support Layer 2 switching and to perform normal bridging functions. Cisco VPLS uses 802.1Q Tunneling, a double 802.1Q or QinQ encapsulation, to aggregate traffic between the u-PE and n-PE. The QinQ trunk becomes an access port to a VPLS instance on an n-PE.

## Carrier Ethernet

Cisco Carrier Ethernet uses high-bandwidth Ethernet technology to provide Internet access and WAN communications to business and consumer LANs. It enables users to connect their LANs to service provider networks via the same interface they use to attach other network elements. It provides a transparent service that connects LANs in distant locations together as if they were one network. Users can manage these connected networks using VLAN tools that group computers together logically, no matter where they physically reside.

Carrier Ethernet is commonly deployed in three ways:

- Conventional Ethernet—The least expensive type of system, but difficult to modify or expand.
- Ethernet over Synchronous Digital Hierarchy (SDH)—An ideal solution where an SDH infrastructure already exists, but is relatively inflexible and does not always offer the desired degree of management when bandwidth usage varies greatly.
- Ethernet over MPLS—Offers scalability and bandwidth management but is the most expensive technology of the three.

To extend Ethernet to a global network that serves multiple customers, it had to be extensively upgraded to handle fault tolerance, service levels and continuous traffic changes. Carrier Ethernet standards are set via the Metro Ethernet Forum (MEF).

## REP

Cisco Resilient Ethernet Protocol (REP) is a new technology implemented on Cisco Carrier Ethernet switches and intelligent service edge routers. It extends network resiliency across Cisco IP Next-Generation Network (NGN) Carrier Ethernet Design. Requiring no hardware upgrades, REP is designed to provide network and application convergence within 50 ms. In some scenarios, the network convergence times may increase to within 250 ms, but a 250-ms convergence time is still expected to have limited or no discernable effect on most network applications. REP is a segment protocol that integrates easily into existing Carrier Ethernet networks. It is not intended to replace STP, but allows network architects to limit the scope of STP domains. Since Cisco REP can also notify STP about potential topology changes, it allows for interoperability with STP. Ideally, REP can be positioned as a migration strategy from legacy spanning tree domains.

Because REP is a distributed and secure protocol, it does not rely on a master node controlling the status of the ring. Hence failures can be detected locally either through loss of signal (LOS) or loss of neighbor adjacency. Any REP port can initiate a switchover as long as it has acquired the secure key to unblock the alternate port. By default, REP elects an alternate port unless the administrator defines a preferred port. For optimal bandwidth usage and for traffic engineering, REP supports load balancing per group of VLANs.

## CFM

Ethernet Connectivity Fault Management (CFM) is an end-to-end, per-service-instance Ethernet layer operations, administration, and maintenance (OAM) protocol. It includes proactive connectivity monitoring, fault verification, and fault isolation for large Ethernet MANs and WANs. “End-to-end” can mean PE-to-PE or CE-to-CE. A service can be identified as a service provider VLAN (S-VLAN) or an Ethernet Virtual Connection (EVC) service.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [Link Aggregation Group \(ILinkAggregationGroup802dot3ad\)](#)
- [Link Aggregation Group Port Entry \(ILagPortEntry\)](#)
- [Ethernet Interface \(IEthernet\)](#)
- [Ethernet Physical \(IPhysicalLayer\)](#)
- [Virtual LAN Interface \(IVlanInterface\)](#)
- [Virtual LAN Entry \(IVlanEntry\)](#)
- [Virtual LAN Multiplexer \(IVlanEncapMux\)](#)
- [Virtual LAN Encapsulation \(IEEE802\)](#)
- [Virtual LAN Mapping \(IVlanMapping\)](#)
- [Data Link Aggregation Container \(IDataLinkAggregationContainer\)](#)
- [Spanning Tree Protocol Service \(IStpService\)](#)
- [Multiple Spanning Tree Protocol Service \(IMstService\)](#)
- [Multiple Spanning Tree Protocol Properties \(IMstProperties\)](#)
- [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)
- [Multiple Spanning Tree Protocol Instance Information \(IMstInstanceInfo\)](#)
- [Per-VLAN Spanning Tree Protocol Service \(IPvstpService\)](#)
- [Per-VLAN Spanning Tree Protocol Instance Information \(IPvstpInstanceInfo\)](#)
- [Per-VLAN Spanning Tree Protocol Port Information \(IPvstPortInfo\)](#)
- [Rapid Spanning Tree Protocol Instance Information \(IRstpInstanceInfo\)](#)
- [Spanning Tree Protocol Port Information \(IStpPortInfo\)](#)
- [Multiple Spanning Tree Protocol Port Information \(IMstPortInfo\)](#)
- [Virtual Switch Interface \(IVsi\)](#)
- [Pseudowire Properties \(IPseudowireProperties\)](#)
- [VLAN Tagged Interface \(IVLANTaggedInterface\)](#)
- [Ethernet Flow Point \(IEfp\)](#)
- [VLAN Trunking Protocol Service \(IVtpService\)](#)
- [CFM Service \(ICfmService\)](#)
- [CFM Maintenance Domain \(IMaintenanceDomain\) \(continued\)](#)
- [CFM Maintenance Point \(IMaintenancePoint\)](#)
- [CFM Maintenance Endpoints \(IMaintenanceEndPoints\)](#)
- [CFM Maintenance Association \(IMaintenanceAssociation\)](#)
- [CFM Maintenance Intermediate Point \(IMaintenanceIntermediatePoint\)](#)



## Link Aggregation Group

The data link layer [Link Aggregation Group](#) object aggregates multiple [Ethernet Interfaces](#), which it is bound to by its Containing Termination Points attribute. It is accessed primarily by the [Virtual LAN Multiplexer](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Common Components](#).

**Table 17-1** *Link Aggregation Group (ILinkAggregationGroup802dot3ad)*

| Attribute Name                           | Attribute Description                                                | Scheme | Polling Interval |
|------------------------------------------|----------------------------------------------------------------------|--------|------------------|
| Group Number                             | Group identifier of the aggregated Ethernet interfaces               | Any    | Configuration    |
| Bandwidth                                | Accumulated bandwidth of all aggregated Ethernet interfaces in Mb/s  | Any    | Configuration    |
| Aggregation Protocol                     | Aggregation protocol ( <i>None, LACP, PAGP</i> )                     | Any    | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer      | N/A    | N/A              |
| Containing Connection Termination Points | Underlying termination points ( <a href="#">Ethernet Interface</a> ) | Any    | N/A              |
| Contained Connection Termination Points  | Bound connection termination points                                  | Any    | N/A              |

## Link Aggregation Group Port Entry

The [Link Aggregation Group Port Entry](#) object describes the Link Aggregation Control configuration parameters for each aggregation port of a [Link Aggregation Group](#).

**Table 17-2** *Link Aggregation Group Port Entry (ILagPortEntry)*

| Attribute Name                                       | Attribute Description                                | Scheme | Polling Interval |
|------------------------------------------------------|------------------------------------------------------|--------|------------------|
| Actor and Partner Administrative Keys                | Actor and partner administrative keys                | Any    | Configuration    |
| Actor and Partner Operational Keys                   | Actor and partner operational keys                   | Any    | Configuration    |
| Selected and Attached Aggregation Identification     | Selected and attached aggregation identifier         | Any    | Configuration    |
| Actor Port                                           | Actor port                                           | Any    | Configuration    |
| Actor Port Priority                                  | Actor port priority                                  | Any    | Configuration    |
| Partner Administrative and Operational Port          | Partner administrative and operational port          | Any    | Configuration    |
| Partner Administrative and Operational Port Priority | Partner administrative and operational port priority | Any    | Configuration    |
| Actor and Partner Administrative States              | Actor and partner administrative states              | Any    | Configuration    |
| Actor and Partner Operational States                 | Actor and partner operational states                 | Any    | Configuration    |

## Ethernet Interface

The data link layer [Ethernet Interface](#) object is bound by its Containing Termination Points attribute to a physical layer interface ([Ethernet Physical](#)) object. It is accessed primarily by the [Virtual LAN Multiplexer/Interface](#), [Link Aggregation Group](#), [Cisco Ethernet Channel](#) or [IP Interface](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

**Table 17-3** *Ethernet Interface (IEthernet)*

| Attribute Name                           | Attribute Description                                           | Scheme  | Polling Interval |
|------------------------------------------|-----------------------------------------------------------------|---------|------------------|
| MAC Address                              | MAC address                                                     | Product | Configuration    |
| Duplex Mode                              | Duplex mode ( <i>Unknown, Full, Half</i> )                      | Any     | Configuration    |
| Output Flow Control                      | Output flow control ( <i>Enable, Disable</i> )                  | Any     | Configuration    |
| Input Flow Control                       | Input flow control ( <i>Enable, Disable</i> )                   | Any     | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A     | N/A              |
| Containing Connection Termination Points | Underlying termination points (connection or physical)          | Any     | N/A              |
| Contained Connection Termination Points  | Bound Connection Termination Point                              | Any     | N/A              |
| Port Type                                | The port type                                                   | Any     | N/A              |

## Ethernet Physical

The physical layer [Ethernet Physical](#) object is bound by its Containing Termination Points attribute to a [Port Connector](#) object. It is accessed by the data link layer [Ethernet Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 17-4** *Ethernet Physical (IPhysicalLayer)*

| Attribute Name                                                                            | Attribute Description | Scheme | Polling Interval |
|-------------------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as those of <a href="#">Physical Layer (IPhysicalLayer)</a> . |                       |        |                  |

## Virtual LAN Interface

The data link layer [Virtual LAN Interface](#) object, which is used in a switched LAN environment, is bound by its Containing Termination Points attribute to an [Ethernet Interface](#) object. It is accessed primarily by the network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

**Table 17-5** *Virtual LAN Interface (IVlanInterface)*

| Attribute Name                           | Attribute Description                                                                                         | Scheme  | Polling Interval |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------|------------------|
| Mode                                     | VLAN mode ( <i>Access, Trunk, 802.1Q Tunnel</i> )                                                             | Any     | Configuration    |
| Native VLAN Identification               | VLAN identifier, used for untagged received and transmitted frames                                            | Any     | Configuration    |
| Virtual LAN Table                        | Array of <a href="#">Virtual LAN Entries</a> (instances of IVlanEntry) configured for this VLAN interface     | Any     | Configuration    |
| VlanMappings                             | Array of all <a href="#">Virtual LAN Mappings</a> (instances of IVlanMapping) defined for this VLAN interface | Product | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer                                               | N/A     | N/A              |
| Containing Connection Termination Points | Underlying termination points (connection or physical)                                                        | Any     | N/A              |
| Contained Connection Termination Points  | Bound connection termination points                                                                           | Any     | N/A              |

## Virtual LAN Entry

The [Virtual LAN Entry](#) object describes the association of a [Virtual LAN Interface](#), which operates in Trunk mode, to one of the bridged Virtual LANs configured in the device.

**Table 17-6** *Virtual LAN Entry (IVlanEntry)*

| Attribute Name      | Attribute Description                                                | Scheme | Polling Interval |
|---------------------|----------------------------------------------------------------------|--------|------------------|
| VLAN Identification | VLAN identifier of received and transmitted frames                   | Any    | Configuration    |
| Encapsulation Type  | VLAN encapsulation ( <i>Unknown, ISL, IEEE 802.10, IEEE 802.1Q</i> ) | Any    | Configuration    |
| Upper Layer         | Upper layer Object Identifier (OID)                                  | Any    | Configuration    |

## Virtual LAN Multiplexer

The [Virtual LAN Multiplexer](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to an [Ethernet Interface](#) object. It is accessed primarily by the data link layer [Virtual LAN Encapsulations](#) bound by its Contained Connection Termination Points attribute.

**Table 17-7** *Virtual LAN Multiplexer (IVlanEncapMux)*

| Attribute Name                          | Attribute Description                                                              | Scheme | Polling Interval |
|-----------------------------------------|------------------------------------------------------------------------------------|--------|------------------|
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                    | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points ( <a href="#">Ethernet Interface</a> )               | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points ( <a href="#">Virtual LAN Encapsulations</a> ) | Any    | N/A              |

## Virtual LAN Encapsulation

The data link layer [Virtual LAN Encapsulation](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to a [Virtual LAN Multiplexer](#) object. It is accessed primarily by the Network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

**Table 17-8** *Virtual LAN Encapsulation (IEEE802)*

| Attribute Name                           | Attribute Description                                           | Scheme | Polling Interval |
|------------------------------------------|-----------------------------------------------------------------|--------|------------------|
| VLAN Identification                      | VLAN identifier                                                 | Any    | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A    | N/A              |
| Containing Connection Termination Points | Underlying termination points (connection or physical)          | Any    | N/A              |
| Contained Connection Termination Points  | Bound Connection Termination Point                              | Any    | N/A              |

## Virtual LAN Mapping

The data link layer [Virtual LAN Mapping](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to a [Virtual LAN Multiplexer](#) object. It is accessed primarily by the Network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

**Table 17-9** *Virtual LAN Mapping (IVlanMapping)*

| Attribute Name        | Attribute Description                                                                                          | Scheme  | Polling Interval |
|-----------------------|----------------------------------------------------------------------------------------------------------------|---------|------------------|
| Direction             | Describes whether the VLAN mapping is defined in the egress or ingress direction                               | Product | Configuration    |
| VLANRewriteDefinition | The rewriting actions (push tag, pop tag, and so on.) to be done over the frames which fit the match criteria. | Product | Configuration    |
| VLANMatchCriteria     | Defines the frames which undergo the VLAN mapping.                                                             | Product | Status           |
| Drop                  | Defines if the frame should be dropped, instead of undergoing a rewrite definition.                            | Product | Status           |

## Data Link Aggregation Container

The [Data Link Aggregation Container](#) object aggregates or contains a single type of data link aggregation, such as [Link Aggregation Group](#) or [Cisco Ethernet Channel](#).

**Table 17-10** *Data Link Aggregation Container (IDataLinkAggregationContainer)*

| Attribute Name         | Attribute Description                                                                                                           | Scheme | Polling Interval |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Data Link Aggregations | Array of single-type data link aggregations ( <a href="#">Link Aggregation Group</a> , <a href="#">Cisco Ethernet Channel</a> ) | Any    | Configuration    |
| Type                   | Aggregation type ( <i>Null</i> , <i>Ethernet Link Aggregator</i> )                                                              | Any    | Configuration    |

## Spanning Tree Protocol Service

The [Spanning Tree Protocol Service](#) object is used in a switched LAN environment. It describes the Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

**Table 17-11** *Spanning Tree Protocol Service (IStpService)*

| Attribute Name        | Attribute Description                                                                                                                       | Scheme | Polling Interval |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Protocol Type         | Spanning Tree Protocol type ( <i>Unknown</i> , <i>STP</i> , <i>RSTP</i> , <i>PVSTP</i> , <i>MST</i> )                                       | Any    | Configuration    |
| Current Maximum Age   | The current used value for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds)                    | Any    | Configuration    |
| Current Hello Time    | The current used value for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds)              | Any    | Configuration    |
| Current Forward Delay | The current used value for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any    | Configuration    |

**Table 17-11** *Spanning Tree Protocol Service (IStpService) (continued)*

| Attribute Name             | Attribute Description                                                                                                                                                                                                           | Scheme | Polling Interval |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Instance Information Table | Array of <a href="#">Spanning Tree Protocol Instance Information</a>                                                                                                                                                            | Any    | Configuration    |
| UplinkFast State           | Indicates whether the UplinkFast feature is enabled ( <i>true, false</i> )                                                                                                                                                      | Any    | Configuration    |
| BackboneFast State         | Indicates whether the BackboneFast feature is enabled ( <i>true, false</i> )                                                                                                                                                    | Any    | Configuration    |
| Bridge Maximum Age         | The value that all bridges should use (when this bridge is acting as the root) for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds)                                                | Any    | Configuration    |
| Bridge Hello Time          | The value that all bridges should use (when this bridge is acting as the root) for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds)                                          | Any    | Configuration    |
| Bridge Forward Delay       | The current used value, and the value that all bridges should use (when this bridge is acting as the root) for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any    | Configuration    |

All additional attributes are the same as [System Service \(ISystemService\)](#)

## Multiple Spanning Tree Protocol Service

The [Multiple Spanning Tree Protocol Service](#) object is used in a switched VLAN environment. It describes the Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

**Table 17-12** *Multiple Spanning Tree Protocol Service (IMstService)*

| Attribute Name      | Attribute Description                      | Scheme | Polling Interval |
|---------------------|--------------------------------------------|--------|------------------|
| Protocol Properties | Multiple Spanning Tree Protocol properties | Any    | Configuration    |

All additional attributes are the same as [Spanning Tree Protocol Service \(IStpService\)](#).

## Multiple Spanning Tree Protocol Properties

The [Multiple Spanning Tree Protocol Properties](#) object, used in a switched VLAN environment. It describes the Multiple Spanning Tree Protocol properties. It is accessed only by the [Multiple Spanning Tree Protocol Service](#)'s Protocol Properties attribute.

**Table 17-13** *Multiple Spanning Tree Protocol Properties (IMstProperties)*

| Attribute Name       | Attribute Description                                                      | Scheme | Polling Interval |
|----------------------|----------------------------------------------------------------------------|--------|------------------|
| Force Version        | Force version ( <i>Unknown, STP, RSTP, PVSTP, MST</i> )                    | Any    | Configuration    |
| Configuration Format | Configuration format used by this device and negotiated with other devices | Any    | Configuration    |
| Region Name          | Region name used by this device and negotiated with other devices          | Any    | Configuration    |
| Revision Level       | Revision level used by this device and negotiated with other devices       | Any    | Configuration    |

**Table 17-13 Multiple Spanning Tree Protocol Properties (IMstProperties) (continued)**

| Attribute Name     | Attribute Description                                      | Scheme | Polling Interval |
|--------------------|------------------------------------------------------------|--------|------------------|
| External Root Cost | External root cost of this Multiple Spanning Tree Protocol | Any    | Configuration    |
| Maximum Instances  | Maximum Multiple Spanning Tree Protocol instances          | Any    | Configuration    |

## Spanning Tree Protocol Instance Information

The following [Rapid Spanning Tree Protocol Instance Information](#) objects describe the instance information associated with and accessed by the [Multiple Spanning Tree Protocol Service](#)'s Instance Information Table attribute.

**Table 17-14 Spanning Tree Protocol Instance Information (IStpInstanceInfo)**

| Attribute Name             | Attribute Description                                                                      | Scheme | Polling Interval |
|----------------------------|--------------------------------------------------------------------------------------------|--------|------------------|
| Object Identification      | Instance Object Identifier (OID)                                                           | Any    | Configuration    |
| Identification             | Bridge identifier (MAC address)                                                            | Any    | Configuration    |
| Priority                   | Bridge priority in the Spanning Tree Protocol                                              | Any    | Configuration    |
| Designated Root and Bridge | MAC addresses of the designated root and bridge in the spanning tree                       | Any    | Configuration    |
| Root Cost                  | Root cost value for this bridge                                                            | Any    | Configuration    |
| Is Root                    | Is this bridge currently the root of the Spanning Tree Protocol?<br>( <i>True, False</i> ) | Any    | Configuration    |
| Root Port Identification   | Object Identifier (OID) of the bridge port used to reach the designated root               | Any    | Configuration    |
| Port Information Table     | Array of <a href="#">Spanning Tree Protocol Port Information</a>                           | Any    | Configuration    |

## Multiple Spanning Tree Protocol Instance Information

**Table 17-15 Multiple Spanning Tree Protocol Instance Information (IMstInstanceInfo)**

| Attribute Name          | Attribute Description                               | Scheme | Polling Interval |
|-------------------------|-----------------------------------------------------|--------|------------------|
| Instance Identification | Multiple Spanning Tree Protocol instance identifier | Any    | Configuration    |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)

## Per-VLAN Spanning Tree Protocol Service

The [Per-VLAN Spanning Tree Protocol Service](#) object is used in a switched VLAN environment. It describes the Per-VLAN Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

**Table 17-16** *Per-VLAN Spanning Tree Protocol Service (IPvstpService)*

| Attribute Name | Attribute Description                                                        | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------------------|--------|------------------|
| UplinkFast     | Indicates whether the UplinkFast feature is enabled ( <i>true, false</i> )   | Any    | Configuration    |
| BackboneFast   | Indicates whether the BackboneFast feature is enabled ( <i>true, false</i> ) | Any    | Configuration    |

## Per-VLAN Spanning Tree Protocol Instance Information

**Table 17-17** *Per-VLAN Spanning Tree Protocol Instance Information (IPvstpInstanceInfo)*

| Attribute Name                   | Attribute Description                                                                                                                                                                                                          | Scheme | Polling Interval |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Protocol Type                    | Spanning tree protocol type ( <i>Unknown, STP, RSTP, PVSTP, MST</i> )                                                                                                                                                          | Any    | Configuration    |
| Current and Bridge Maximum Age   | The current used value, and the value that all bridges should use when this bridge is acting as the root, for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds)                    | Any    | Configuration    |
| Current and Bridge Hello Time    | The current used value, and the value that all bridges should use when this bridge is acting as the root, for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds)              | Any    | Configuration    |
| Current and Bridge Forward Delay | The current used value, and the value that all bridges should use when this bridge is acting as the root, for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any    | Configuration    |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)

## Per-VLAN Spanning Tree Protocol Port Information

**Table 17-18** *Per-VLAN Spanning Tree Protocol Port Information (IPvstpPortInfo)*

| Attribute Name | Attribute Description                                                    | Scheme | Polling Interval |
|----------------|--------------------------------------------------------------------------|--------|------------------|
| PortFast State | Indicates whether PortFast is enabled on the port ( <i>true, false</i> ) | Any    | Configuration    |



## Rapid Spanning Tree Protocol Instance Information

**Table 17-19** *Rapid Spanning Tree Protocol Instance Information (IRstpInstanceInfo)*

| Attribute Name | Attribute Description                                   | Scheme | Polling Interval |
|----------------|---------------------------------------------------------|--------|------------------|
| Force Version  | Force version ( <i>Unknown, STP, RSTP, PVSTP, MST</i> ) | Any    | Configuration    |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)

## Spanning Tree Protocol Port Information

The following [Spanning Tree Protocol Port Information](#) objects describe the port information associated with and accessed by the [Spanning Tree Protocol Instance Information](#)'s Port Information Table attribute.

**Table 17-20** *Spanning Tree Protocol Port Information (IStpPortInfo)*

| Attribute Name         | Attribute Description                                                                                     | Scheme | Polling Interval |
|------------------------|-----------------------------------------------------------------------------------------------------------|--------|------------------|
| Object Identification  | Port Object Identifier (OID)                                                                              | Any    | Configuration    |
| Priority               | Port priority in the Spanning Tree Protocol                                                               | Any    | Configuration    |
| State                  | Port state ( <i>Unknown, Disable, Blocking, Listening, Learning, Forwarding, Broken, Down, LoopBack</i> ) | Any    | Configuration    |
| Path Cost              | Port path cost, which represents the media speed for this port                                            | Any    | Configuration    |
| Is Edge                | Is this an edge port (connected to a nonbridging device)? ( <i>True, False</i> )                          | Any    | Configuration    |
| Is Point To Point      | Is this port connected to a point-to-point link? ( <i>True, False</i> )                                   | Any    | Configuration    |
| Role                   | Port role ( <i>Unknown, Disable, Backup, Alternative, Designated, Root, Boundary</i> )                    | Any    | Configuration    |
| Port BPDU Guard State  | Indicates whether the PortFast Bridge Protocol Data Unit guard is enabled on the port                     | Any    | Configuration    |
| Port BPDU Filter State | Indicates whether PortFast Bridge Protocol Data Unit filtering is enabled on the port                     | Any    | Configuration    |

## Multiple Spanning Tree Protocol Port Information

**Table 17-21** *Multiple Spanning Tree Protocol Port Information (IMstPortInfo)*

| Attribute Name | Attribute Description                                                                                | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------------------------------------------|--------|------------------|
| Hello Time     | Hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of a second) | Any    | Configuration    |

All additional attributes are the same as [Spanning Tree Protocol Port Information \(IStpPortInfo\)](#)

## Virtual Switching Instance

The [Virtual Switching Instance](#) object represents a Virtual Switching Instance (also known as VFI, Virtual Forwarding Instance) component of a VPLS logical bridge.

**Table 17-22** *Virtual Switch Interface (IVsi)*

| Attribute Name       | Attribute Description                                                                  | Scheme | Polling Interval |
|----------------------|----------------------------------------------------------------------------------------|--------|------------------|
| VPLS Instance Name   | The unique VPLS instance name                                                          | IPCore | Configuration    |
| VPLS VPN ID          | The unique VPN ID in the MPLS core                                                     | IPCore | Configuration    |
| discoveryMode        | The VSI discovery mode ( <i>Manual, BGP, LDP, RADIUS, DNS, MSS/OSS, Unknown</i> )      | IPCore | Configuration    |
| vsMode               | The VSI mode ( <i>point-to-point, multipoint, unknown</i> )                            | IPCore | Configuration    |
| Operational state    | The operational status of the VPLS instance ( <i>up, down</i> )                        | IPCore | Configuration    |
| Administrative state | The configured administrative status of the VPLS instance ( <i>enabled, disabled</i> ) | IPCore | Configuration    |
| Pseudowires          | An array of <a href="#">Pseudowire Properties</a> (IPseudowireProperties).             | IPCore | System           |

## Pseudowire Properties

The [Pseudowire Properties](#) object represents an MPLS pseudowire connecting two or more [Virtual Switching Instances](#).

**Table 17-23** *Pseudowire Properties (IPseudowireProperties)*

| Attribute Name        | Attribute Description                                                                                                                                                   | Scheme | Polling Interval |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Pseudowire OID        | The Object Identifier of the pseudowire                                                                                                                                 | IPCore | System           |
| isSplitHorizonEnabled | Indicates whether split horizon is enabled on the pseudowire ( <i>true, false</i> ). The split horizon policy determines whether packets are returned to the MPLS core. | IPCore | System           |
| isAutoDiscovered      | Indicates how the pseudowire was discovered ( <i>manual, automatic</i> ).                                                                                               | IPCore | System           |

## VLAN Tagged Interface

The [VLAN Tagged Interface](#) object represents a VLAN interface on which both dot1Q and QinQ VLAN are supported.

**Table 17-24** *VLAN Tagged Interface (IVLANTaggedInterface)*

| Attribute Name       | Attribute Description                                                                | Scheme  | Polling Interval |
|----------------------|--------------------------------------------------------------------------------------|---------|------------------|
| InterfaceName        | Name of the VLAN subinterface on which VLAN IDs are configured.                      | Product | Configuration    |
| Inner Vlan Id        | The configured customer-edge VLAN (CE-VLAN) ID.                                      | Product | Configuration    |
| Outer Vlan Id        | The configured service-provider VLAN (SP-VLAN) ID.                                   | Product | Configuration    |
| Encap Type           | The encapsulation type ( <i>dot1Q</i> , <i>QinQ</i> ).                               | Product | Configuration    |
| Match Criteria       | The match criteria compared against the arriving frame's first and second VLAN tags. | Product | Configuration    |
| Operational state    | The operational status of the subinterface that the QinQ resides on.                 | Product | System           |
| Administrative state | The administrative status of the subinterface that the QinQ resides on.              | Product | System           |

## Ethernet Flow Point

The [Ethernet Flow Point](#) object represents a forwarding decision point in provider edge switch routers that allows Layer 2 traffic flow decisions to be made within the interface itself. Any number of EFPs can be configured on a single physical Layer 2 traffic port (usually on the User-Network Interface [UNI] port) and each can manipulate inbound frames in a different manner and make different forwarding decisions. The [Ethernet Flow Point](#) is accessed by a [Virtual LAN Multiplexer](#).

**Table 17-25** *Ethernet Flow Point (IEfp)*

| Attribute Name    | Attribute Description                                                                                                                                                                                              | Scheme  | Polling Interval |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| EfpId             | ID of the Ethernet Flow Point.                                                                                                                                                                                     | Product | Configuration    |
| RewriteParams     | The rewriting actions ( <i>push tag</i> , <i>pop tag</i> , and so on.) which will be done over the frames which fit the match criteria.                                                                            | IPCore  | Configuration    |
| EncapsParams      | Encapsulation parameters (dot.q and dot.ad, IEEE).                                                                                                                                                                 | Product | Configuration    |
| AdminStatus       | The administrative status of the service instance.                                                                                                                                                                 | Product | System           |
| OperStatus        | The operational status of the service instance.                                                                                                                                                                    | Product | System           |
| SplitHorizonGroup | Flag indicating whether a split horizon group is configured for the EFP. If <i>null</i> , no split horizon group is defined. If split horizon is enabled on the EFP, this will always contain the default group 0. | Product | Configuration    |
| matchCriteria     | The EFP match criteria compared against the arriving frame's first and second VLANs tags.                                                                                                                          | IPCore  | Configuration    |

## VLAN Trunking Protocol Service

The [VLAN Trunking Protocol Service](#) object represents a VTP configuration on a switch. It extends [System Service](#).

**Table 17-26** *VLAN Trunking Protocol Service (IVtpService)*

| Attribute Name          | Attribute Description                                                                      | Scheme  | Polling Interval |
|-------------------------|--------------------------------------------------------------------------------------------|---------|------------------|
| Version                 | The VTP version ( <i>Version1, Version2, Version3</i> )                                    | Product | Configuration    |
| OperatingMode           | The VTP mode ( <i>Server, Client, Transparent, Primary Server, Secondary Server, Off</i> ) | Product | Configuration    |
| DomainName              | The VTP domain name                                                                        | Product | Configuration    |
| ConfigurationRevision   | The VTP's configuration revision number                                                    | Product | Configuration    |
| isPruningEnabled        | Indicates whether VTP is enabled on the switch ( <i>True, False</i> )                      | Product | Configuration    |
| isAuthenticationEnabled | Indicates whether VTP authentication is enabled on the switch ( <i>True, False</i> )       | Product | Configuration    |

## CFM Service

The [CFM Service](#) object represents an instance of CFM enabled on a device.

**Table 17-27** *CFM Service (ICfmService)*

| Attribute Name                     | Attribute Description                                                                                                                                                                        | Scheme  | Polling Interval |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| cacheSize                          | The CFM traceroute cache size used by the CFM service.                                                                                                                                       | IP Core | Configuration    |
| maximumCacheSize                   | The CFM traceroute maximum cache size used by the CFM service.                                                                                                                               | IP Core | Configuration    |
| holdTime                           | The configured hold-time value used to indicate to the receiver the validity of traceroute and loopback messages transmitted by this device. The default is 2.5 times the transmit interval. | IP Core | Configuration    |
| version                            | The CFM version running on the device.                                                                                                                                                       | IP Core | Configuration    |
| maintenanceIntermediatePointsTable | An array of all the <a href="#">CFM Maintenance Intermediate Point</a> objects configured on the device.                                                                                     | IP Core | Configuration    |
| maintenanceDomain                  | The <a href="#">CFM Maintenance Domain</a> configured on the device.                                                                                                                         | IP Core | Configuration    |

## CFM Maintenance Domain

The [CFM Maintenance Domain](#) object represents an instance of a CFM management space used to manage and administer a network. A CFM management domain is owned and operated by a single entity and defined by the set of ports internal to it and at its boundary.

**Table 17-28** *CFM Maintenance Domain (IMaintenanceDomain) (continued)*

| Attribute Name         | Attribute Description                                                                                                                                                                                                                                                | Scheme  | Polling Interval |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| name                   | The name of the management domain. This must be unique and cannot be used within a different maintenance level.                                                                                                                                                      | IP Core | Configuration    |
| level                  | The domain level (an integer in the range 0 to 7). Domain levels permit creation of a domain hierarchy. The larger the level value, the larger the domain. For instance, the costumer domain will have a level of 7, and the operator domain will have a level of 0. | IP Core | Configuration    |
| Id                     | The domain ID. Optional and may not be defined. When undefined, the domain name is used as the default value.                                                                                                                                                        | IP Core | Configuration    |
| maintenanceAssociation | A list of the domain's <a href="#">CFM Maintenance Associations</a> . These are the associations represented by the service. In Cisco devices, the domain is mapped to a VLAN.                                                                                       | IP Core | Configuration    |

## CFM Maintenance Point

The [CFM Maintenance Point](#) object represents an instance of a CFM maintenance point configured on one or more of a device's interfaces.

**Table 17-29** *CFM Maintenance Point (IMaintenancePoint)*

| Attribute Name | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Scheme  | Polling Interval |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| macAddress     | The MAC address on the the interface on which the maintenance point is configured. In different interface modes, the MAC address may hold different values. For example, an inward facing interface uses the Bridge-Brain MAC address; an outward facing interface, such as a routed port, uses the port MAC address; and outward facing MEPs on port channels use the Bridge-Brain MAC address of the first member link. When port channel members change, the identities of outward facing MEPs do not have to change. | IP Core | Configuration    |
| Interface      | A link to the interface on which the maintenance point is configured. This property includes all interface types that can be configured with CFM maintenance points.                                                                                                                                                                                                                                                                                                                                                     | IP Core | Configuration    |

## CFM Maintenance Endpoint

The [CFM Maintenance Endpoint](#) object represents an instance of a CFM Maintenance Endpoint (MEP). Unlike MIPs, MEPs are associated by a [CFM Maintenance Association](#) (S-VLAN).

**Table 17-30** CFM Maintenance Endpoints (*IMaintenanceEndPoints*)

| Attribute Name                | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                     | Scheme  | Polling Interval |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Id                            | The ID of the MEP (an integer from 1 and 8191). It identifies the MEP in CFM communications and to catalog CFM frames in the local CFM database. The MEP ID is meaningful throughout the CFM domain and through the maintenance association.                                                                                                                                                                              | IP Core | Configuration    |
| Continuity Check Status       | Current MEP status sent to other MEPs and MIPs via multicast CCMs ( <i>Unknown, MEP active, MEP inactive, MEP enabled, MEP disabled</i> ). CCMs are confined to a domain and S-VLAN.                                                                                                                                                                                                                                      | IP Core | Configuration    |
| direction                     | Direction of the MEP ( <i>inward facing, outward facing</i> ). Inward facing means the MEP communicates through the Bridge Relay function and uses the Bridge-Brain MAC address. Outward facing means that the MEP communicates through the wire. Outward facing MEPs can be configured on routed ports and switch ports. A MIP configuration at a level higher than the level of the outward facing MEP is not required. | IP Core | Configuration    |
| cfmRemoteMaintenanceEndPoints | An array listing all the remote CFM MEPs that were discovered through this MEP. Properties for each remote MEP are used to establish CFM topology between CFM MEPs.                                                                                                                                                                                                                                                       | IP Core | Configuration    |

## CFM Maintenance Association

The [CFM Maintenance Association](#) object models a grouping of [CFM Maintenance Endpoint](#).

**Table 17-31** CFM Maintenance Association (*IMaintenanceAssociation*)

| Attribute Name          | Attribute Description                                                                                   | Scheme  | Polling Interval |
|-------------------------|---------------------------------------------------------------------------------------------------------|---------|------------------|
| name                    | The Association name.                                                                                   | IP Core | Configuration    |
| associationType         | The Association type ( <i>Unknown, Bridge Domain VLAN, Bridge Domain, Port, Pseudowire</i> ).           | IP Core | Configuration    |
| maximalMeps             | The maximum number of MEPs that can be configured on the Maintenance Association.                       | IP Core | Configuration    |
| continuityCheckInterval | The configured time interval between continuity checks performed by the Maintenance Association's MEPs. | IP Core | Configuration    |

**Table 17-31** CFM Maintenance Association (*IMaintenanceAssociation*) (continued)

| Attribute Name        | Attribute Description                                                                                                                                                                                                                                                                              | Scheme  | Polling Interval |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| continuityCheckEnable | Indicates whether continuity checking is enabled for the Association. CFM continuity checks are periodic heartbeat messages exchanged between the MEPs under the association. They allow MEPs to discover each other and <a href="#">CFM Maintenance Intermediate Points</a> to discover the MEPs. | IP Core | Configuration    |
| crossCheckEnable      | Indicates whether cross-checking is enabled for the Association. CFM cross-checking verifies that all end points of a service are operational. It is timer-driven and performed once.                                                                                                              | IP Core | Configuration    |
| direction             | The direction of the association ( <i>up</i> , <i>down</i> , <i>unknown</i> ).                                                                                                                                                                                                                     | IP Core | Configuration    |
| bridge                | Object Identifier of the bridge on which the association (VLAN) is configured.                                                                                                                                                                                                                     | IP Core | Configuration    |
| maintenanceEndPoints  | An array of the <a href="#">CFM Maintenance Endpoint</a> configured within the bounds of the <a href="#">CFM Maintenance Domain</a> .                                                                                                                                                              | IP Core | Configuration    |

## CFM Maintenance Intermediate Point

The [CFM Maintenance Intermediate Point](#) object represents a single instance of a CFM Maintenance Intermediate Point (MIP). Unlike MEPs, MIPs are not grouped by [CFM Maintenance Associations](#) (S-VLAN). Instead, they are grouped by [CFM Maintenance Domain](#) (using the Level parameter) and for all S-VLANs enabled or allowed on a port.

**Table 17-32** CFM Maintenance Intermediate Point (*IMaintenanceIntermediatePoint*)

| Attribute Name | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Scheme  | Polling Interval |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| level          | The level defined for this MIP. This is the same as the Level parameter defined for <a href="#">CFM Maintenance Domains</a> : An integer from 0 to 7, assigned to each MIP for the purpose of creating hierarchical relationships among MIPs. All CFM frames at a level lower than the level assigned to the MIP are stopped and dropped, independent of whether they originate from the wire or relay function. All CFM frames at a higher level than the MIP are forwarded, independent of whether they arrive from the wire or relay function. | IP Core | Configuration    |
| cfmInterface   | The normalized name of the interface on which the MIP is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | IP Core | Configuration    |
| isAutocreated  | Indicates whether this MIP was created automatically ( <i>true</i> ) or by entering properties manually using the command-line interface (CLI) ( <i>false</i> ).                                                                                                                                                                                                                                                                                                                                                                                  | IP Core | Configuration    |
| Vlans          | A list of the VLANs in which this MIP participates. A MIP configured on an interface normally functions via maintenance domain (level) and for all S-VLANs enabled or allowed on that port. To limit its functionality, however, a CFM MIP can also be configured with a list of S-VLANs or associations.                                                                                                                                                                                                                                         | IP Core | Configuration    |
| macAddress     | The MAC address that identifies the CFM entity (for example, <i>bridge-brain MAC</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                           | IP Core | Configuration    |

# Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices. The following sections describe vendor-specific objects for this technology:

- [Cisco Ethernet Channel](#)
- [Cisco REP Service](#)
- [Cisco REP Segment Information](#)
- [Cisco REP Port Information](#)

## Cisco Ethernet Channel

The [Cisco Ethernet Channel](#) data link layer object aggregates multiple [Ethernet Interfaces](#), to which it is bound by its Containing Termination Points attribute. It is accessed primarily by the [Virtual LAN Multiplexer/Interface](#) or [IP Interface](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

**Table 17-33** *Cisco Ethernet Channel (IEthernetChannel)*

| Attribute Name                           | Attribute Description                                                | Scheme | Polling Interval |
|------------------------------------------|----------------------------------------------------------------------|--------|------------------|
| Group Number                             | Group identifier of the aggregated Ethernet interfaces               | Any    | Configuration    |
| Bandwidth                                | Accumulated bandwidth of all aggregated Ethernet interfaces, in Mb/s | Any    | Configuration    |
| Aggregation Protocol                     | Aggregation protocol ( <i>Manual, LACP, PAGP</i> )                   | Any    | Configuration    |
| IANA Type                                | Internet Assigned Numbers Authority (IANA) type of the sublayer      | N/A    | N/A              |
| MAC Address                              | MAC address of the aggregated Ethernet interfaces                    | Any    | Configuration    |
| Administrative Status                    | Administrative status of the aggregated interfaces                   | Any    | Configuration    |
| Operational Status                       | Operational status of the aggregated interfaces                      | Any    | Configuration    |
| Containing Connection Termination Points | Underlying termination points ( <a href="#">Ethernet Interface</a> ) | Any    | N/A              |
| Contained Connection Termination Points  | Bound connection termination points                                  | Any    | N/A              |



## Cisco REP Service

The [Cisco REP Service](#) object represents REP protocol configured on a device.

**Table 17-34** *Cisco REP Service (IREPSERVICE)*

| Attribute Name      | Attribute Description                                                                                                       | Scheme  | Polling Interval |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| version             | The version of REP being used.                                                                                              | IP Core | Configuration    |
| administrativeVlan  | The ID of the administrative VLAN used by REP to transmit its hardware flooding layer messages (an integer from 1 to 4094). | IP Core | Configuration    |
| notificationEnabled | Indicates whether the device will generate REP notifications.                                                               | IP Core | Configuration    |
| segmentsTable       | An array of <a href="#">Cisco REP Segment Information</a> objects.                                                          | IP Core | Configuration    |

## Cisco REP Segment Information

The [Cisco REP Segment Information](#) object represents a single REP segment.

**Table 17-35** *Cisco REP Segment Information (IREPSEGMENTINFO)*

| Attribute Name  | Attribute Description                                                                                 | Scheme  | Polling Interval |
|-----------------|-------------------------------------------------------------------------------------------------------|---------|------------------|
| segmentId       | The ID of the segment.                                                                                | IP Core | Configuration    |
| segmentComplete | Indicates whether the segment is complete (that is, no port in the segment is in the “failed” state). | IP Core | Configuration    |
| portsTable      | An array of <a href="#">Cisco REP Port Information</a> objects.                                       | IP Core | Configuration    |

## Cisco REP Port Information

The [Cisco REP Port Information](#) object represents a REP port.

**Table 17-36** *Cisco REP Port Information (IREPPORTINFO)*

| Attribute Name | Attribute Description                                                                                                                                                                                                  | Scheme  | Polling Interval |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| portName       | The interface name.                                                                                                                                                                                                    | IP Core | Configuration    |
| portKey        | The Object Identifier of the port.                                                                                                                                                                                     | IP Core | Configuration    |
| segmentId      | The segment of which the interface is a part.                                                                                                                                                                          | IP Core | Configuration    |
| portType       | The type of port ( <i>Primary, Secondary, Intermediate</i> ).                                                                                                                                                          | IP Core | Configuration    |
| portRole       | The role the REP port is playing, determined by its link state and whether it is forwarding or blocking traffic ( <i>Failed, Alternate, Open</i> ).                                                                    | IP Core | Configuration    |
| operStatus     | The current operational link state of the REP port ( <i>None, Init Down, No Neighbor, One Way, Two Way, Flapping, Wait, Unknown</i> ).                                                                                 | IP Core | Configuration    |
| blockedVlans   | The list of VLANs configured to be blocked at the alternate port. This value is only effective on the alternate port (i.e. if the portRole value is <i>alternate</i> ). Formats are: 800-850,1050-1200,2900-2999,3555. | IP Core | Configuration    |

**Table 17-36** Cisco REP Port Information (IREPPortInfo) (continued)

| Attribute Name   | Attribute Description                                                                                                                                                                                                                                                                                                                 | Scheme  | Polling Interval |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| preemptTimer     | Specifies the time interval that REP waits before triggering preemption after the segment is complete (an integer from 0 to 300, or <i>Disabled</i> ). <i>Disabled</i> indicates that no time delay is configured and the preemption will happen manually. This value is only effective on the device acting as the REP primary edge. | IP Core | Configuration    |
| lslAgeoutTimer   | The link status layer age-out timer; that is, the time, in milliseconds, for which the REP interface remains up without receiving a hello from a neighbor.                                                                                                                                                                            | IP Core | Configuration    |
| remoteDeviceName | The name of the neighbor device on the segment to which this port is connected (may be null).                                                                                                                                                                                                                                         | IP Core | Configuration    |
| remoteDeviceMac  | The MAC address of the neighbor bridge on the segment to which this port is connected (may be null).                                                                                                                                                                                                                                  | IP Core | Configuration    |
| remotePortName   | The name of the neighbor port on the neighbor bridge on the segment to which this port is connected (may be null)                                                                                                                                                                                                                     | IP Core | Configuration    |

## Network Topology

Cisco ANA conducts discovery of Ethernet data link layer topology by using various types of data. This includes information from CDP, LLDP, STP, and can include MAC learning information. All types of data are collected and, based on priority, used to verify the adjacency between two ports.

Connections between CDP and LLDP ports are straightforward, as they expose neighbor information.

For STP topology, the STP port information is used in the following way: The Bridge ID, Designated Bridge, and Port identifier are compared with the relevant remote information. If a match is found, a link is created.

MAC-based topology is traced by searching for the local MAC address on any remote side's bridge or in ARP tables related to the same type of the local Ethernet port. The basic assumption, which is not always valid, is that every Ethernet port has a unique MAC address. This topology is also applied to the underlying physical links.

Verification is done based on STP, CDP, and LLDP. Further verification is preformed by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of network traffic to function correctly.

Many service providers configure customer access to VLAN ports using L2PT. This avoids the need to process Layer 2 protocols such as CDP. In these scenarios, discovery may create links between ports which are not directly connected, because the Layer 2 protocol information is tunneled and does not reflect the actual physical links. Users can overcome this problem by configuring static links on these ports. These static links will override any incorrect dynamically discovered links.

# Service Alarms

The following alarms are supported for this technology:

- Cloud Problem
- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal
- VSI Down/VSI Up
- EFP Down/EFP Up
- VLAN Sub Interface Down/VLAN Sub Interface Up

Note that these alarms, apart from Cloud Problem, are related to the underlying physical interface (see [Common Components](#)).

Cisco ANA does not generate service alarms specific to QinQ technology. However, correlation takes this technology into account when performing flow analysis.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 18

## Asynchronous Transfer Mode

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This chapter describes the level of support that Cisco ANA provides for ATM, as follows:

- [Technology Description, page 18-1](#)
- [Information Model Objects \(IMOs\), page 18-2](#)
- [Vendor-Specific Inventory and IMOs, page 18-7](#)
- [Network Topology, page 18-12](#)
- [Service Alarms, page 18-12](#)

## Technology Description

### ATM

ATM is a cell-switching and multiplexing technology that combines the benefits of circuit switching (guaranteed capacity and constant transmission delay) with those of packet switching (flexibility and efficiency for intermittent traffic). It provides data link (Layer 2) services with scalable bandwidth from a few megabits per second (Mb/s) to many gigabits per second (Gb/s), which usually run over SONET/SDH physical (Layer 1) links.

ATM networks consist of ATM switches interconnected by point-to-point ATM links or interfaces and are fundamentally connection oriented, which means that a virtual channel (VC) must be set up across the ATM network prior to any data transfer.

### IMA

Inverse Multiplexing over ATM (IMA) involves inverse multiplexing and demultiplexing of ATM cells in a cyclical fashion among physical links grouped to form a higher bandwidth and logical link. The rate of the logical link is approximately the sum of the rate of the physical links in the IMA group. Streams of cells are distributed in a round-robin manner across the multiple T1/E1 links and reassembled at the destination to form the original cell stream. Sequencing is provided using IMA Control Protocol (ICP) cells.

The ATM cell stream received from the ATM layer is distributed on a cell-by-cell basis across the multiple links within the IMA group. At the far end, the receiving IMA unit reassembles the cells from each link on a cell-by-cell basis, recreates the original ATM cell stream, and passes it to the ATM layer.

## IP over ATM, Ethernet over ATM (MPoA)

IP over ATM (MPoA 1483R) and Ethernet over ATM (MPoA 1483B) are both implementations of Multi protocol over ATM (MPoA), an ATM Forum standard that provides for routing of legacy protocols (such as IP and Ethernet) over ATM networks.

Based on ATM UNI signaling, and integrating LANE and Next Hop Resolution Protocol (NHRP), MPoA preserves the benefits of LANE while allowing intersubnet, internetwork layer protocol communication over virtual channel connections (VCCs). Unlike LANE, it requires no routers in the data path. MPoA provides a framework for effectively synthesizing bridging and routing with ATM in an environment of diverse protocols, network technologies, and IEEE 802.1 VLANs. MPoA can use routing and bridging information to locate optimal exits from the ATM cloud and allows the physical separation of internetwork layer route calculation and forwarding (virtual routing).

MPoA defines two components—MPoA Clients (MPCs) and MPoA Servers (MPSs)—and the protocols that are required to communicate and receive services. An MPS is a router component, and requires a Next Hop Server (NHS) and interfaces to one or more LAN Emulation Clients (LECs). This MPS route server performs the routing calculations and sends its results to the ATM switches and edge devices, which perform high-speed forwarding of IP datagrams and Ethernet packets.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [ATM Interface \(IAtm\)](#)
- [ATM Virtual Connection \(IAtmVc\)](#)
- [Inverse Multiplexing for ATM \(IMA\) Group \(IIMAGroup\)](#)
- [ATM Traffic Descriptor \(IAtmTrafficDescriptor\)](#)
- [ATM Traffic Shape Descriptor \(IAtmTrafficShapingDescriptor\)](#)

## ATM Interface

The data link layer [ATM Interface](#) object aggregates multiple [ATM Virtual Connections](#) by its VC Table attributes. It is bound by its Containing Termination Points attribute to a physical layer interface. It is accessed primarily by the [Virtual Connection Switching Entity](#) and [VC Encapsulation Multiplexer](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Virtual Connection Switching Entity](#).

**Table 18-1**      **ATM Interface (IAtm)**

| Attribute Name                          | Attribute Description                                                                                                                                    | Scheme  | Polling Interval |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| ATM Address                             | ATM 20-byte address ( <i>Address Prefix   MAC Address   Address Selector</i> )                                                                           | Any     | Configuration    |
| Interface Type                          | ATM interface type ( <i>N/A, UNI, Private UNI, Public UNI, NNI, Private NNI, Public NNI, STI, Unconfigured, VNNI, VUNI, EVNNI, EVUNI, VP TRUNK UNI</i> ) | Any     | Configuration    |
| VP and VC Ranges                        | Numeric ranges of the allowed Virtual Path Identifier/Virtual Channel Identifier (VPI/VCI) values                                                        | Any     | Configuration    |
| VC Table                                | Array of <a href="#">ATM Virtual Connections</a>                                                                                                         | Any     | Configuration    |
| Cross Connect Table                     | Array of <a href="#">Virtual Cross Connections</a>                                                                                                       | Any     | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                                                                          | N/A     | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                                                                                                   | Any     | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                                                                                                      | Any     | N/A              |
| Tx Allocated Bandwidth                  | ATM allocated transmit bandwidth                                                                                                                         | Product | Configuration    |
| Tx Maximum Bandwidth                    | ATM maximum transmit bandwidth                                                                                                                           | Product | Configuration    |
| Tx UBR Allocated Bandwidth              | ATM allocated transmit bandwidth at unspecified bit rate                                                                                                 | Product | Configuration    |
| Tx CBR Allocated Bandwidth              | ATM allocated transmit bandwidth at constant bit rate                                                                                                    | Product | Configuration    |
| Rx Allocated Bandwidth                  | ATM allocated receive bandwidth                                                                                                                          | Product | Configuration    |
| Rx Maximum Bandwidth                    | ATM maximum transmit bandwidth                                                                                                                           | Product | Configuration    |
| Rx UBR Allocated Bandwidth              | ATM allocated transmit bandwidth at unspecified bit rate                                                                                                 | Product | Configuration    |
| Rx CBR Allocated Bandwidth              | ATM allocated transmit bandwidth at constant bit rate                                                                                                    | Product | Configuration    |

## ATM Virtual Connection

The data link layer [ATM Virtual Connection](#) object is bound by its Containing Termination Points attribute to a data link layer [ATM Interface](#) object. It is accessed primarily by the [Virtual Cross Connection](#) and data link layer [VC Encapsulation](#), but is not bound to any of them by any of its attributes.

**Table 18-2** *ATM Virtual Connection (IAtmVc)*

| Attribute Name                             | Attribute Description                                                 | Scheme | Polling Interval |
|--------------------------------------------|-----------------------------------------------------------------------|--------|------------------|
| Virtual Channel Identifier                 | Virtual Channel Identifier (VCI)                                      | Any    | Configuration    |
| Virtual Path Identifier                    | Virtual Path Identifier (VPI)                                         | Any    | Configuration    |
| Shaping Profile                            | Shaping profile ( <a href="#">ATM Traffic Shape Descriptor</a> )      | Any    | Configuration    |
| Discarded and Received Input Data Counters | Discarded and received input octets and reassembled packet counters   | Any    | Topology L2      |
| Dropped and Forward Output Data Counters   | Dropped and forwarded output octets and reassembled packet counters   | Any    | Topology L2      |
| Ingress Traffic Descriptor                 | Ingress traffic descriptor ( <a href="#">ATM Traffic Descriptor</a> ) | Any    | Configuration    |
| Egress Traffic Descriptor                  | Egress traffic descriptor ( <a href="#">ATM Traffic Descriptor</a> )  | Any    | Configuration    |
| Administrative Status                      | Administrative status ( <i>Unknown, Up, Down</i> )                    | Any    | Status           |
| Operational Status                         | Operational status ( <i>Unknown, Up, Down</i> )                       | Any    | Status           |
| IANA Type                                  | Internet Assigned Numbers Authority (IANA) type of the sublayer       | N/A    | N/A              |
| Containing Termination Points              | Underlying termination points (connection or physical)                | Any    | N/A              |
| Contained Connection Termination Points    | Bound connection termination points                                   | Any    | N/A              |



## Inverse Multiplexing for ATM (IMA) Group

The [Inverse Multiplexing for ATM \(IMA\) Group](#) object is bound to its multiple [DS1 Physicals](#) by its Containing Termination Points attribute. It is accessed by a single data link layer [ATM Interface](#).

**Table 18-3** *Inverse Multiplexing for ATM (IMA) Group (IIMAGroup)*

| Attribute Name                   | Attribute Description                                                                                                                                                                                                                                               | Scheme | Polling Interval |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Administrative Status            | Administrative status of the IMA Group interface ( <i>Unknown, Up, Down, Testing</i> ).                                                                                                                                                                             | Any    | Status           |
| Operational Status               | Operational status of the IMA Group interface ( <i>Unknown, Up, Down, Testing, Dormant, Not Present</i> ).                                                                                                                                                          | Any    | Status           |
| Group Number                     | The IMA Group number.                                                                                                                                                                                                                                               | Any    | Configuration    |
| IMA Version                      | The configured IMA version ( <i>1.0, 1.1</i> ).                                                                                                                                                                                                                     | Any    | Configuration    |
| Speed                            | The active bandwidth of the IMA Group.                                                                                                                                                                                                                              | Any    | Configuration    |
| Configured Bandwidth             | The total bandwidth of the IMA Group (the sum of all individual links in the Group).                                                                                                                                                                                | Any    | Configuration    |
| Number of Links                  | The number of DS1 links in the IMA Group.                                                                                                                                                                                                                           | Any    | Configuration    |
| Number of Active Links           | The number of DS1 links active in the IMA Group.                                                                                                                                                                                                                    | Any    | Configuration    |
| Minimum Number of Transmit Links | The minimum number of transmit links needed for the IMA Group to be operational.                                                                                                                                                                                    | Any    | Configuration    |
| Minimum Number of Receive Links  | The minimum number of receive links needed for the IMA Group to be operational.                                                                                                                                                                                     | Any    | Configuration    |
| Clock Mode                       | The IMA Group's clock mode ( <i>CTC, ITC</i> ).                                                                                                                                                                                                                     | Any    | Configuration    |
| Frame Length                     | The length of IMA frames.                                                                                                                                                                                                                                           | Any    | Configuration    |
| Group Failure Status             | Reason for the IMA Group failure ( <i>noFailure, startup, invalidMValueNe, invalidMValueFe, failedAssymmetricNe, failedAssymmetricFe, insufficientLinksFe, insufficientLinksMe, blockedNe, blockedFe, invalidImaVersionNe, invalidImaVersionFe, otherFailure</i> ). | Any    | Configuration    |
| Operational Status Last Change   | Date of last operational status change.                                                                                                                                                                                                                             | Any    | Configuration    |
| Description                      | The IMA Group interface name (for example, <i>ATM8/0/IMA1</i> ).                                                                                                                                                                                                    | Any    | Configuration    |
| IANA Type                        | Internet Assigned Numbers Authority (IANA) type of the sublayer.                                                                                                                                                                                                    | N/A    | N/A              |
| Containing Termination Points    | Underlying termination points ( <a href="#">DS1 Physicals</a> ).                                                                                                                                                                                                    | Any    | N/A              |

## ATM Traffic Descriptor

The [ATM Traffic Descriptor](#) object describes the traffic of a single [ATM Virtual Connection](#). It is aggregated by a [Traffic Descriptor Container](#) object (see [Common Components](#)).

**Table 18-4** *ATM Traffic Descriptor (IAtmTrafficDescriptor)*

| Attribute Name                                     | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                             | Scheme | Polling Interval |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Traffic Descriptor Type                            | ATM traffic descriptor type ( <i>Null, Best Effort, No CLP and no SCR, CLP with no tagging and no SCR, CLP with tagging and no SCR, No CLP with SCR, CLP with no tagging and with SCR, CLP with tagging and with SCR, CLP with no tagging and with MCR, CLP-transparent with no SCR, CLP-transparent with SCR, No CLP with tagging and no SCR, No CLP and no SCR with CDVT, No CLP with SCR and CDVT, No CLP and no SCR with CDVT, No CLP with SCR and CDVT</i> ) | Any    | Configuration    |
| Service Category                                   | ATM service category ( <i>Unknown, UBR, UBR1, UBR2, CBR, CBR1, CBR2, CBR3, ABR, VBR, RT VBR, NRT VBR, VBR1RT, VBR2RT, VBR3RT, VBR1NRT, VBR2NRT, VBR3NRT, GFR</i> )                                                                                                                                                                                                                                                                                                | Any    | Configuration    |
| Cell Loss Priority                                 | Cell loss priority ( <i>Unknown, True, False</i> )                                                                                                                                                                                                                                                                                                                                                                                                                | Any    | Configuration    |
| Cell Delay Variation                               | Cell delay variation                                                                                                                                                                                                                                                                                                                                                                                                                                              | Any    | Configuration    |
| Cell Delay Variation Tolerance                     | Cell delay variation tolerance                                                                                                                                                                                                                                                                                                                                                                                                                                    | Any    | Configuration    |
| Maximum High Priority and Aggregate Burst Sizes    | Maximum high priority and aggregate (CLP=0 and CLP=0+1) burst sizes                                                                                                                                                                                                                                                                                                                                                                                               | Any    | Configuration    |
| Minimum High Priority and Aggregate Cell Rates     | Minimum high priority and aggregate (CLP=0 and CLP=0+1) cell rates                                                                                                                                                                                                                                                                                                                                                                                                | Any    | Configuration    |
| Sustainable High Priority and Aggregate Cell Rates | Sustainable high priority and aggregate (CLP=0 and CLP=0+1) cell rates                                                                                                                                                                                                                                                                                                                                                                                            | Any    | Configuration    |
| Peak High Priority and Aggregate Cell Rates        | Peak high priority and aggregate (CLP=0 and CLP=0+1) cell rates                                                                                                                                                                                                                                                                                                                                                                                                   | Any    | Configuration    |
| Name                                               | Traffic descriptor name                                                                                                                                                                                                                                                                                                                                                                                                                                           | Any    | Configuration    |
| Index                                              | Traffic descriptor index                                                                                                                                                                                                                                                                                                                                                                                                                                          | Any    | Configuration    |

## ATM Traffic Shape Descriptor

The [ATM Traffic Shape Descriptor](#) object describes the traffic shape of a single [ATM Virtual Connection](#). It is aggregated by a [Traffic Descriptor Container](#) object (see [Common Components](#)).

**Table 18-5** *ATM Traffic Shape Descriptor (IAtmTrafficShapingDescriptor)*

| Attribute Name                    | Attribute Description                               | Scheme | Polling Interval |
|-----------------------------------|-----------------------------------------------------|--------|------------------|
| Maximum Burst Size                | Maximum burst sizes                                 | Any    | Configuration    |
| Sustainable and Peak Cell Rates   | Sustainable and peak cell rates                     | Any    | Configuration    |
| Cell Delay Variation              | Cell delay variation                                | Any    | Configuration    |
| State                             | Descriptor state ( <i>Null, Enabled, Disabled</i> ) | Any    | Configuration    |
| Buffer Size                       | Buffer size                                         | Any    | Configuration    |
| Cell Loss Priority Discarded Size | Cell loss priority discarded size                   | Any    | Configuration    |
| Name                              | Traffic descriptor name                             | Any    | Configuration    |
| Index                             | Traffic descriptor index                            | Any    | Configuration    |

## Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices. The following sections describe vendor-specific objects for this technology:

- [Lucent ATM Trunk Interface](#)
- [Cisco or Lucent ATM Logical Interface](#)
- [Cisco or Lucent ATM Trunk Virtual Connection](#)
- [Cisco or Lucent ATM Soft Permanent Virtual Connection](#)
- [Alcatel ASAM ATM Interface](#)
- [ECI HiFocus ATM Interface](#)
- [Alcatel ASAM ATM Traffic Descriptor](#)
- [ECI HiFocus ATM Traffic Descriptor](#)
- [Lucent WAN Switch ATM Traffic Descriptor](#)
- [Alcatel ATM Access Traffic Descriptor](#)
- [Alcatel ASAM Access Traffic Descriptor](#)

## Lucent ATM Trunk Interface

The [Lucent ATM Trunk Interface](#) data link layer object aggregates multiple [ATM Virtual Connections](#), to which it is bound by its VC Table attributes. It is bound by its Containing Termination Points attribute to a physical layer interface. It is accessed primarily by a [Virtual Connection Switching Entity](#) bound by its Contained Connection Termination Points attribute.

**Table 18-6** *Lucent ATM Trunk Interface (IAtmTrunk)*

| Attribute Name                                                      | Attribute Description | Scheme | Polling Interval |
|---------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as <a href="#">ATM Interface (IAtm)</a> |                       |        |                  |

## Cisco or Lucent ATM Logical Interface

The [Cisco or Lucent ATM Logical Interface](#) data link layer object aggregates multiple [ATM Virtual Connections](#), to which it is bound by its VC Table attributes. It is bound by its Containing Termination Points attribute to a physical layer interface. It is accessed primarily by a [Virtual Connection Switching Entity](#) and data link layer [VC Encapsulation](#) bound by its Contained Connection Termination Points attribute.

**Table 18-7** *Cisco or Lucent ATM Logical Interface (IAtmLogicalPort/Trunk)*

| Attribute Name                       | Attribute Description                                                                | Scheme | Polling Interval |
|--------------------------------------|--------------------------------------------------------------------------------------|--------|------------------|
| Resource Management Cell Termination | Resource management cell termination ( <i>Unknown, CCRM Only, CCRM, BCM</i> )        | Any    | Configuration    |
| Resource Management Cell Generation  | Resource management cell generation ( <i>Unknown, None, CCRM, BCM</i> )              | Any    | Configuration    |
| Effective Check                      | Effective check ( <i>Unknown, No, Yes</i> )                                          | Any    | Configuration    |
| Input and Output Capacities          | Input and output capacities                                                          | Any    | Configuration    |
| Administrative Status                | Administrative status ( <i>Null, Up, Down, Testing</i> )                             | Any    | Status           |
| Operational Status                   | Operational status ( <i>Null, Up, Down, Testing, Unknown, Dormant, Not Present</i> ) | Any    | Status           |

All additional attributes are the same as [ATM Interface \(IAtm\)](#)

## Cisco or Lucent ATM Trunk Virtual Connection

The [Cisco or Lucent ATM Trunk Virtual Connection](#) and [Cisco or Lucent ATM Soft Permanent Virtual Connection](#) data link layer objects are bound by their Containing Termination Points attributes to an [ATM Interface](#) object. They are accessed primarily by a [Virtual Cross Connection](#) object, although they are not bound to it by any of their attributes.

**Table 18-8** *Cisco or Lucent ATM Trunk Virtual Connection (IAtmTrunkVc)*

| Attribute Name          | Attribute Description         | Scheme | Polling Interval |
|-------------------------|-------------------------------|--------|------------------|
| Destination Description | Destination party description | Any    | Configuration    |

All additional attributes are the same as [ATM Virtual Connection \(IAtmVc\)](#)

## Cisco or Lucent ATM Soft Permanent Virtual Connection

**Table 18-9** Cisco or Lucent ATM Soft Permanent Virtual Connection (IAtmSpVc)

| Attribute Name                      | Attribute Description                                                            | Scheme | Polling Interval |
|-------------------------------------|----------------------------------------------------------------------------------|--------|------------------|
| Remote Virtual Channel Identifier   | Remote Virtual Channel Identifier (VCI)                                          | Any    | Configuration    |
| Remote Virtual Path Identifier      | Remote Virtual Path Identifier (VPI)                                             | Any    | Configuration    |
| Remote Network Service Access Point | Remote Network Service Access Point (NSAP), which is the destination ATM address | Any    | Configuration    |

All additional attributes are the same as [ATM Virtual Connection \(IAtmVc\)](#)

## Alcatel ASAM ATM Interface

The [Alcatel ASAM ATM Interface](#) and [ECI HiFocus ATM Interface](#) data link layer objects aggregate multiple [ATM Virtual Connections](#), which they are bound to by their VC Table attributes. They are bound by their Containing Termination Points attributes to a physical layer interface. They are accessed primarily by [Virtual Connection Switching Entity](#) and data link layer [VC Encapsulation](#) objects bound by their Contained Connection Termination Points attributes.

**Table 18-10** Alcatel ASAM ATM Interface (IAsamAtm)

| Attribute Name            | Attribute Description                                                                                         | Scheme  | Polling Interval |
|---------------------------|---------------------------------------------------------------------------------------------------------------|---------|------------------|
| CAC Traffic Descriptor    | Connection admission control (CAC) traffic descriptor ( <a href="#">Alcatel ASAM ATM Traffic Descriptor</a> ) | Product | Configuration    |
| Access Traffic Descriptor | Access traffic descriptor ( <a href="#">Alcatel ASAM Access Traffic Descriptor</a> )                          | Product | Configuration    |

All additional attributes are the same as [ATM Interface \(IAtm\)](#)

## ECI HiFocus ATM Interface

**Table 18-11** ECI HiFocus ATM Interface (IHiFocusAtm)

| Attribute Name            | Attribute Description                                                                                        | Scheme  | Polling Interval |
|---------------------------|--------------------------------------------------------------------------------------------------------------|---------|------------------|
| CAC Traffic Descriptor    | Connection admission control (CAC) traffic descriptor ( <a href="#">ECI HiFocus ATM Traffic Descriptor</a> ) | Product | Configuration    |
| Access Traffic Descriptor | Access traffic descriptor ( <a href="#">Alcatel ATM Access Traffic Descriptor</a> )                          | Product | Configuration    |

All additional attributes are the same as [ATM Interface \(IAtm\)](#)

## Alcatel ASAM ATM Traffic Descriptor

The following objects — [Alcatel ASAM ATM Traffic Descriptor](#), [ECI HiFocus ATM Traffic Descriptor](#), [Lucent WAN Switch ATM Traffic Descriptor](#) and [Lucent WAN Switch ATM Traffic Descriptor](#) — describe traffic of a single [ATM Virtual Connection](#). They are aggregated by a [Traffic Descriptor Container](#) object.

**Table 18-12** Alcatel ASAM ATM Traffic Descriptor (*IASamAtmTrafficDescriptor*)

| Attribute Name        | Attribute Description                             | Scheme  | Polling Interval |
|-----------------------|---------------------------------------------------|---------|------------------|
| User VP and VC Ranges | Numeric ranges of the allowed user VPI/VCI values | Product | Configuration    |

All additional attributes are the same as [ATM Traffic Descriptor \(IAtmTrafficDescriptor\)](#)

## ECI HiFocus ATM Traffic Descriptor

**Table 18-13** ECI HiFocus ATM Interface (*IHiFocusAtm*)

| Attribute Name   | Attribute Description                       | Scheme  | Polling Interval |
|------------------|---------------------------------------------|---------|------------------|
| Service Category | ATM service category ( <i>Unspecified</i> ) | Product | Configuration    |

All additional attributes are the same as [ATM Traffic Descriptor \(IAtmTrafficDescriptor\)](#)

## Lucent WAN Switch ATM Traffic Descriptor

**Table 18-14** Lucent's WAN Switch ATM Traffic Descriptor (*ILucentWANSwitchAtmTrafficDescriptor*)

| Attribute Name | Attribute Description | Scheme  | Polling Interval |
|----------------|-----------------------|---------|------------------|
| Priority       | Connection priority   | Product | Configuration    |
| Type           | Connection type       | Product | Configuration    |

All additional attributes are the same as [ATM Traffic Descriptor \(IAtmTrafficDescriptor\)](#)

## Alcatel ATM Access Traffic Descriptor

The [Alcatel ATM Access Traffic Descriptor](#) object describes access traffic of a single [ATM Virtual Connection](#). It is aggregated by a [Traffic Descriptor Container](#).

**Table 18-15** Alcatel ATM Access Traffic Descriptor (*IAtmAccessTrafficDescriptor*)

| Attribute Name                     | Attribute Description                                       | Scheme  | Polling Interval |
|------------------------------------|-------------------------------------------------------------|---------|------------------|
| Scope                              | Access scope ( <i>Null, Local, Network</i> )                | Product | Configuration    |
| Maximum Active VPCs and VCCs       | Maximum active virtual path and virtual channel connections | Product | Configuration    |
| Maximum Supported VPI and VCI Bits | Maximum supported virtual path and virtual channel bits     | Product | Configuration    |
| Generic Flow Control Mode          | Generic flow control mode ( <i>Null, UNI, NNI</i> )         | Product | Configuration    |
| Police Mode                        | Police mode ( <i>Null, None, VC Only, All</i> )             | Product | Configuration    |
| Name                               | Traffic descriptor name                                     | Product | Configuration    |
| Index                              | Traffic descriptor index                                    | Product | Configuration    |

## Alcatel ASAM Access Traffic Descriptor

[Alcatel ASAM Access Traffic Descriptor](#) object describes access traffic of a single [ATM Virtual Connection](#). It is aggregated by a [Traffic Descriptor Container](#).

**Table 18-16** Alcatel ASAM Access Traffic Descriptor (*IAsamAccessTrafficDescriptor*)

| Attribute Name                                                                                                                | Attribute Description                                          | Scheme  | Polling Interval |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------|------------------|
| Maximum Supported VPCs and VCCs                                                                                               | Maximum supported virtual path and virtual channel connections | Product | Configuration    |
| Maximum Active VPI and VCI Bits                                                                                               | Maximum active virtual path and virtual channel bits           | Product | Configuration    |
| All additional attributes are the same as <a href="#">Alcatel ATM Access Traffic Descriptor (IAtmAccessTrafficDescriptor)</a> |                                                                |         |                  |

# Network Topology

Cisco ANA discovers ATM data link layer topology by searching for the same set of active [ATM Virtual Connections](#) in any remote side's ATM port VC table related to the same type of the local ATM port. This topology also applies to the underlying physical links.

In particular, Cisco ANA looks for harmony between the VC tables of participating ports based on the lowest active VC (registry default to 3). Further verification is done by matching the VC traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic to function correctly.

This mechanism supports configurations that have either the same VCs or the same VPs on both sides. It does not support a mixture of VCs on one side and VPs on the other side.

## Service Alarms

The following alarms are supported for this technology:

- Cloud Problem
- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal
- IMA Admin Down
- IMA Oper Down
- High Priority IMA Down
- Medium Priority IMA Down
- Low Priority IMA Down

Note that these alarms, apart from Cloud Problem, are related to the underlying physical interface (see [Common Components](#)).

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 19

## Frame Relay

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This chapter describes the level of support that Cisco ANA provides for Frame Relay, as follows:

- [Technology Description, page 19-1](#)
- [Information Model Objects \(IMOs\), page 19-1](#)
- [Vendor-Specific Inventory and IMOs, page 19-4](#)
- [Network Topology, page 19-4](#)
- [Service Alarms, page 19-4](#)

## Technology Description

### Frame Relay

Frame Relay is a high-performance data link (Layer 2) WAN protocol that uses variable-length packet switching with statistical multiplexing. Although originally designed for use across ISDN interfaces, today it is used over a variety of additional network interfaces.

Frame Relay networks consist of Frame Relay switches interconnected by point-to-point Frame Relay links or interfaces. Frame Relay is fundamentally connection oriented, which means that a VC must be set up across the Frame Relay network prior to any data transfer.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [Frame Relay Interface \(IFrameRelay/IFrTrunk\)](#)
- [Frame Relay Virtual Connection \(IFrVc\)](#)
- [Frame Relay Traffic Descriptor \(IFRTrafficDescriptor\)](#)
- [Frame Relay Logical Interface \(IFrameRelayLogicalPort/Trunk\)](#)
- [Frame Relay Trunk Virtual Connection \(IFrTrunkVc\)](#)

## Frame Relay Interface

The data link layer [Frame Relay Interface](#) object aggregates multiple [Frame Relay Virtual Connections](#), which it is bound to by its VC Table attributes. It is bound by its Containing Termination Points attribute to a physical layer interface. It is accessed primarily by the data link layer [VC Multiplexer](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Virtual Connection Switching Entity](#).

**Table 19-1** *Frame Relay Interface (IFrameRelay/IFrTrunk)*

| Attribute Name                          | Attribute Description                                                                  | Scheme | Polling Interval |
|-----------------------------------------|----------------------------------------------------------------------------------------|--------|------------------|
| Address Format                          | Frame Relay address format ( <i>Unknown, q921, q922March90, q922November90, q922</i> ) | Any    | Configuration    |
| Maximum Supported VCs                   | Maximum supported virtual connections                                                  | Any    | Configuration    |
| Protocol Type                           | Frame Relay protocol type ( <i>Unknown, Frame Relay, FR FUNI, Frame Forward</i> )      | Any    | Configuration    |
| VC Table                                | Array of <a href="#">Frame Relay Virtual Connections</a>                               | Any    | Configuration    |
| Cross Connect Table                     | Array of <a href="#">Virtual Cross Connections</a>                                     | Any    | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                        | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                                 | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                                    | Any    | N/A              |

## Frame Relay Virtual Connection

The data link layer [Frame Relay Virtual Connection](#) object is bound by its Containing Termination Points attribute to a data link layer [Frame Relay Interface](#) object. It is accessed primarily by a [Virtual Cross Connection](#) and data link layer [VC Encapsulation](#), but is not bound to them by any of its attributes.

**Table 19-2** *Frame Relay Virtual Connection (IFrVc)*

| Attribute Name                             | Attribute Description                                                         | Scheme | Polling Interval |
|--------------------------------------------|-------------------------------------------------------------------------------|--------|------------------|
| Data Link Connection Identifier            | Data Link Connection Identifier (DLCI)                                        | Any    | Configuration    |
| Traffic Descriptor                         | Traffic descriptor ( <a href="#">Frame Relay Traffic Descriptor</a> )         | Any    | Configuration    |
| Discarded and Received Input Data Counters | Discarded and received input octet and packet counters                        | Any    | Configuration    |
| Dropped and Forwarded Output Data Counters | Dropped and forwarded output octet and packet counters                        | Any    | Configuration    |
| Ingress Traffic Descriptor                 | Ingress traffic descriptor ( <a href="#">Frame Relay Traffic Descriptor</a> ) | Any    | Configuration    |
| Egress Traffic Descriptor                  | Egress traffic descriptor ( <a href="#">Frame Relay Traffic Descriptor</a> )  | Any    | Configuration    |
| Administrative Status                      | Administrative status ( <i>Unknown, Up, Down</i> )                            | Any    | Status           |
| Operational Status                         | Operational status ( <i>Unknown, Up, Down</i> )                               | Any    | Status           |

**Table 19-2** *Frame Relay Virtual Connection (IFrVc) (continued)*

| Attribute Name                          | Attribute Description                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------|--------|------------------|
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)          | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                             | Any    | N/A              |

## Frame Relay Traffic Descriptor

The [Frame Relay Traffic Descriptor](#) object describes the traffic of a single [Frame Relay Virtual Connection](#). It is aggregated by a [Traffic Descriptor Container](#) object (see [Common Components](#)).

**Table 19-3** *Frame Relay Traffic Descriptor (IFRTrafficDescriptor)*

| Attribute Name    | Attribute Description    | Scheme | Polling Interval |
|-------------------|--------------------------|--------|------------------|
| Committed Rate    | Committed burst rate     | Any    | Configuration    |
| Excess Burst Rate | Excess burst rate        | Any    | Configuration    |
| Name              | Traffic descriptor name  | Any    | Configuration    |
| Index             | Traffic descriptor index | Any    | Configuration    |

## Frame Relay Logical Interface

The data link layer [Frame Relay Logical Interface](#) object aggregates multiple [Frame Relay Virtual Connections](#), which it is bound to by its VC Table attributes. It is bound by its Containing Termination Points attribute to a physical layer interface. It is accessed primarily by the [Virtual Connection Switching Entity](#) and data link layer [VC Encapsulation](#) bound by its Contained Connection Termination Points attribute.

**Table 19-4** *Frame Relay Logical Interface (IFrameRelayLogicalPort/Trunk)*

| Attribute Name        | Attribute Description                                                                | Scheme | Polling Interval |
|-----------------------|--------------------------------------------------------------------------------------|--------|------------------|
| Administrative Status | Administrative status ( <i>Null, Up, Down, Testing</i> )                             | Any    | Status           |
| Operational Status    | Operational status ( <i>Null, Up, Down, Testing, Unknown, Dormant, Not Present</i> ) | Any    | Status           |

All additional attributes are the same as [Frame Relay Interface \(IFrameRelay/IFrTrunk\)](#)

## Frame Relay Trunk Virtual Connection

The data link layer [Frame Relay Trunk Virtual Connection](#) object is bound by its Containing Termination Points attribute to a [Frame Relay Interface](#) object. It is accessed primarily by a [Virtual Cross Connection](#) and data link layer [VC Encapsulation](#), but is not bound to them by any of its attributes.

**Table 19-5** *Frame Relay Trunk Virtual Connection (IFrTrunkVc)*

| Attribute Name                                                                                   | Attribute Description         | Scheme | Polling Interval |
|--------------------------------------------------------------------------------------------------|-------------------------------|--------|------------------|
| Destination Description                                                                          | Destination party description | Any    | Configuration    |
| All additional attributes are the same as <a href="#">Frame Relay Virtual Connection (IFrVc)</a> |                               |        |                  |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of Frame Relay data link layer topology. This topology is manually (statically) configured by the system administrator.

## Service Alarms

The following alarms are supported for this technology:

- Cloud Problem
- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal

Note that these alarms, apart from Cloud Problem, are related to the underlying physical interface (see [Common Components](#)).

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



## CHAPTER 20

# Integrated Services Digital Network

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This chapter describes the level of support that Cisco ANA provides for ISDN, as follows:

- [Technology Description, page 20-1](#)
- [Information Model Objects \(IMOs\), page 20-1](#)
- [Vendor-Specific Inventory and IMOs, page 20-3](#)
- [Network Topology, page 20-3](#)
- [Service Alarms, page 20-3](#)

## Technology Description

### ISDN

ISDN is a digital telephony and data transport service offered by regional telephone carriers. ISDN involves digitization of the telephone network, which permits voice, data, text, graphics, music, video, and other source material to be transmitted over existing telephone wires.

ISDN offers two types of channels: A 64-Kb/s Bearer (B) channel used for data, and a 64-Kb/s (maximum) Delta (D) channel used for signaling and control over layers 1, 2, and 3 of the Open Systems Interconnection (OSI) model. It also offers two types of channel-based services: The 192-Kb/s Basic Rate Interface (BRI) service, which offers two B channels and one D channel (2B+D); and the 1.544/2.048-Mb/s Primary Rate Interfaces (PRI) service, which offers 23 to 31 B channels and one D channel, respectively, for the xDSL interface backup.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [ISDN Interface \(IIsdnLayer2\)](#)
- [ISDN Channel \(IIsdnChannel\)](#)
- [ISDN Physical \(IIsdnLayer1\)](#)

## ISDN Interface

The data link layer [ISDN Interface](#) object is bound by its Containing Termination Points attribute to a physical layer [ISDN Physical](#) object. It is accessed primarily by a [PPP Encapsulation](#) bound by its Contained Connection Termination Points attribute.

**Table 20-1** *ISDN Interface (IIsdnLayer2)*

| Attribute Name                          | Attribute Description                                                          | Scheme  | Polling Interval |
|-----------------------------------------|--------------------------------------------------------------------------------|---------|------------------|
| Control Administrative Status           | Administrative status ( <i>Unknown, Up, Down, Testing</i> )                    | Product | Status           |
| Operational Status                      | Operational status ( <i>Unknown, Up, Down, Testing, Dormant, Not Present</i> ) | Product | Status           |
| Channels Table                          | Array of <a href="#">ISDN Channels</a>                                         | Product | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                | N/A     | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                         | Product | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                            | Product | N/A              |

## ISDN Channel

The data link layer [ISDN Channel](#) object describes an [ISDN Interface](#) channels table's entry.

**Table 20-2** *ISDN Channel (IIsdnChannel)*

| Attribute Name                | Attribute Description                                                          | Scheme  | Polling Interval |
|-------------------------------|--------------------------------------------------------------------------------|---------|------------------|
| Control Administrative Status | Administrative status ( <i>Unknown, Up, Down, Testing</i> )                    | Product | Status           |
| Operational Status            | Operational status ( <i>Unknown, Up, Down, Testing, Dormant, Not Present</i> ) | Product | Status           |

## ISDN Physical

The physical layer [ISDN Physical](#) object is bound by its Containing Termination Points attribute to a [Port Connector](#) object. It is accessed by the data link layer [ISDN Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 20-3** *ISDN Physical (IIIsdnLayer1)*

| Attribute Name                                                                            | Attribute Description | Scheme | Polling Interval |
|-------------------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as those of <a href="#">Physical Layer (IPhysicalLayer)</a> . |                       |        |                  |

# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of ISDN physical layer topology. This topology is manually (statically) configured by the system administrator.

## Service Alarms

The following alarms are supported for this technology:

- Link Down/Link Up
- Port Down/Port Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).







# CHAPTER 21

## Point-to-Point Protocol

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This chapter describes the level of support that Cisco ANA provides for PPP, as follows:

- [Technology Description, page 21-1](#)
- [Information Model Objects \(IMOs\), page 21-3](#)
- [Vendor-Specific Inventory and IMOs, page 21-4](#)
- [Network Topology, page 21-4](#)
- [Service Alarms, page 21-5](#)

## Technology Description

### PPP

PPP (RFC 1661) originally emerged as an encapsulation protocol for transporting IP traffic over point-to-point links. PPP also established standards for the assignment and management of IP addresses, octet-synchronous (asynchronous) encapsulation, use of an HDLC-like framing protocol (RFC 1662), bit-synchronous encapsulation, use of HDLC protocols, network protocol multiplexing, link configuration, link quality testing, error detection, and option negotiation for such capabilities as network layer address and data compression negotiation.

PPP supports these functions by providing an extensible Link Control Protocol (LCP) and a family of Network Control Protocols (NCPs) to negotiate optional configuration parameters and facilities.

### POS

Packet over SONET/SDH (PoS) is a data link (Layer 2) technology that uses PPP (RFC 1661) in HDLC-like framing (RFC 1662) encapsulation over SONET/SDH framing. The PoS interface supports SONET/SDH-level alarm processing, performance monitoring, synchronization, and protection switching, which enables seamless interoperability with existing SONET infrastructures and provides the capability to migrate to IP+Optical networks without the need for legacy SONET infrastructures.

## PPPoA

Point-to-Point Protocol over ATM (PPPoA, RFC 2364) is a protocol for encapsulating PPP frames for transmission over an ATM network. It offers standard PPP features and supports the VC-MUX and LLC based encapsulation. It is used mainly by DOCSIS and DSL carriers.

## PPPoE

Point-to-Point Protocol over Ethernet (PPPoE, RFC 2516) is a protocol for encapsulating PPP frames inside Ethernet frames. It is used mainly with DSL services where individual users connect to the DSL modem over Ethernet and in plain Metro Ethernet networks.

## PPPoFR

Point-to-Point Protocol over Frame Relay (PPPoE, RFC 1973) is a protocol for encapsulating PPP frames for transmission across Frame Relay connections. The traditional usage of this interface has been on dial-in access servers, to support multiple PPP dial-in clients terminating their connection on a single interface running IP.

## Multilink PPP

Multilink PPP (also referred to as MP, MPPP, MLP, or Multilink) provides a method for spreading traffic across multiple physical WAN links while providing packet fragmentation and reassembly, proper sequencing, multivendor interoperability, and load balancing on inbound and outbound traffic. MPPP allows packets to be fragmented. These fragments are sent simultaneously over multiple point-to-point links to the same remote address. The multiple physical links come up in response to a user-defined load threshold. This load can be measured on just inbound traffic, on just outbound traffic, or on either; however, it cannot be measured on the combined load of both inbound and outbound traffic.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [PPP Encapsulation \(IVcBasedEncapsulation\)](#)
- [Multilink PPP Interface \(IMLPPP\)](#)

## PPP Encapsulation

The data link layer [PPP Encapsulation](#) object is bound by its Containing Termination Points attribute to an ATM/Frame Relay [VC Multiplexer](#) object. It is accessed primarily by a network layer object, such as the [IP Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 21-1** *PPP Encapsulation (IVcBasedEncapsulation)*

| Attribute Name                          | Attribute Description                                                                                                                                                    | Scheme | Polling Interval |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Virtual Connection                      | Virtual connection, if applicable ( <a href="#">ATM Virtual Connection</a> , <a href="#">Frame Relay Virtual Connection</a> , or <a href="#">Virtual LAN Interface</a> ) | Any    | Configuration    |
| Binding Information                     | Binding information ( <i>User Name</i> , and so on)                                                                                                                      | Any    | Configuration    |
| Binding Status                          | Binding status ( <i>Not Bound</i> , <i>Bound</i> )                                                                                                                       | Any    | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                                                                                          | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                                                                                                                   | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                                                                                                                      | Any    | N/A              |

## Multilink PPP Interface

The [Multilink PPP Interface](#) object models a multilink PPP bundle, which is a named virtual interface with multiple member links.

**Table 21-2** *Multilink PPP Interface (IMLPPP)*

| Attribute Name  | Attribute Description                                                                                           | Scheme  | Polling Interval |
|-----------------|-----------------------------------------------------------------------------------------------------------------|---------|------------------|
| InterfaceName   | The interface name (for example, <i>Multilink</i> ).                                                            | Product | Configuration    |
| GroupName       | The numerical group ID of the multilink bundle (for example, 8).                                                | Product | Configuration    |
| MTU             | The Maximum Transmission Unit for the bundle link.                                                              | Product | Configuration    |
| FragmentDelay   | The maximum realtime delay (in milliseconds) between each fragment.                                             | Product | Configuration    |
| FragmentDisable | Indicates whether the multilink fragmentation function is disabled ( <i>true</i> ) or enabled ( <i>false</i> ). | Product | Configuration    |
| FragmentMaximum | The maximum number of fragments allowed per packet.                                                             | Product | Configuration    |
| FragmentSize    | The maximum size of each fragment.                                                                              | Product | Configuration    |
| Interleave      | Indicates whether the fragment interleaving function is enabled ( <i>true</i> ) or disabled ( <i>false</i> ).   | Product | Configuration    |

**Table 21-2**      **Multilink PPP Interface (IMLPPP)**

| Attribute Name         | Attribute Description                                                                                                                                                                                                                                                                                                                                    | Scheme  | Polling Interval |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| KeepaliveTime          | The keepalive timeout value (in milliseconds) for the member links.                                                                                                                                                                                                                                                                                      | Product | Configuration    |
| KeepaliveRetry         | The number of times to attempt keepalive before timing out.                                                                                                                                                                                                                                                                                              | Product | Configuration    |
| MinimumConfigured Link | Minimum number of member interfaces configured to participate in a multilink PPP bundle.                                                                                                                                                                                                                                                                 | Product | Configuration    |
| MaximumConfigure dLink | Maximum number of member interfaces configured to participate in a multilink PPP bundle.                                                                                                                                                                                                                                                                 | Product | Configuration    |
| LocalMRRU              | The Maximum Received Reconstructed Unit (in bytes) for the local links.                                                                                                                                                                                                                                                                                  | Product | Configuration    |
| RemoteMRRU             | The Maximum Received Reconstructed Unit (in bytes) for the remote links.                                                                                                                                                                                                                                                                                 | Product | Configuration    |
| LoadThreshold          | The threshold percentage of bandwidth usage at which to add member links and increase the bandwidth of the bundle interface (or delete member links and decrease capacity). Values range from 1 (unloaded) to 255 (fully loaded) and correspond to a percentage of total use (for example, a value of 191 represents a threshold of 75% of total usage). | Product | Configuration    |
| LCPStatus              | The Link Control Protocol status code (values 1 through 11).                                                                                                                                                                                                                                                                                             | Product | Configuration    |
| AdminStatus            | The administrative status of the bundle ( <i>Down, Testing, Up</i> ).                                                                                                                                                                                                                                                                                    | Product | Configuration    |
| OperStatus             | The operational status of the bundle ( <i>Down, Testing, Up</i> ).                                                                                                                                                                                                                                                                                       | Product | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA performs discovery of PPP topologies by searching for the local IP subnet in any one-hop-away remote sides of the PPP interfaces. In particular, it compares the local and remote IP subnets gathered from the upper IP Network layers.

# Service Alarms

The following alarms are supported for this technology:

- MLPPP Down Due To Flapping
- MLPPP Down Flapping Update
- MLPPP Down Flapping Proxy
- MLPPP Down Due To Admin Down
- MLPPP Down Due To Oper Down
- MLPPP Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





## CHAPTER 22

# High-Level Data Link Control

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This chapter describes the level of support that Cisco ANA provides for HDLC, as follows:

- [Technology Description, page 22-1](#)
- [Information Model Objects \(IMOs\), page 22-2](#)
- [Vendor-Specific Inventory and IMOs, page 22-2](#)
- [Network Topology, page 22-2](#)
- [Service Alarms, page 22-2](#)

## Technology Description

### HDLC

HDLC is a group of data link (Layer 2) protocols used to transmit synchronous data packets between point-to-point nodes. Data is organized into addressable frames. This format has been used for other multipoint-to-multipoint protocols, and inspired the HDLC-like framing protocol described in RFC 1662.

HDLC uses a zero-insertion/deletion process (bit stuffing) to ensure that the bit pattern of the delimiter flag does not occur in the fields between flags. The HDLC frame is synchronous and therefore relies on the physical layer (Layer 1) to clock and synchronize frame transmission and reception.

# Information Model Objects (IMOs)

This section describes the following IMO:

- [HDLC Encapsulation \(IEncapsulation\)](#)

## HDLC Encapsulation

The data link layer [HDLC Encapsulation](#) object is bound by its Containing Termination Points attribute to an ATM/Frame Relay [VC Multiplexer](#) object. It is accessed primarily by a network layer object, such as the [IP Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 22-1** *HDLC Encapsulation (IEncapsulation)*

| Attribute Name                          | Attribute Description                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------|--------|------------------|
| Virtual Connection                      | Virtual connection                                              | Any    | Configuration    |
| Binding Information                     | Binding information ( <i>User Name, ...</i> )                   | Any    | Configuration    |
| Binding Status                          | Binding status ( <i>Not Bound, Bound</i> )                      | Any    | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)          | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                             | Any    | N/A              |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA performs discovery of HDLC topologies by searching for the local IP subnet in any one-hop-away remote sides of the HDLC interfaces. In particular, it compares the local and remote IP subnets gathered from the upper IP Network layers.

## Service Alarms

There are no faults or alarms specific to this technology.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 23

## Layer 2 Tunnel Protocol

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This chapter describes the level of support that Cisco ANA provides for L2TP, as follows:

- [Technology Description, page 23-1](#)
- [Information Model Objects \(IMOs\), page 23-2](#)
- [Vendor-Specific Inventory and IMOs, page 23-3](#)
- [Network Topology, page 23-4](#)
- [Service Alarms, page 23-5](#)



**Note**

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L2TP technology is currently not supported for Cisco devices.

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## Technology Description

### L2TP

Layer 2 Tunnel Protocol (L2TP) acts like a data link (Layer 2) protocol for tunneling network traffic between two peers over an existing network (usually the Internet). The two endpoints of an L2TP tunnel are the initiator of the tunnel, the L2TP access concentrator (LAC), and the L2TP network server (LNS), which waits for new tunnels. Once a tunnel is established, the network traffic between the peers is bidirectional.

L2TP is, in fact, a session layer (Layer 5) protocol, as the entire L2TP packet is sent within a User Datagram Protocol (UDP) datagram, while it is common to carry PPP sessions within an L2TP tunnel. L2TP does not by itself provide confidentiality or strong authentication. IPsec is often used to secure L2TP packets by providing confidentiality, authentication, and integrity.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [L2TP Interface \(IL2TPTunnel\)](#)
- [L2TP Session Entry \(IL2TPSessionEntry\)](#)

## L2TP Interface

The [L2TP Interface](#) object represents one edge of an L2TP tunnel. It aggregates multiple [L2TP Session Entries](#), to which it is bound by its Session Table attributes. It is aggregated by an L2TP peer from which it is created or cloned.

**Table 23-1** *L2TP Interface (IL2TPTunnel)*

| Attribute Name                          | Attribute Description                                                         | Scheme  | Polling Interval |
|-----------------------------------------|-------------------------------------------------------------------------------|---------|------------------|
| Local and Remote Tunnel Identifications | Local and remote tunnel identifications                                       | Product | Configuration    |
| Local and Remote Tunnel Names           | Local and remote tunnel names                                                 | Product | Configuration    |
| Remote Address                          | Remote IP address                                                             | Product | Configuration    |
| Control Errors                          | Control errors count                                                          | Product | Configuration    |
| Last Error Code                         | Error code value recorded for the last error that caused tunnel disconnection | Product | Configuration    |
| Tunnel State                            | Tunnel state ( <i>Unknown, Idle, Connecting, Established, Disconnecting</i> ) | Product | Configuration    |
| Sessions Count                          | Current session count                                                         | Product | Configuration    |
| Sessions Table                          | Array of <a href="#">L2TP Session Entries</a>                                 | Product | Configuration    |

## L2TP Session Entry

The [L2TP Session Entry](#) object represents a session within an L2TP tunnel. It is primarily accessed by the [L2TP Interface](#) in which it is contained.

**Table 23-2** *L2TP Session Entry (IL2TPSessionEntry)*

| Attribute Name                           | Attribute Description                                                          | Scheme  | Polling Interval |
|------------------------------------------|--------------------------------------------------------------------------------|---------|------------------|
| Local and Remote Session Identifications | Local and remote session identifications                                       | Product | Configuration    |
| Subscriber Name                          | Subscriber name                                                                | Product | Configuration    |
| Session Type                             | Session type ( <i>Unknown, LAC, LNS</i> )                                      | Product | Configuration    |
| Session State                            | Session state ( <i>Unknown, Idle, Connecting, Established, Disconnecting</i> ) | Product | Configuration    |
| Input and Output Data Counters           | Input and output data octets and packet counters                               | Product | Configuration    |

# Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices. The following sections describe objects for specific vendors:

- [Redback L2TP Peer](#)
- [Redback L2TP Group](#)
- [Redback L2TP Domain Entry](#)

## Redback L2TP Peer

The [Redback L2TP Peer](#) object describes a logical component aggregating multiple [L2TP Interfaces](#) and their configurations. It is bound by its Logical Sons attribute and is used primarily for managing the creation of L2TP tunnels.

**Table 23-3** *Redback L2TP Peer (IL2TPPeer)*

| Attribute Name                      | Attribute Description                                                       | Scheme  | Polling Interval |
|-------------------------------------|-----------------------------------------------------------------------------|---------|------------------|
| Local and Peer Addresses            | Local and peer IP addresses                                                 | Product | Configuration    |
| Local and Peer Names                | Local and peer names                                                        | Product | Configuration    |
| Tunnel Type                         | Tunnel type ( <i>Unknown, LAC, LNS</i> )                                    | Product | Configuration    |
| Tunnel Mode                         | Tunnel mode ( <i>Null, Static, Dynamic</i> )                                | Product | Configuration    |
| Maximum and Current Tunnels Counts  | Maximum and current tunnel counts                                           | Product | Configuration    |
| Maximum and Current Sessions Counts | Maximum and current session counts                                          | Product | Configuration    |
| Session Authentication Type         | Session authentication type ( <i>Null, None, Simple, Challenge</i> )        | Product | Configuration    |
| Tunnel Password                     | Tunnel password for the authentication phase of the tunnel establishment    | Product | Configuration    |
| RADIUS Identification               | RADIUS identifier                                                           | Product | Configuration    |
| Hello Time Interval                 | Time interval at which hello (keepalive) packets should be sent             | Product | Configuration    |
| Control Errors                      | Control errors count                                                        | Product | Configuration    |
| Media Type                          | Underlying media type ( <i>Null, Other, None, UDPLP, Frame Relay, ATM</i> ) | Product | Configuration    |
| Group Identification                | OID of LT2P group ( <i>IL2TPGroup</i> )                                     | Product | Configuration    |
| Domains Table                       | Array of <a href="#">L2TP Domain Entries</a>                                | Product | Configuration    |
| Logical Sons                        | Array of aggregated <a href="#">L2TP Interfaces</a>                         | Product | N/A              |

## Redback L2TP Group

The [Redback L2TP Group](#) object describes a logical component that is load balancing multiple [Redback L2TP Peers](#). The [Redback L2TP Peers](#) are grouped by the [Redback L2TP Group](#) Peer List attribute and aggregated by a [Traffic Descriptor Container](#) object.

**Table 23-4** *Redback L2TP Group (IL2TPGroup)*

| Attribute Name        | Attribute Description                        | Scheme  | Polling Interval |
|-----------------------|----------------------------------------------|---------|------------------|
| Group Name            | Layer 2 tunnel protocol group name           | Product | Configuration    |
| Tunnel Algorithm      | Tunnel algorithm                             | Product | Configuration    |
| Dead Time             | Dead time                                    | Product | Configuration    |
| RADIUS Identification | RADIUS identifier                            | Product | Configuration    |
| Peers List            | Array of <a href="#">Redback L2TP Peers</a>  | Product | Configuration    |
| Domains Table         | Array of <a href="#">L2TP Domain Entries</a> | Product | Configuration    |
| Name                  | Group name                                   | Product | Configuration    |
| Index                 | Group index                                  | Product | Configuration    |

## Redback L2TP Domain Entry

The [Redback L2TP Domain Entry](#) object describes an Internet domain in which members are allowed to open L2TP sessions within L2TP tunnels, aggregated by the L2TP peers or groups containing the domain. It is aggregated by a [Traffic Descriptor Container](#) object.

**Table 23-5** *Redback L2TP Domain Entry (IL2TPDomainEntry)*

| Attribute Name     | Attribute Description                                                                                               | Scheme  | Polling Interval |
|--------------------|---------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Domain Name        | L2TP domain name                                                                                                    | Product | Configuration    |
| Attached To Object | OID of the <a href="#">Redback L2TP Peer</a> or <a href="#">Redback L2TP Group</a> to which this domain is attached | Product | Configuration    |
| Name               | Peer or group name                                                                                                  | Product | Configuration    |
| Index              | Peer or group index                                                                                                 | Product | Configuration    |

## Network Topology

Cisco ANA does not support discovery or manual configuration of L2TP data link layer topology.

# Service Alarms

Table 23-6 lists the L2TP technology alarms.

**Table 23-6**      **L2TP Alarms Summary**

| Alarm                        | Severity | Description                                                                                                                                                                                                                                                                                                                                                       | Up Alarm                               |
|------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| L2TP Peer Is Not Established | Major    | The state of a statically configured L2TP tunnel is changed from <i>established</i> to anything else. Such a failure may be the result of a configuration or network problem. The Up alarm is issued when this problem has been fixed.                                                                                                                            | L2TP Peer is Established               |
| L2TP Peer Was Removed        | Info     | A dynamically configured L2TP tunnel was removed from a device. This alarm is not issued as a ticket, but it invokes a correlation flow and can be viewed in Cisco ANA EventVision. It also appears in the Cisco ANA NetworkVision application, but only if correlated to another alarm, such as Link Down or Port Down.                                          | None                                   |
| L2TP Sessions Count Exceeded | Major    | The current percentage of the number of sessions in the L2TP peer has exceeded the maximum configurable threshold. The maximum number of sessions allowed for a single peer is defined by the L2TP peer and L2TP tunnel configuration parameters. The Up alarm is issued when the current percentage of the number of sessions is below the configured threshold. | L2TP Sessions Count Returned to Normal |

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 24

## Discovery Protocols

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This chapter describes the level of support that Cisco ANA provides for discovery protocols, as follows:

- [Technology Description, page 24-1](#)
- [Information Model Objects \(IMOs\), page 24-2](#)
- [Vendor-Specific Inventory and IMOs, page 24-3](#)
- [Network Topology, page 24-4](#)
- [Service Alarms, page 24-4](#)

## Technology Description

### LLDP

Link Layer Discovery Protocol (LLDP) is an open IEEE-standard (802.1AB) Layer 2 protocol used by network devices to share information about their identities and functionality with other network elements.

LLDP defines a standard method for Ethernet network devices to advertise information about themselves to other nodes on the network and store the information they discover. LLDP runs on all 802 media. The protocol runs over the data-link layer only, allowing two systems running different network layer protocols to learn about each other.

LLDP-enabled devices store the information they gather in a local table that can be queried using SNMP. This information can include:

- System name and description
- Port name and description
- VLAN name
- IP management address
- System capabilities (switching, routing, and so on)
- MAC/PHY information
- MDI power
- Link aggregation

## CDP

Cisco Discovery Protocol (CDP) is Cisco's proprietary Layer 2 protocol, used to discover and share information about network-connected Cisco equipment. Cisco devices share their information by sending CDP announcements every 60 seconds on interfaces that support Subnetwork Access Protocol (SNAP) headers.

Each Cisco network element that supports CDP stores in its CDP table the information it receives from other devices to which it is directly connected. Each entry's information is refreshed, and the hold time reset, each time a new announcement is received. The hold time specifies how long entries in the table must be kept. If no announcements are received from a device before the timer expires, the device's information is discarded.

The information contained in CDP announcements varies by the type of device and the version of the operating system running on it, but always contains at least the device's device ID, port ID, and IP address.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [LLDP Service](#)
- [LLDP Neighbor Entry](#)

## LLDP Service

The [LLDP Service](#) object represents the LLDP configuration on the network element.

**Table 24-1** *LLDP Service Table (LLDPService)*

| Attribute name             | Attribute Description                                          | Scheme | Polling Interval |
|----------------------------|----------------------------------------------------------------|--------|------------------|
| status                     | The LLDP status ( <i>enabled, disabled</i> ).                  | Any    | Configuration    |
| lldpAdvertisementsInterval | The LLDP advertisement interval.                               | Any    | Configuration    |
| lldpHoldTime               | The advertised LLDP hold time.                                 | Any    | Configuration    |
| lldpReinitialisationDelay  | The LLDP interface reinitialization delay.                     | Any    | Configuration    |
| localChassisID             | The local chassis ID.                                          | Any    | Configuration    |
| localSystemName            | The local system name.                                         | Any    | Configuration    |
| NeighborsInfoTable         | An array of instances of <a href="#">LLDP Neighbor Entry</a> . | Any    | Configuration    |



## LLDP Neighbor Entry

The [LLDP Neighbor Entry](#) object represents information about a network element's neighbor discovered using the [LLDP Service](#).

**Table 24-2** *LLDP Neighbor Entry (ILLDPNeighbor)*

| Attribute name     | Attribute Description                       | Scheme | Polling Interval |
|--------------------|---------------------------------------------|--------|------------------|
| localPortName      | The local port name.                        | Any    | Configuration    |
| localPortId        | The local port ID.                          | Any    | Configuration    |
| remotePortDesc     | Description of the remote port.             | Any    | Configuration    |
| remoteChassisId    | The neighbor's chassis ID.                  | Any    | Configuration    |
| remotePortId       | The remote port ID.                         | Any    | Configuration    |
| remoteDeviceId     | The remote device ID.                       | Any    | Configuration    |
| localPortOid       | The link for the port.                      | Any    | Configuration    |
| remoteManagementIP | The IP address of the remote management IP. | Any    | Configuration    |

## Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices. The following sections describe objects for specific vendors:

- [CDP Service](#)
- [CDP Neighbor Entry](#)

## CDP Service

The [CDP Service](#) object represents the CDP configuration on the network element.

**Table 24-3** *CDP Service (ICdpService)*

| Attribute name     | Attribute Description                                                    | Scheme | Polling Interval |
|--------------------|--------------------------------------------------------------------------|--------|------------------|
| cdpHoldtime        | The configured hold time.                                                | Any    | Configuration    |
| cdpMessageInterval | The configured CDP message interval.                                     | Any    | Configuration    |
| cdpDeviceId        | The ID of the device on which CDP is configured.                         | Any    | Configuration    |
| cdpState           | The state of the CDP service on the device ( <i>enabled, disabled</i> ). | Any    | Configuration    |
| cdpVersion         | The CDP version supported on the device.                                 | Any    | Configuration    |
| NeighborsInfoTable | An array of instances of <a href="#">CDP Neighbor Entry</a> .            | Any    | Configuration    |

## CDP Neighbor Entry

The [CDP Neighbor Entry](#) object represents information about a network element's neighbor discovered using the [CDP Service](#).

**Table 24-4** CDP Neighbor Entry (ICdpNeighbor)

| Attribute name  | Attribute Description     | Scheme | Polling Interval |
|-----------------|---------------------------|--------|------------------|
| remoteDeviceId  | The neighbor device ID.   | Any    | Configuration    |
| remotePortId    | The neighbor port number. | Any    | Configuration    |
| remoteIPAddress | The neighbor IP address.  | Any    | Configuration    |
| localPortId     | The local port ID.        | Any    | Configuration    |
| localPortOid    | The link for the port.    | Any    | Configuration    |

## Network Topology

The Cisco Discovery Protocol (CDP), although proprietary, plays a major role in discovery of all Cisco network equipment. Cisco ANA uses it as part of the data link topology discovery for all Cisco network elements. It uses CDP by searching for the existence of local CDP neighbor signatures, gathered from the CDP process, in any remote side port of the same type.

LLDP, which is a standard discovery protocol for data link layer, is also used for link discovery on a few Cisco devices which support this protocol. Cisco ANA uses LLDP by searching for the existence of local LLDP neighbor signatures, gathered from the LLDP Process, in any remote side port of the same type.

## Service Alarms

There are no faults or alarms associated with this technology.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



# CHAPTER 25

## Local Switching

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This chapter describes the level of support that Cisco ANA provides for local switching, as follows:

- [Technology Description, page 25-1](#)
- [Information Model Objects \(IMOs\), page 25-2](#)
- [Vendor-Specific Inventory and IMOs, page 25-2](#)
- [Network Topology, page 25-2](#)
- [Service Alarms, page 25-3](#)

## Technology Description

### Local Switching

Local switching allows switching of Layer 2 data between two attachment circuits on the same device. Local switching operates in several modes and technologies.

In local switching (also known as *hairpin connection*), frames from one attachment circuit are switched to another attachment circuit on the same router. The attachment interfaces can be on the same line card or on different cards. During this type of switching, no address information is used at all. The local switching act as a kind of tube between the two interfaces.



#### Note

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Cisco ANA version 3.6 SP4 and later provides support for local switching only in Ethernet and VLAN modes on CRS-1 devices running IOS-XR software.

---

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [Local Switching Entity](#)
- [Local Switching Entry](#)

## Local Switching Entity

The [Local Switching Entity](#) is the container for [Local Switching Entry](#) objects.

**Table 25-1** *Local Switching Entity Interface (ILocalSwitchingEntity)*

| Attribute Name        | Attribute Description                 | Scheme | Polling Interval |
|-----------------------|---------------------------------------|--------|------------------|
| Local Switching Table | A set of ILocalSwitchingEntry objects | IPCore | Configuration    |

## Local Switching Entry

Each [Local Switching Entry](#) describes a single locally switched cross-connect entry.

**Table 25-2** *Local Switching Entry Interface (ILocalSwitchingEntry)*

| Attribute name               | Attribute Description                                  | Scheme  | Polling Interval |
|------------------------------|--------------------------------------------------------|---------|------------------|
| Local Switching Entry Key    | Entry key for the cross-connect group                  | Product | Configuration    |
| Local Switching Entry Status | Status of the cross-connect                            | Product | Configuration    |
| Segment 1                    | Object Identifier of the first cross-connect endpoint  | Product | Configuration    |
| Segment 1 Port Name          | Name of the first cross-connect endpoint               | Product | Configuration    |
| Segment 1 Status             | Status of first cross-connect endpoint                 | Product | Configuration    |
| Segment 2                    | Object Identifier of the second cross-connect endpoint | Product | Configuration    |
| Segment 2 Port Name          | Name of the second cross-connect endpoint              | Product | Configuration    |
| Segment 2 Status             | Status of second cross-connect endpoint                | Product | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology. Currently, only the Cisco CRS-1 device running IOS-XR is supported.

## Network Topology

There is no network topology to be discovered specifically for local switching. Local switching is viewable from the Cisco ANA logical inventory through an appropriate cross-connect container. This modeling enables flow functions to operate according to the cross-connect, permitting correlation and path-tracing.

# Service Alarms

The following alarms are supported for this technology:

- Local Switching Entry down
- Local Switching Entry unresolved
- Local Switching Entry up

Both the “Local Switching Entry down” and “Local Switching Entry unresolved” alarms are cleared by the “Local Switching Entry up” alarm.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 26

## Digital Subscriber Line

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This chapter describes the level of support that Cisco ANA provides for DSL, as follows:

- [Technology Description, page 26-1](#)
- [Information Model Objects \(IMOs\), page 26-2](#)
- [Vendor-Specific Inventory and IMOs, page 26-5](#)
- [Network Topology, page 26-6](#)
- [Service Alarms, page 26-6](#)

## Technology Description

### xDSL

DSL is a modem technology that uses existing twisted-pair telephone lines to transport high-bandwidth data, such as multimedia and video, to service subscribers. The term *xDSL* covers a number of similar yet competing forms of DSL, including asymmetric:

- DSL (ADSL/ADSL 2)
- Symmetric DSL (SDSL)
- High-speed DSL (HDSL)
- Rate-adaptive DSL (RADSL)
- Very high bit data rate DSL (VDSL) for delivering up to 52 Mb/s downstream

At the customer end of the connection, a DSL modem converts data from the digital signals used by computers into a voltage signal of a suitable frequency range, which is then applied to the phone line. At the exchange end, a digital subscriber line access multiplexer (DSLAM) terminates the DSL circuits, aggregates them, and hands them off to other networking transports. In the case of ADSL, the voice component is also separated at this step, either by a filter integrated into the DSLAM or by specialized filtering equipment installed upstream.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [DSL Interface \(IDsl/IIdsl/ISdsl/IShdsl\)](#)
- [ADSL Interface \(IADsl\)](#)
- [ADSL 2 Interface \(IADsl2\)](#)
- [DSL Traffic Descriptor \(IIdslTrafficDescriptor\)](#)
- [ADSL Traffic Descriptor \(IAdslTrafficDescriptor\)](#)
- [ADSL 2 Spectrum Traffic Descriptor \(IAdsl2TrafficDescriptor\)](#)
- [Synchronous DSL Traffic Descriptor \(ISdslTrafficDescriptor\)](#)
- [Synchronous High Bit Rate DSL Traffic Descriptor \(IShdslTrafficDescriptor\)](#)

## DSL Interface

The following physical layer [DSL Interface](#) (which represents any DSL interface), [ADSL Interface](#), and [ADSL 2 Interface](#) objects are bound by their Containing Termination Points attribute to a [Port Connector](#) object. Each of these objects is accessed primarily by a data link (Layer 2) [ATM Interface](#) bound by its Contained Connection Termination Points attribute.

**Table 26-1** *DSL Interface (IDsl/IIdsl/ISdsl/IShdsl)*

| Attribute Name          | Attribute Description                                             | Scheme  | Polling Interval |
|-------------------------|-------------------------------------------------------------------|---------|------------------|
| Modulation Type         | Modulation type ( <i>Null, DMT, CAP, QAM, GLite, GDMT, 2B1Q</i> ) | Product | Configuration    |
| Customer Identification | Customer identifier                                               | Product | Configuration    |
| Traffic Descriptor      | Traffic descriptor ( <a href="#">DSL Traffic Descriptor</a> )     | Product | Configuration    |

Additional attributes are the same as [Physical Layer \(IPhysicalLayer\)](#)

## ADSL Interface

**Table 26-2** *ADSL Interface (IADsl)*

| Attribute Name                               | Attribute Description                        | Scheme  | Polling Interval |
|----------------------------------------------|----------------------------------------------|---------|------------------|
| Maximum Reception and Transmission Bandwidth | Maximum reception and transmission bandwidth | Product | Configuration    |

Additional attributes are the same as [DSL Interface \(IDsl/IIdsl/ISdsl/IShdsl\)](#)



## ADSL 2 Interface

**Table 26-3** *ADSL 2 Interface (IADsl2)*

| Attribute Name              | Attribute Description                                                              | Scheme  | Polling Interval |
|-----------------------------|------------------------------------------------------------------------------------|---------|------------------|
| Spectrum Traffic Descriptor | Spectrum traffic descriptor ( <a href="#">ADSL 2 Spectrum Traffic Descriptor</a> ) | Product | Configuration    |
| Traffic Descriptor          | Traffic descriptor ( <a href="#">ADSL Traffic Descriptor</a> )                     | Product | Configuration    |

Additional attributes are the same as [ADSL Interface \(IADsl\)](#)

## DSL Traffic Descriptor

The following [DSL Traffic Descriptor](#), [ADSL Traffic Descriptor](#), [ADSL 2 Spectrum Traffic Descriptor](#), [Synchronous DSL Traffic Descriptor](#), and [Synchronous High Bit Rate DSL Traffic Descriptor](#) objects describe the traffic of various standard DSL interfaces. Each object is aggregated by a [Traffic Descriptor Container](#) object.

**Table 26-4** *DSL Traffic Descriptor (IldslTrafficDescriptor)*

| Attribute Name  | Attribute Description    | Scheme  | Polling Interval |
|-----------------|--------------------------|---------|------------------|
| Target Bit Rate | Target bit rate          | Product | Configuration    |
| Name            | Traffic descriptor name  | Product | Configuration    |
| Index           | Traffic descriptor index | Product | Configuration    |

## ADSL Traffic Descriptor

**Table 26-5** *ADSL Traffic Descriptor (IAdslTrafficDescriptor)*

| Attribute Name                                                       | Attribute Description                                                                                      | Scheme  | Polling Interval |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------|------------------|
| Maximum, Minimum and Target Transmission and Reception Noise Margins | Maximum, minimum, and target transmission and reception noise margins                                      | Product | Configuration    |
| Maximum, Minimum and Planned Transmission and Reception Bit Rates    | Maximum, minimum, and planned transmission and reception bit rates                                         | Product | Configuration    |
| Maximum Transmission Power Spectral Density                          | Maximum transmission Power Spectral Density (PSD)                                                          | Product | Configuration    |
| Transmission and Reception Rate Adaptation                           | Transmission and reception rate adaptation mode ( <i>Null, Fixed, Adapt at Startup, Adapt at Runtime</i> ) | Product | Configuration    |
| Channel Type                                                         | ADSL channel type ( <i>Null, Fast, Interleaved, Fast or Interleaved, Fast and Interleaved</i> )            | Product | Configuration    |
| Name                                                                 | Traffic descriptor name                                                                                    | Product | Configuration    |
| Index                                                                | Traffic descriptor index                                                                                   | Product | Configuration    |

## ADSL 2 Spectrum Traffic Descriptor

**Table 26-6** *ADSL 2 Spectrum Traffic Descriptor (IAdsl2TrafficDescriptor)*

| Attribute Name                                                       | Attribute Description                                                 | Scheme  | Polling Interval |
|----------------------------------------------------------------------|-----------------------------------------------------------------------|---------|------------------|
| Maximum, Minimum and Target Transmission and Reception Noise Margins | Maximum, minimum, and target transmission and reception noise margins | Product | Configuration    |
| Name                                                                 | Traffic descriptor name                                               | Product | Configuration    |
| Index                                                                | Traffic descriptor index                                              | Product | Configuration    |

## Synchronous DSL Traffic Descriptor

**Table 26-7** *Synchronous DSL Traffic Descriptor (ISdslTrafficDescriptor)*

| Attribute Name              | Attribute Description            | Scheme  | Polling Interval |
|-----------------------------|----------------------------------|---------|------------------|
| Target and Minimum Bit Rate | Target and minimum line bit rate | Product | Configuration    |
| Target Noise Margin         | Target noise margin              | Product | Configuration    |
| Name                        | Traffic descriptor name          | Product | Configuration    |
| Index                       | Traffic descriptor index         | Product | Configuration    |

## Synchronous High Bit Rate DSL Traffic Descriptor

**Table 26-8** *Synchronous High Bit Rate DSL Traffic Descriptor (IShdslTrafficDescriptor)*

| Attribute Name  | Attribute Description                                | Scheme  | Polling Interval |
|-----------------|------------------------------------------------------|---------|------------------|
| Target Bit Rate | Target line bit rate                                 | Product | Configuration    |
| Wire Mode       | Wire mode ( <i>Null, Two Wire, Four Wire</i> )       | Product | Configuration    |
| Spectral Mode   | Spectral mode ( <i>Null, Symmetric, Asymmetric</i> ) | Product | Configuration    |
| Name            | Traffic descriptor name                              | Product | Configuration    |
| Index           | Traffic descriptor index                             | Product | Configuration    |

## Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices.

The following vendors' DSL Traffic Descriptor objects describe traffic of these vendors' standard DSL interfaces, and are aggregated by a [Traffic Descriptor Container](#) object.

- [ECI HiFocus ADSL Traffic Descriptor \(IECIHiFocusAdslTrafficDescriptor\)](#)
- [Alcatel ASAM SHDSL Traffic Descriptor \(IAcatelAsamShdslTrafficProfile\)](#)

### ECI HiFocus ADSL Traffic Descriptor

**Table 26-9** ECI HiFocus ADSL Traffic Descriptor (IECIHiFocusAdslTrafficDescriptor)

| Attribute Name                                      | Attribute Description                                                       | Scheme  | Polling Interval |
|-----------------------------------------------------|-----------------------------------------------------------------------------|---------|------------------|
| Discrete Multi-Tone Coding Model                    | Discrete multitone coding model ( <i>Null, discrctMultiTone</i> )           | Product | Configuration    |
| ATUC Downstream and ATUR Upstream Usage             | ATUC downstream and ATUR upstream usage ( <i>Null, Yes, No</i> )            | Product | Configuration    |
| ATUC Downstream Fast and Interleave Check Bytes     | ATUC downstream fast and interleave check bytes                             | Product | Configuration    |
| ATUR Upstream Fast and Interleave Check Bytes       | ATUR upstream fast and interleave check bytes                               | Product | Configuration    |
| ATUC Downstream and ATUR Upstream Interleaved Depth | ATUC downstream and ATUR interleave depth ( <i>Power of 2, 0, Non</i> )     | Product | Configuration    |
| ATUC Downstream and ATUR Upstream Code Word Length  | ATUC downstream and ATUR upstream code word length in symbols per code word | Product | Configuration    |
| Trellis Coded Modulation Option Usage               | Trellis coded modulation option usage ( <i>Null, Enabled, Disabled</i> )    | Product | Configuration    |
| Echo Cancellation Option                            | Echo cancellation option ( <i>Null, Enabled, Disabled</i> )                 | Product | Configuration    |
| Coding Mode                                         | Coding mode ( <i>Null, Automatic, Manual</i> )                              | Product | Configuration    |

All additional attributes are the same as [ADSL Traffic Descriptor \(IAdslTrafficDescriptor\)](#)

### Alcatel ASAM SHDSL Traffic Descriptor

**Table 26-10** Alcatel ASAM SHDSL Traffic Descriptor (IAcatelAsamShdslTrafficProfile)

| Attribute Name                        | Attribute Description                 | Scheme  | Polling Interval |
|---------------------------------------|---------------------------------------|---------|------------------|
| Minimum and Maximum Required Bit Rate | Minimum and maximum required bit rate | Product | Configuration    |

All additional attributes are the same as [Synchronous High Bit Rate DSL Traffic Descriptor \(IShdslTrafficDescriptor\)](#)

# Network Topology

Cisco ANA does not support discovery of DSL physical layer topology. This topology is manually (statically) configured by the system administrator.

However, it is used in conjunction with the data link layer above it, such as ATM, for discovering its physical topology, while further verifying it by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic in order to function correctly.

## Service Alarms

The following alarms are supported for this technology:

- Link Down/Link Up
- Port Down/Port Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



## CHAPTER 27

# Internet Protocol Over Dense Wave Division Multiplexing

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This chapter describes the level of support that Cisco ANA provides for IPoDWDM, as follows:

- [Technology Description, page 27-1](#)
- [Information Model Objects \(IMOs\), page 27-2](#)
- [Vendor-Specific Inventory and IMOs, page 27-4](#)
- [Network Topology, page 27-4](#)
- [Service Alarms, page 27-4](#)

## Technology Description

### IPoDWDM

IPoDWDM is a network architecture approach that integrates layer 1 (optical) and layer 3 (IP) technologies by combining DWDM transponder features and functions into the router interface. Instead of being limited to a short-reach gray wavelength, the router is able to emit a tunable, ITU-grid compatible colored wavelength, with G.709 Digital Wrapper and Enhanced Forward Error Correction (EFEC) functions. This combination provides multiple advantages, including savings in capital and operational expenditures due to the elimination of multiple transponder shelves, cross-connect shelves, and associated short-reach interfaces. The total number of optical-electronic components is reduced by 50 percent, further lowering costs, improving availability, lowering the time needed to provision services on the network, and increasing mean time between failures (MTBF). It also halves the number of patch cables needed at the terminating sites, reduces power consumption, and shrinks the overall physical footprint of the equipment.



#### Note

Cisco ANA version 3.6.6 and later provides support for IPoDWDM only on CRS-1 devices running IOS-XR software.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [DWDM Interface](#)
- [DWDM G709 Information](#)
- [DWDM PM Settings](#)

## DWDM Interface

The [DWDM Interface](#) object represents a DWDM controller physical termination point. It is accessed by the [Module](#) containing it.

**Table 27-1** *DWDM Interface (IDWDM)*

| Attribute Name   | Attribute Description                                                                                                                                       | Scheme | Polling Interval |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Location         | Indicates the port location on which the controller resides. It is the postfix of the Physical Port which has this DWDM controller.                         | IPCore | Configuration    |
| Loopback         | Transponder loopback setting ( <i>none, internal, line</i> ).                                                                                               | IPCore | Configuration    |
| ControllerStatus | Status of the controller status ( <i>up, down</i> ).                                                                                                        | IPCore | Configuration    |
| WavelengthBand   | Indicates the wavelength band ( <i>C-band, L-band</i> ).                                                                                                    | IPCore | Configuration    |
| Channel          | The Multisource Agreement (MSA) ITU channel number. The ITU channel number is an integer from 1 to 83 (for the C-band) or from 106 to 185 (for the L-band). | IPCore | Configuration    |
| Frequency        | Frequency of the channel, in terahertz.                                                                                                                     | IPCore | Configuration    |
| Wavelength       | Wavelength corresponding to the channel number, in nanometers.                                                                                              | IPCore | Configuration    |
| OpticsType       | Indicates the optics type of the DWDM controller ( <i>DWDM, Cisco 10Gb DWDM, LR-2/L-64.2a (80km), 10Gb MSA WDM (65km)</i> , and so on) .                    | IPCore | Configuration    |
| TxPower          | Transmit power level. Values are in units of 0.1 dBm and can range from -190 to +10. This corresponds to a range of -19 dBm to +1 dBm.                      | IPCore | Configuration    |
| RxPower          | Receive power level. Values are in units of 0.1 dBm and can range from -200 to 0. This corresponds to a range of -20 dBm to 0 dBm.                          | IPCore | Configuration    |
| RxLosThreshold   | Indicates the transponder receive power LOS threshold value (in units of 0.1dBm).                                                                           | IPCore | Configuration    |
| G709Info         | The raw string output value of G709 status, as retrieved using the command line interface (CLI).                                                            | IPCore | Configuration    |
| PMSettings       | An array of one or more instances of <a href="#">DWDM PM Settings</a> objects                                                                               | IPCore | Configuration    |

## DWDM G709 Information

The [DWDM G709 Information](#) object represents the G709 wrapper data for a [DWDM Interface](#) on a DWDM controller.

**Table 27-2** DWDM G709 Information (*IDwdmG709Info*)

| Attribute Name    | Attribute Description                                                                                                                                     | Scheme | Polling Interval |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Location          | The location of the DWDM controller.                                                                                                                      | IPCore | Configuration    |
| Status            | The administrative status of the DWDM controller.                                                                                                         | IPCore | Configuration    |
| OtuAlarmCounters  | A list of OTU alarm counters. Each entry has a counter value and an alarm type ( <i>AIS, BDI, BEI, BIP, FECMISMATCH, IAE, LOF, LOM, LOS, TIM</i> ).       | IPCore | Configuration    |
| OduAlarmCounters  | A list of ODU alarm counters. Each entry has a counter value and an alarm type ( <i>AIS, BDI, BEI, BIP, LCK, OCI, PTIM, TIM</i> ).                        | IPCore | Configuration    |
| OtuAlarmReporting | A list of OTU alarm types in the DWDM controller which are enabled to report in the command line interface (CLI).                                         | IPCore | Configuration    |
| OduAlarmReporting | A list of ODU alarm types in the DWDM controller which are enabled to report in the CLI.                                                                  | IPCore | Configuration    |
| OtuAssertedAlarms | A list of asserted OTU alarm types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OduAssertedAlarms | A list of asserted ODU alarm types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OtuDetectedAlarms | A list of detected OTU alarm types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OduDetectedAlarms | A list of detected ODU alarm types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OtuAlertCounters  | A list of OTU alert counters. Each entry has a counter value and an alarm type ( <i>SD_BER, SF_BER, PM_TCA, SM_TCA</i> ).                                 | IPCore | Configuration    |
| OtuAlertReporting | A list of OTU alert types in the DWDM controller which are enabled to report in CLI.                                                                      | IPCore | Configuration    |
| OtuAssertedAlerts | A list of asserted OTU alert types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OtuDetectedAlerts | A list of detected OTU alert types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OduAlertCounters  | A list of ODU alert counters. Each entry has a counter value and an alarm type ( <i>D_BER, SF_BER, PM_TCA, SM_TCA</i> ).                                  | IPCore | Configuration    |
| OduAlertReporting | A list of ODU alert types in the DWDM controller which are enabled to report in CLI.                                                                      | IPCore | Configuration    |
| OduAssertedAlerts | A list of asserted ODU alert types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OduDetectedAlerts | A list of detected ODU alert types in the DWDM controller.                                                                                                | IPCore | Configuration    |
| OtuTTI            | The OTU trail trace identifier. It contains the TTI type ( <i>SENT, EXPECTED, RECEIVED</i> ), the stringType ( <i>ASCII, HEX</i> ), and the string value. | IPCore | Configuration    |
| OduTTI            | The ODU trail trace identifier.                                                                                                                           | IPCore | Configuration    |
| FecInfo           | The FEC data in the G709 wrapper. It contains the FECMode, RemoteFECMode, ecTCA, ucTCA, ecCounter, and ucCounter.                                         | IPCore | Configuration    |

## DWDM PM Settings

The [DWDM PM Settings](#) object contains the PM setting for the threshold crossing alarm (TCA) values and the threshold values on a DWDM controller.

**Table 27-3** DWDM PM Settings (*IDwdmPmSettings*)

| Attribute Name   | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                     | Scheme | Polling Interval |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Location         | The Location of the DWDM controller.                                                                                                                                                                                                                                                                                                                                                                                                                      | IPCore | Configuration    |
| IntervalType     | The sampling interval type ( <i>15_min, 24_hour</i> ).                                                                                                                                                                                                                                                                                                                                                                                                    | IPCore | Configuration    |
| FecPmSettings    | The FEC type ( <i>EC-BITS, UC_WORDS</i> ), TCA, and threshold values.                                                                                                                                                                                                                                                                                                                                                                                     | IPCore | Configuration    |
| OpticsPmSettings | The optics PM type ( <i>LBC, OPR, OPT</i> ), maxTCA, minTCA, maxThreshold, minThreshold, and thresholdUnit.                                                                                                                                                                                                                                                                                                                                               | IPCore | Configuration    |
| OtnPmSettings    | The OTN PM type, TCA, and threshold value. Possible values of the OTN PM type are <i>BBE_PM_FE, BBE_PM_NE, BBE_SM_FE, BBE_SM_NE, BBER_PM_FE, BBER_PM_NE, BBER_SM_FE, BBER_SM_NE, ES_PM_FE, ES_PM_NE, ES_SM_FE, ES_SM_NE, ESR_PM_FE, ESR_PM_NE, ESR_SM_FE, ESR_SM_NE, FC_PM_FE, FC_PM_NE, FC_SM_FE, FC_SM_NE, SES_PM_FE, SES_PM_NE, SES_SM_FE, SES_SM_NE, SESR_PM_FE, SESR_PM_NE, SESR_SM_FE, SESR_SM_NE, UAS_PM_FE, UAS_PM_NE, UAS_SM_FE, UAS_SM_NE</i> . | IPCore | Configuration    |

## Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology. Currently, only the Cisco CRS-1 device running IOS-XR is supported.

## Network Topology

There is no network topology to be discovered specifically for IPoDWDM. The command line interface (CLI) is used to discover physical inventory attributes for DWDM controllers in the chassis. Cisco ANA models them as it does other physical ports.

## Service Alarms

The following alarms are supported for this technology:

- DWDM Controller up/down
- DWDM G709 Wrapper up/down

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 28

## SONET/SDH

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This chapter describes the level of support that Cisco ANA provides for synchronous optical technology (SONET/SDH), as follows:

- [Technology Description, page 28-1](#)
- [Information Model Objects \(IMOs\), page 28-2](#)
- [Vendor-Specific Inventory and IMOs, page 28-5](#)
- [Network Topology, page 28-5](#)
- [Service Alarms, page 28-5](#)

## Technology Description

### SONET/SDH

SONET/SDH was originally standardized for connecting one fiber system to another at the optical level, to form a single international standard for fiber interconnects between telephone networks of different countries. Today it is a widely deployed, mature technology used in implementing high-speed, large-scale IP networks. It combines high bandwidth capacity with efficient link utilization, making it a major building block for accommodating fast-growing IP infrastructure both in the core and at the edge.

SONET/SDH can handle a variety of transmission rates and applications by defining a synchronous, flexible, optical hierarchy for carrying many signals of different capacities. This is accomplished using a byte-interleaved multiplexing scheme, which simplifies multiplexing and offers end-to-end network management. It is a layered protocol that defines four separate layers—Photonic, Section, Line, and Path—within the OSI physical layer (Layer 1).

SONET/SDH networks consist of path terminating elements (PTEs), which represent the physical layer interfaces; add/drop multiplexers (ADMs) or Digital Crossconnect Systems (DCSs); and regenerators interconnected by point-to-point SONET/SDH links called *sections*. These are fundamentally connection oriented, which means that a VC must be set up across the SONET/SDH network prior to any data transfer.



#### Note

This physical technology is supported only insofar as the underlying physical layer is supported in conjunction with other data link layer technologies, such as ATM and PoS.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [SONET/SDH Physical \(ISonetSdh\)](#)
- [DS1 Channelized Interface \(IDS1PdhChannelized\)](#)
- [DS3 Channelized Interface \(IDS3PdhChannelized\)](#)
- [SONET SDH Hop \(ISonet\\_SdhHop\)](#)
- [SONET STS 1 \(ISonetSts1\)](#)
- [SDH AU 4 \(ISdhAu4\)](#)
- [SDH AU 3 \(ISdhAu3\)](#)

## SONET/SDH Physical

The physical layer [SONET/SDH Physical](#) object is bound by its Containing Termination Points attribute to a [Port Connector](#) object. It is accessed primarily by the data link layer object, such as [Asynchronous Transfer Mode](#) and [Frame Relay](#) interfaces, as well as the PoS interface (implemented using [PPP Encapsulation](#)), bound by its Contained Connection Termination Points attribute.

**Table 28-1** SONET/SDH Physical (ISonetSdh)

| Attribute Name  | Attribute Description                                                                                                                                                                                                                   | Scheme | Polling Interval |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Specific Type   | Specific type ( <i>Null, SONET/SDH Mux, OC3, OC12, OC24, OC48, OC192, STM1, STM4, STM16, STM64</i> )                                                                                                                                    | IPCore | Configuration    |
| Loop Back Type  | Loopback type ( <i>Null, Cell, Payload, Diag, Line, None, Other, Path, Metallic, Non Metallic, Serial, Parallel, Local, Internal, Network, Inward, Dual, Remote, Inbound Local, No Loop, Facility Loop, Terminal Loop, Other Loop</i> ) | IPCore | Configuration    |
| Scrambling Mode | Scrambling mode ( <i>Null, On, Off, Payload, Frame, Payload and Frame</i> )                                                                                                                                                             | IPCore | Configuration    |
| TCAThresholdB1  | The threshold for B1 threshold crossing alarms (B1-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of 6 (10e-6).                        | IPCore | Configuration    |
| TCAThresholdB2  | The threshold for B2 threshold crossing alarms (B2-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of 6 (10e-6).                        | IPCore | Configuration    |
| TCAThresholdB3  | The threshold for B3 threshold crossing alarms (B3-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of 6 (10e-6).                        | IPCore | Configuration    |
| Clocking        | The SONET port TX clock source where the internal keyword sets the internal clock ( <i>line, internal</i> ). The <i>line</i> keyword sets the clock recovered from the line (this is the default).                                      | IPCore | Configuration    |

All additional attributes are the same as [Physical Layer \(IPhysicalLayer\)](#)

## DS1 Channelized Interface

The physical layer [DS1 Channelized Interface](#) object represents a high-order SONET/SDH DS1 circuit.

**Table 28-2** *DS1 Channelized Interface (IDS1PdhChannelized)*

| Attribute Name       | Attribute Description                                                                                                                                                     | Scheme | Polling Interval |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Description          | The description of the channelized DS1 PDH.                                                                                                                               | IPCore | Configuration    |
| PathType             | The type of SONET/SDH high-order interface.                                                                                                                               | IPCore | Configuration    |
| Sts1OrAu4OrAu3Number | The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode | IPCore | Configuration    |
| Tug3Number           | The TUG-3 number inside a channelized controller configured in SDH framing mode                                                                                           | IPCore | Configuration    |
| T3OrE3Number         | The T3 or E3 number inside a channelized controller configured in SONET framing mode.                                                                                     | IPCore | Configuration    |
| PortIps              | An array of subinterfaces configured on top of this channelized DS1 PDH.                                                                                                  | IPCore | Configuration    |

## DS3 Channelized Interface

The physical layer [DS3 Channelized Interface](#) object represents a high-order SONET/SDH DS3 circuit.

**Table 28-3** *DS3 Channelized Interface (IDS3PdhChannelized)*

| Attribute Name       | Attribute Description                                                                                                                                                     | Scheme | Polling Interval |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Description          | The description of the channelized DS3 PDH                                                                                                                                | IPCore | Configuration    |
| PathType             | The type of SONET/SDH high-order interface.                                                                                                                               | IPCore | Configuration    |
| Sts1OrAu4OrAu3Number | The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode | IPCore | Configuration    |
| Tug3Number           | The TUG-3 number inside a channelized controller configured in SDH framing mode                                                                                           | IPCore | Configuration    |
| T3OrE3Number         | The T3 or E3 number inside a channelized controller configured in SONET framing mode.                                                                                     | IPCore | Configuration    |
| PortIps              | An array of subinterfaces configured on top of this channelized DS3 PDH.                                                                                                  | IPCore | Configuration    |

## SONET SDH Hop

The physical layer [SONET SDH Hop](#) object represents an interface on a high-order SONET/SDH circuit.

**Table 28-4** *SONET SDH Hop (ISonet\_SdhHop)*

| Attribute Name       | Attribute Description                                                                                                                                                     | Scheme | Polling Interval |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Description          | The description of the high-order SONET/SDH interface (for example, <i>STS1</i> , <i>AU4</i> , <i>AU3</i> , and so on)                                                    | IPCore | Configuration    |
| AppliqueType         | Indicates the lowest level channel type to which this interface will convert (for example, <i>DS1</i> , <i>E1</i> , and so on)                                            | IPCore | Configuration    |
| PathType             | The type of high-order SONET/SDH circuit (for example, <i>STS1</i> , <i>AU4</i> , <i>AU3</i> , and so on)                                                                 | IPCore | Configuration    |
| Sts1OrAu4OrAu3Number | The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode | IPCore | Configuration    |

## SONET STS 1

The physical layer [SONET STS 1](#) object represents an instance of an STS1 circuit.

**Table 28-5** *SONET STS 1 (ISonetSts1)*

| Attribute Name                                                               | Attribute Description | Scheme | Polling Interval |
|------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as <a href="#">SONET SDH Hop (ISonet_SdhHop)</a> |                       |        |                  |

## SDH AU 4

The physical layer [SDH AU 4](#) object represents an instance of an AU4 circuit .

**Table 28-6** *SDH AU 4 (ISdhAu4)*

| Attribute Name                                                               | Attribute Description | Scheme | Polling Interval |
|------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as <a href="#">SONET SDH Hop (ISonet_SdhHop)</a> |                       |        |                  |

## SDH AU 3

The physical layer [SDH AU 3](#) object represents an instance of an AU3 circuit.

**Table 28-7** *SDH AU 3 (ISdhAu3)*

| Attribute Name                                                               | Attribute Description | Scheme | Polling Interval |
|------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as <a href="#">SONET SDH Hop (ISonet_SdhHop)</a> |                       |        |                  |

# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of SONET/SDH physical layer topology. This topology is manually (statically) configured by the system administrator.

However, it is used in conjunction with the data link layer above it, such as ATM, for discovering its physical topology, while further verifying it by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic in order to function correctly.

## Service Alarms

The following alarms are supported for this technology:

- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal
- DS1path Port Down
- DS1path port up
- DS1path link down due to admin down
- DS1path link down due to oper down
- DS1path link up
- DS1path port down
- DS3path port up
- DS3path link down due to admin down
- DS3path link down due to oper down
- DS3path link up
- Sonetpath port down
- Sonetpath port up
- Sonetpath link down due to admin down
- Sonetpath link down due to oper down
- Sonetpath link up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 29

## TDM/DSx

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This chapter describes the level of support that Cisco ANA provides for time-division multiplexing (TDM), Digital Signal (DSx) Hierarchy, and related physical technologies, as follows:

- [Technology Description, page 29-1](#)
- [Information Model Objects \(IMOs\), page 29-3](#)
- [Vendor-Specific Inventory and IMOs, page 29-11](#)
- [Network Topology, page 29-11](#)
- [Service Alarms, page 29-11](#)

## Technology Description

### TDM

Time-Division Multiplexing (TDM) is a type of digital multiplexing in which two or more signals or bit streams are transferred apparently as subchannels in one communication channel. The transmission of these streams appears to be simultaneous, but they are actually taking turns on the channel. This is done by dividing the transmission time domain into several recurrent slots of fixed length, one for each subchannel. A sample byte or data block of subchannel 1 is transmitted during timeslot 1, subchannel 2 during timeslot 2, and so on. One TDM frame consists of one timeslot per subchannel. After the last subchannel, the cycle starts again with a new frame, starting with the second sample, byte or data block from subchannel 1, and so on.

### DSx

Digital Signal (DSx) Hierarchy refers to the rate and format of digital telecommunication circuits, as part of the North American Digital Hierarchy. DSx is related to the T-carrier designations. However, DS refers to multiplexing techniques, while the T designations refer to the underlying equipment and signaling. There are various DS levels, the most common being:

- DS0/Fractional T1 (64 Kb/s), which represents a single voice telephone call.
- DS1/T1 (1.544 Mb/s), with 24 user channels.
- DS2/T2 (6.312 Mb/s), with 96 user channels.
- DS3/T3 (44.736 Mb/s), with 672 user channels.

## T3/E3

T-carrier telecommunications is a generic name for several digitally multiplexed telecommunications carrier systems used in North America, Japan, and Korea. The basic unit of the T-carrier system is the Fractional T1, which corresponds to the Digital Signal Hierarchy's DS0, and is commonly used for one voice circuit.

The E-carrier system (the "E" stands for "European") is incompatible with the T-carrier system (though cross-compliant cards exist). It is in common use everywhere outside of North America, Japan, and Korea. It typically uses the E1 (2.048 Mb/s) and E (334.368 Mb/s) line rates.

## Channelized T3, OC3, DS3 Interface

Channelization, coupled with native edge-aggregation services such as MPLS and QoS, allows service providers and large enterprises to save dramatically on power, floor space, local-loop charges, and equipment costs, by permitting receipt and transmission of multiplexed T3, OC3 and DS3 circuits over high-bandwidth physical media.

## Circuit Emulation over MPLS

In CEM, TDM bitstream connections (T1, E1, T3, E3) are encapsulated as pseudowires over the MPLS backbone. Both structured and structure-agnostic TDM bitstreams are supported.

## 1588 Clocking

TDM 1588 is known as Precision Time Protocol (PTP). The PTP standard specifies a clock synchronization protocol applicable to distributed systems consisting of one or more nodes communicating over a network. Nodes are modeled as containing a real-time clock that may be used by applications within the node for various purposes, such as generating time stamps for data or ordering events managed by the node. The protocol provides a mechanism for synchronizing the clocks of participating nodes to a high degree of accuracy and precision.



## SyncE Clocking

One of the fundamental requirements placed on next-generation networks is to provide the ability to distribute precision frequency or timing synchronization around the network. Frequency synchronization is provided by SONET/SDH equipment. used in conjunction with external timing technology, such as Cesium oscillators and GPS.

As SONET/SDH equipment is replaced by Ethernet equipment, this frequency synchronization ability is required over Ethernet ports. Synchronous Ethernet (SyncE) provides SONET/SDH physical layer (POS-PHY) frequency distribution of known, common precision frequency references.

To maintain SyncE links, a set of operations messages is required. These messages provide information about the quality of the timing source being used to clock the SyncE link, ensuring that each node is always deriving timing from the most reliable source. In SONET/SDH networks, these messages are known as Synchronization Status Messages (SSM). Each timing source has a Quality Level (QL) associated with it, which gives the accuracy of the clock. This QL information is transmitted across the network via SSMs over the Ethernet Synchronization Messaging Channel (ESMC), or via SSMs contained in the SONET/SDH frames, so that devices can know the best available source with which to synchronize. To define a preferred network synchronization flow and help prevent timing loops, users can assign priority values to particular timing sources on each router. The combination of QL information and user-assigned priority levels allows each router to choose a timing source to clock its SyncE and SONET/SDH interfaces.

**Note**

Cisco ANA supports these technologies only in conjunction with data link layer technologies, such as ATM or PoS.

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [DS0 Bundle Interface \(IDS0Bundle\)](#)
- [DS1 Physical \(IDS1Pdh\)](#)
- [DS3 Physical \(IDS3Pdh\)](#)
- [CEM Interface \(ICEMEncap\)](#)
- [CEM Group \(ICEMGroup\)](#)
- [Clock Service \(IClockService\)](#)
- [Clock Source \(IClockSource\)](#)
- [PTP Service \(IPtpService\)](#)
- [PTP Interface \(IPtpInterface\)](#)
- [ACR Service \(IACRService\)](#)
- [Recovered Clock \(IRecoveredClock\)](#)
- [SyncE Service \(ISyncE\)](#)
- [SyncE Interface \(ISyncEInterface\)](#)

## DS0 Bundle Interface

The data link layer [DS0 Bundle Interface](#) object is bound by its Containing Termination Points attribute to either [DS1 Physical](#) or [DS3 Physical](#) Layer objects. It is accessed primarily by the data link layer object, such as the [ATM Interface](#) and the [Frame Relay Interface](#), bound by its Contained Connection Termination Points attribute.

**Table 29-1** *DS0 Bundle Interface (IDS0Bundle)*

| Attribute Name                          | Attribute Description                                                    | Scheme  | Polling Interval |
|-----------------------------------------|--------------------------------------------------------------------------|---------|------------------|
| Bundled Time Slots                      | Bundled time slots (DS1 channels).                                       | Product | Configuration    |
| Bundle Location                         | Bundle location/index.                                                   | Product | Configuration    |
| AdminStatus                             | The administrative status of the interface ( <i>Down, Testing, Up</i> ). | IPCore  | Configuration    |
| OperStatus                              | The operational status of the interface ( <i>Down, Testing, Up</i> ).    | IPCore  | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer.         | N/A     | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical).                  | Product | N/A              |
| Contained Connection Termination Points | Bound connection termination points.                                     | Product | N/A              |

## DS1 Physical

The physical layer [DS1 Physical](#) and [DS3 Physical](#) objects are bound by their Containing Termination Points attribute to a [Port Connector](#) object. Each of these objects is accessed primarily by the data link layer object (such as an [ATM Interface](#), [Frame Relay Interface](#), or [DS0 Bundle Interface](#)) bound by its Contained Connection Termination Points attribute.

**Table 29-2** *DS1 Physical (IDS1Pdh)*

| Attribute Name        | Attribute Description                                                                                                                                                                                                                                                    | Scheme  | Polling Interval |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Framing Type          | Framing type ( <i>Null, OTHER, ESF, ANSI ESFf, D4, E1, E1 CRC, E1 MF, E1 CRC MF, UNFRAMED, E1 UNFRAMED, DS2 M12, E2, E1 Q50, E1 Q50 CRC, ANSI SF, E1 CAS CRC4, E1 CAS No CRC4, E1 No CAS CRC4, E1 No CAS No CRC4, E1 Unstructured, T1 Unstructured, CLEAR CHANNEL</i> ). | Product | Configuration    |
| Cell Mapping Type     | Cell mapping type ( <i>Null, PLCP, HEC, HCS, Direct, ADM</i> ).                                                                                                                                                                                                          | Product | Configuration    |
| Loop Back Type        | Loopback type ( <i>Null, Cell, Payload, Diag, Line, None, Other, Path, Metallic, Non Metallic, Serial, Parallel, Local, Internal, Network, Inward, Dual, Remote, Inbound Local, No Loop</i> ).                                                                           | Product | Configuration    |
| Scrambling Mode       | Scrambling mode ( <i>Null, On, Off</i> ).                                                                                                                                                                                                                                | Product | Configuration    |
| Port Description      | Port description.                                                                                                                                                                                                                                                        | Product | Configuration    |
| International Bit     | Indicates whether the E3 international bit is set.                                                                                                                                                                                                                       | Product | Configuration    |
| Line Code             | Line-code type for T1 or E1 lines ( <i>ami, b8zs, hdb3</i> ).                                                                                                                                                                                                            | Product | Configuration    |
| Cable Length          | Set cable length.                                                                                                                                                                                                                                                        | Product | Configuration    |
| Recovered Clocking ID | Recovered clocking ID.                                                                                                                                                                                                                                                   | Product | Configuration    |

**Table 29-2 DS1 Physical (IDS1Pdh) (continued)**

| Attribute Name | Attribute Description                                                         | Scheme  | Polling Interval |
|----------------|-------------------------------------------------------------------------------|---------|------------------|
| Clocking       | Clocking type ( <i>stratum1</i> , and so on).                                 | Product | Configuration    |
| Loopback       | Transponder loopback setting ( <i>none</i> , <i>internal</i> , <i>line</i> ). | Product | Configuration    |

All additional attributes are the same as [Physical Layer \(IPhysicalLayer\)](#)

## DS3 Physical

**Table 29-3 DS3 Physical (IDS3Pdh)**

| Attribute Name        | Attribute Description                                                                                                                                                                                                                                                                                                                                | Scheme  | Polling Interval |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| Framing Type          | Framing type ( <i>Null</i> , <i>Other</i> , <i>M23</i> , <i>SYNTRAN</i> , <i>CBIT</i> , <i>Clear Channel</i> , <i>E3 Other</i> , <i>E3 Framed</i> , <i>Unframed</i> , <i>E3 Unframed</i> , <i>ITU-T G.804</i> , <i>ITU-T G.832</i> , <i>M13</i> ).                                                                                                   | Product | Configuration    |
| Cell Mapping Type     | Cell mapping type ( <i>Null</i> , <i>PLCP</i> , <i>HEC</i> , <i>HCS</i> , <i>Direct</i> , <i>ADM</i> ).                                                                                                                                                                                                                                              | Product | Configuration    |
| Loop Back Type        | Loopback type ( <i>Null</i> , <i>Cell</i> , <i>Payload</i> , <i>Diag</i> , <i>Line</i> , <i>None</i> , <i>Other</i> , <i>Path</i> , <i>Metalic</i> , <i>Non Metalic</i> , <i>Serial</i> , <i>Parallel</i> , <i>Local</i> , <i>Internal</i> , <i>Network</i> , <i>Inward</i> , <i>Dual</i> , <i>Remote</i> , <i>Inbound Local</i> , <i>No Loop</i> ). | Product | Configuration    |
| Scrambling Mode       | Scrambling mode ( <i>Null</i> , <i>On</i> , <i>Off</i> ).                                                                                                                                                                                                                                                                                            | Product | Configuration    |
| Port Description      | Port description.                                                                                                                                                                                                                                                                                                                                    | Product | Configuration    |
| International Bit     | Indicates whether the E3 international bit is set.                                                                                                                                                                                                                                                                                                   | Product | Configuration    |
| Line Code             | Line-code type for T1 or E1 lines ( <i>ami</i> , <i>b8zs</i> , <i>hdb3</i> ).                                                                                                                                                                                                                                                                        | Product | Configuration    |
| Cable Length          | Set cable length.                                                                                                                                                                                                                                                                                                                                    | Product | Configuration    |
| Recovered Clocking ID | Recovered clocking ID.                                                                                                                                                                                                                                                                                                                               | Product | Configuration    |
| Clocking              | Clocking type ( <i>stratum1</i> , and so on).                                                                                                                                                                                                                                                                                                        | Product | Configuration    |
| Loopback              | Transponder loopback setting ( <i>none</i> , <i>internal</i> , <i>line</i> ).                                                                                                                                                                                                                                                                        | Product | Configuration    |

All additional attributes are the same as [Physical Layer \(IPhysicalLayer\)](#)

## CEM Interface

The [CEM Interface](#) object represents a CEM-encapsulated E1/T1 circuit interface.

**Table 29-4 CEM Interface (ICEMEncap)**

| Attribute Name | Attribute Description                                                           | Scheme | Polling Interval |
|----------------|---------------------------------------------------------------------------------|--------|------------------|
| cemIfName      | The interface name (for example, <i>CEM8/0/0</i> or <i>Virtual-cem8/0/24</i> ). | IPCore | Configuration    |

## CEM Group

The [CEM Group](#) object represents a CEM Group configured on a physical or virtual [CEM Interface](#).

**Table 29-5** *CEM Group (ICEMGroup)*

| Attribute Name | Attribute Description                                                                                                                            | Scheme | Polling Interval |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| ID             | The DS0 bundle CEM group identifier.                                                                                                             | IPCore | Configuration    |
| IdlePattern    | The 8-bit hexadecimal number that is transmitted on a T1 or E1 line when missing packets are detected on the PW circuit.                         | IPCore | Configuration    |
| IdleCAS        | When channel associated signaling (CAS) is used, the 8-bit hexadecimal signal that is sent when the CEM interface is identified as idle.         | IPCore | Configuration    |
| DeJitter       | The size of the dejitter buffer in milliseconds (ms) (in the range 4-500, 4 is the default).                                                     | IPCore | Configuration    |
| PayloadSize    | The size of the payload (in bytes) for packets on the CEM interface (in the range 32-1312).                                                      | IPCore | Configuration    |
| RTP            | Indicates whether RTP compression is <i>enabled</i> or <i>disabled</i> .                                                                         | IPCore | Configuration    |
| RTPHeader      | Indicates whether RTP header compression is <i>enabled</i> or <i>disabled</i> .                                                                  | IPCore | Configuration    |
| TimeSlots      | The range of timeslots (DS0 channels) allotted to the CEM interface. Empty if the Structure-Agnostic TDM over Packet (SAToP) method is used.     | IPCore | Configuration    |
| Pseudowire     | The name of the pseudowire configured on the CEM interface.                                                                                      | IPCore | Configuration    |
| AdminStatus    | The administrative status of the CEM interface ( <i>Down</i> , <i>Testing</i> , <i>Unknown</i> , <i>Up</i> ).                                    | IPCore | Configuration    |
| OperStatus     | The operational status of the CEM interface ( <i>Dormant</i> , <i>Down</i> , <i>Not Present</i> , <i>Testing</i> , <i>Unknown</i> , <i>Up</i> ). | IPCore | Configuration    |

## Clock Service

The [Clock Service](#) object models the generic clocking configuration and clocking features of a network element, independent of any particular timing scheme, such as PTP or Anonymous Call Rejection (ACR).

**Table 29-6** *Clock Service (IClockService)*

| Attribute Name    | Attribute Description                                                                                                                                       | Scheme | Polling Interval |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| ActiveClockSource | The current active clock source used by the network element.                                                                                                | Any    | Configuration    |
| NcsMode           | The network clock selection mode ( <i>revert</i> , <i>nonrevert</i> , <i>unknown</i> ). NCS is used in case of master device failure.                       | Any    | Configuration    |
| HoldTimeout       | The network clock selection hold timeout in seconds (in the range 0-86400, -1 for no timeout).                                                              | Any    | Configuration    |
| UseStratum4       | Indicates whether the Stratum4 clock is used ( <i>true</i> ) or not ( <i>false</i> ). The default is <i>false</i> , which means the Stratum3 clock is used. | Any    | Configuration    |
| Mode              | The network element clocking mode ( <i>unknown</i> , <i>slave</i> , <i>master</i> , <i>hybrid</i> ).                                                        | Any    | Configuration    |
| NcsPriorityList   | The network clock selection priority list.                                                                                                                  | Any    | Configuration    |

**Table 29-6** *Clock Service (IClockService) (continued)*

| Attribute Name            | Attribute Description                                                             | Scheme | Polling Interval |
|---------------------------|-----------------------------------------------------------------------------------|--------|------------------|
| Pseudowire Clock Recovery | An array of zero or more instances of <a href="#">ACR Service (IACRService)</a> . | Any    | Configuration    |
| PtpService                | An array of zero or more instances of <a href="#">PTP Service (IPtpService)</a> . | Any    | Configuration    |

## Clock Source

The [Clock Source](#) object represents the network clock source defined in an instance of the [Clock Service](#) object.

**Table 29-7** *Clock Source (IClockSource)*

| Attribute Name | Attribute Description                                                                                            | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Priority       | The priority of the defined clock source.                                                                        | Any    | Configuration    |
| Source         | The clock source.                                                                                                | Any    | Configuration    |
| Status         | Indicates that the clock source status is valid ( <i>true</i> ) or non existent/non functional ( <i>false</i> ). | Any    | Configuration    |
| Type           | The clock source type ( <i>BITS</i> , <i>packet-timing</i> , <i>sync</i> , <i>E1/T1</i> ).                       | Any    | Configuration    |

## PTP Service

The [PTP Service](#) object represents PTP (IEEE-1588) configurations on a network element at the device level.

**Table 29-8** *PTP Service (IPtpService)*

| Attribute Name   | Attribute Description                                                                                                                                                                      | Scheme | Polling Interval |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Mode             | The PTP operating mode ( <i>unknown</i> , <i>ordinary</i> , <i>boundary</i> , <i>e2ettransparent</i> , <i>p2pttransparent</i> ). On the Cisco MWR-2941, only <i>ordinary</i> is supported. | Any    | Configuration    |
| ClockId          | The PTP clock ID.                                                                                                                                                                          | Any    | Configuration    |
| Domain           | The PTP domain ID (in the range 0 to 127).                                                                                                                                                 | Any    | Configuration    |
| Priority1        | PTP clock selection priority-1 (in the range 0 to 255).                                                                                                                                    | Any    | Configuration    |
| Priority2        | PTP clock selection priority-2 (in the range 0 to 255).                                                                                                                                    | Any    | Configuration    |
| PtpEnabled       | Indicates whether PTP is enabled ( <i>true</i> ) or disabled ( <i>false</i> ).                                                                                                             | Any    | Configuration    |
| PtpInterfaceList | An array of one or more instances of <a href="#">PTP Interface (IPtpInterface)</a>                                                                                                         | Any    | Configuration    |

## PTP Interface

The [PTP Interface](#) object represents PTP (IEEE-1588) configurations on a network element at the interface level.

**Table 29-9** *PTP Interface (IPtpInterface)*

| Attribute Name     | Attribute Description                                                                                                        | Scheme | Polling Interval |
|--------------------|------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Version            | The PTP version (default is 2).                                                                                              | Any    | Configuration    |
| AnnounceInterval   | The PTP interface announce interval (in the range 0 to 4).                                                                   | Any    | Configuration    |
| AnnounceTimeout    | The PTP interface announce timeout (in the range 2 to 10).                                                                   | Any    | Configuration    |
| DestinationAddress | The clock destination IP address (can be <i>null</i> , set only when in Master mode).                                        | Any    | Configuration    |
| SourceAddress      | The clock source IP address (can be <i>null</i> , set only when in Slave mode).                                              | Any    | Configuration    |
| DelayReq           | The PTP interface delay request message interval.                                                                            | Any    | Configuration    |
| MasterMode         | The PTP communication mode in Master mode ( <i>notset</i> , <i>multicast</i> , <i>unicast</i> , <i>unicastnegotiation</i> ). | Any    | Configuration    |
| SlaveMode          | The PTP communication mode in Slave mode ( <i>notset</i> , <i>multicast</i> , <i>unicast</i> , <i>unicastnegotiation</i> ).  | Any    | Configuration    |
| SyncInterval       | The PTP interface sync interval.                                                                                             | Any    | Configuration    |
| SyncLimit          | The PTP interface maximum offset (in the range 1000 to 50000).                                                               | Any    | Configuration    |
| InterfaceXid       | The XID of the associated interface.                                                                                         | Any    | Configuration    |

## ACR Service

The [ACR Service](#) object represents the pseudowire clock recovery.

**Table 29-10** *ACR Service (IACRService)*

| Attribute Name       | Attribute Description                                                                    | Scheme | Polling Interval |
|----------------------|------------------------------------------------------------------------------------------|--------|------------------|
| RecoveredClockSource | The interface (slot or subslot) on which the clock recovery will occur.                  | Any    | Configuration    |
| RecoveredClockMode   | The recovered clock mode.                                                                | Any    | Configuration    |
| CemInterface         | The corresponding CEM or Virtual CEM interface instance ID.                              | Any    | Configuration    |
| RecoveredClockList   | An array of one or more instances of <a href="#">Recovered Clock (IRecoveredClock)</a> . | Any    | Configuration    |

## Recovered Clock

The [Recovered Clock](#) object represents the clock information derived from the RNC or from other n-PE, P, or u-PE devices.

**Table 29-11** *Recovered Clock (IRecoveredClock)*

| Attribute Name     | Attribute Description              | Scheme | Polling Interval |
|--------------------|------------------------------------|--------|------------------|
| ClockId            | The clock ID.                      | Any    | Configuration    |
| RecoveredClockMode | The recovered clock mode.          | Any    | Configuration    |
| Port               | The port number.                   | Any    | Configuration    |
| Cem                | The CEM Group.                     | Any    | Configuration    |
| Status             | The priority.                      | Any    | Configuration    |
| FrequencyOffset    | The value of the frequency offset. | Any    | Configuration    |

## SyncE Service

The [SyncE Service](#) object represents the global Synchronous Ethernet configuration for a network element.

**Table 29-12** *SyncE Service (ISyncE)*

| Attribute Name  | Attribute Description                                                                                                                                                                                     | Scheme | Polling Interval |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| synchronousMode | Enable automatic synchronization selection process.                                                                                                                                                       | Any    | Configuration    |
| equipmentClock  | Indicates the currently selected Ethernet Equipment Clock option (EEC-Option I, EEC-Option II).                                                                                                           | Any    | Configuration    |
| clockMode       | Indicates whether Quality Level is enabled ( <i>QL-Disable</i> , <i>QL-Enable</i> ).                                                                                                                      | Any    | Configuration    |
| ssmOption       | Indicates which of the Synchronization Status Messages (SSM) options is currently in use on the NE ( <i>ITU-T Option I</i> , <i>ITU-T Option II generation 1</i> , <i>ITU-T Option II generation 2</i> ). | Any    | Configuration    |
| esmcMode        | Indicates whether Ethernet Synchronization Messaging Channel is enabled on the NE ( <i>true</i> ) or not ( <i>false</i> ).                                                                                | Any    | Configuration    |
| holdOffTimer    | The amount of time (in milliseconds) the NE waits before removing a source that has gone down (values in the range 0 to 50000, default is 300).                                                           | Any    | Configuration    |
| waitToRestore   | The amount of time (in milliseconds) the NE waits before adding a source that has just come up (values in the range 0 to 86400).                                                                          | Any    | Configuration    |
| Revertive       | Indicates whether Revertive mode is enabled ( <i>true</i> ) or disabled ( <i>false</i> ) on the NE.                                                                                                       | Any    | Configuration    |

## SyncE Interface

The [SyncE Interface](#) object represents the Synchronous Ethernet configuration for a single interface on an NE.

**Table 29-13** SyncE Interface (ISyncEInterface)

| Attribute Name  | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Scheme | Polling Interval |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| selectionInput  | Assign the interface as a timing source to be passed to the selection algorithm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Any    | Configuration    |
| ingressESMCMode | Indicates whether Ethernet Synchronization Messaging Channel is enabled ( <i>true</i> ) or disabled ( <i>false</i> ) for incoming QL information on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                | Any    | Configuration    |
| egressESMCMode  | Indicates whether Ethernet Synchronization Messaging Channel is enabled ( <i>true</i> ) or disabled ( <i>false</i> ) for outgoing QL information on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                | Any    | Configuration    |
| ingressQLMode   | Indicates whether incoming quality level information is enabled ( <i>true</i> ) or disabled ( <i>false</i> ) on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Any    | Configuration    |
| ingressQuality  | Indicates the type of incoming quality level information, depending on the globally configured SSM option. For <i>ITU-T Option I</i> , available values are <i>QL-PRC</i> , <i>QL-SSU-A</i> , <i>QL-SSU-B</i> , <i>QL-SEC</i> , and <i>QL-DNU</i> . For <i>ITU-T Option II generation 1</i> , available values are <i>QL-PRS</i> , <i>QL-STU</i> , <i>QL-ST2</i> , <i>QL-SMC</i> , <i>QL-ST4</i> , <i>QL-DUS</i> . For <i>ITU-T Option II generation 2</i> , available values are <i>QL-PRS</i> , <i>QL-STU</i> , <i>QL-ST2</i> , <i>QL-TNC</i> , <i>QL-ST3</i> , <i>QL-SMC</i> , <i>QL-ST4</i> , <i>QL-DUS</i> . | Any    | Configuration    |
| egressQLMode    | Indicates whether incoming quality level information is enabled ( <i>true</i> ) or disabled ( <i>false</i> ) on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Any    | Configuration    |
| egressQuality   | Indicates the type of outgoing quality level information, depending on the globally configured SSM option. For <i>ITU-T Option I</i> , available values are <i>QL-PRC</i> , <i>QL-SSU-A</i> , <i>QL-SSU-B</i> , <i>QL-SEC</i> , and <i>QL-DNU</i> . For <i>ITU-T Option II generation 1</i> , available values are <i>QL-PRS</i> , <i>QL-STU</i> , <i>QL-ST2</i> , <i>QL-SMC</i> , <i>QL-ST4</i> , <i>QL-DUS</i> . For <i>ITU-T Option II generation 2</i> , available values are <i>QL-PRS</i> , <i>QL-STU</i> , <i>QL-ST2</i> , <i>QL-TNC</i> , <i>QL-ST3</i> , <i>QL-SMC</i> , <i>QL-ST4</i> , <i>QL-DUS</i> . | Any    | Configuration    |
| waitToRestore   | The amount of time (in milliseconds) the interface waits before adding a source that has just come up (values in the range 0 to 86400).                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Any    | Configuration    |
| holdOffTimer    | The amount of time (in milliseconds) the interface waits before removing a source that has gone down (values in the range 0 to 50000, default is 300).                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Any    | Configuration    |



# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of physical layer topology. This topology is manually (statically) configured by the system administrator. However, it is used in conjunction with the data link layer above it, such as ATM, for discovering its physical topology, while further verifying it by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic in order to function correctly.

## Service Alarms

The following alarms are supported for this technology:

- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal
- DS0 Bundle Admin Down
- DS0 Bundle Oper Down
- DS0 Bundle Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





# CHAPTER 30

## Serial

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This chapter describes the level of support that Cisco ANA provides for serial links, as follows:

- [Technology Description, page 30-1](#)
- [Information Model Objects \(IMOs\), page 30-2](#)
- [Vendor-Specific Inventory and IMOs, page 30-2](#)
- [Network Topology, page 30-2](#)
- [Service Alarms, page 30-2](#)

## Technology Description

### Serial Links

Serial links take many forms, from 2400 b/s dial-up modems to dedicated T3 leased lines. All share two common traits: they interconnect two hosts, and they transmit a single bit at a time in each direction. The stream of bits is assembled into bytes and then packets. The speed of a serial line is rated in bits per second (b/s). They are either synchronous (in which some kind of clocking signal is transmitted with the data) or asynchronous.

**Note**

Cisco ANA supports this technology only in conjunction with data link layer technologies, such as ATM or PoS.

# Information Model Objects (IMOs)

This section describes the following IMO:

- [Serial Interface \(IPhysicalLayer\)](#)

## Serial Interface

Physical layer [Serial Interface](#) objects are bound by their Containing Termination Points attribute to a [Port Connector](#) object. Each object is accessed primarily by the data link layer object, such as the [PPP Encapsulation](#) interface, bound by its Contained Connection Termination Points attribute.

**Table 30-1** *Serial Interface (IPhysicalLayer)*

| Attribute Name                                                                 | Attribute Description | Scheme | Polling Interval |
|--------------------------------------------------------------------------------|-----------------------|--------|------------------|
| All attributes are the same as <a href="#">Physical Layer (IPhysicalLayer)</a> |                       |        |                  |

# Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

## Network Topology

Cisco ANA does not support discovery of physical layer topology. This topology is manually (statically) configured by the system administrator. However, it is used in conjunction with the data link layer above it, such as ATM, for discovering its physical topology, while further verifying it by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic in order to function correctly.

## Service Alarms

The following alarms are supported for this technology:

- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



# CHAPTER 31

## Access Control Lists

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This chapter describes the level of support that Cisco ANA provides for Access Control Lists (ACLs), as follows:

- [Technology Description, page 31-1](#)
- [Information Model Objects \(IMOs\), page 31-2](#)
- [Vendor-Specific Inventory and IMOs, page 31-3](#)
- [Network Topology, page 31-3](#)
- [Service Alarms, page 31-3](#)

## Technology Description

### ACLs

An ACL is a group of statements. Each defines a pattern of data that can be found in an IP packet. As each packet comes through an interface with an associated ACL, the ACL is scanned from top to bottom, in the exact order in which it was entered, for a pattern that matches the incoming packet. A permit or deny rule associated with each pattern determines that packet's fate. A mask (similar to a wild card) can also be used to determine how much of an IP source or destination address to use when matching against the pattern. The pattern statement can also include a TCP or UDP port.

Note that Cisco ANA currently supports IP ACLs only. MAC ACLs are not supported.

# Information Model Objects (IMOs)

This section describes the following IMOs:

- [Access List Traffic Descriptor \(IAccessList\)](#)
- [Access List Entry \(IAccessListEntry\)](#)

## Access List Traffic Descriptor

The [Access List Traffic Descriptor](#), with its [Access List Entry](#) objects, describes an access list of a single type (*Unknown*, *Standard*, *Extended*, or *Rate Limit*). It is aggregated by a [Traffic Descriptor Container](#) object (see [Common Components](#)).

**Table 31-1** Access List Traffic Descriptor (IAccessList)

| Attribute Name            | Attribute Description                                                                       | Scheme | Polling Interval |
|---------------------------|---------------------------------------------------------------------------------------------|--------|------------------|
| Type                      | Access list type ( <i>Unknown</i> , <i>Standard</i> , <i>Extended</i> , <i>Rate Limit</i> ) | Any    | Configuration    |
| Access List Entries Table | Array of instances of <a href="#">Access List Entry</a>                                     | Any    | Configuration    |
| Name or ID                | Traffic descriptor name or identifier                                                       | Any    | Configuration    |
| Index                     | Traffic descriptor index                                                                    | Any    | Configuration    |

## Access List Entry

**Table 31-2** Access List Entry (IAccessListEntry)

| Attribute Name                      | Attribute Description                                                                                                                                                                                                    | Scheme | Polling Interval |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Entry Identification                | Entry identifier.                                                                                                                                                                                                        | Any    | Configuration    |
| Action Logic                        | Action logic ( <i>Unknown</i> , <i>Permit</i> , <i>Deny</i> ).                                                                                                                                                           | Any    | Configuration    |
| Source and Destination Address      | Source and destination IP address.                                                                                                                                                                                       | Any    | Configuration    |
| Source and Destination Wildcard     | Source and destination IP wildcard.                                                                                                                                                                                      | Any    | Configuration    |
| Protocol Type                       | Internet Assigned Numbers Authority (IANA) type of the protocol ( <i>HOPORT</i> , <i>ICMP</i> , <i>IGMP</i> , <i>GGP</i> , <i>IP in IP</i> , <i>ST</i> , <i>TCP</i> , <i>CBT</i> , <i>EGP</i> , <i>IGP</i> , and so on). | Any    | Configuration    |
| Source and Destination Ports Ranges | Source and destination TCP/UDP port ranges.                                                                                                                                                                              | Any    | Configuration    |
| Source and Destination Port Action  | Source and destination port action ( <i>Null</i> , <i>Equal</i> , <i>Not Equal</i> , <i>Greater Than</i> , <i>Less Than</i> , <i>Range</i> ).                                                                            | Any    | Configuration    |
| Protocol Specific Info              | Protocol specific information.                                                                                                                                                                                           | Any    | Configuration    |
| Differential Services Code Points   | Differential Services Code Points (DSCP).                                                                                                                                                                                | Any    | Configuration    |

**Table 31-2** Access List Entry (*IAccessListEntry*) (continued)

| Attribute Name  | Attribute Description                                                                                                                                     | Scheme | Polling Interval |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Type of Service | Type of Service (ToS) ( <i>Normal [0], Min Cost [1], Max Reliability [2], 3, Max Throughput [4], 5, 6, 7, Min Delay [8], 9, 10, 11, 12, 13, 14, 15</i> ). | Any    | Configuration    |
| Precedence      | Precedence ( <i>Routine [0], Priority [1], Immediate [2], Flash [3], Flash Override [4], Critical [5], Internet [6], Network [7]</i> ).                   | Any    | Configuration    |
| Matches         | The number of matches made.                                                                                                                               | Any    | Configuration    |

## Vendor-Specific Inventory and IMOs

In this chapter, [Information Model Objects \(IMOs\), page 31-2](#), currently describes Cisco's QoS objects. However, these are generic QoS objects that can be used by other vendors.

## Network Topology

There is no specific network topology associated with this technology.

## Service Alarms

There are no faults or alarms associated with this technology.

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).







# CHAPTER 32

## Physical Components

This chapter describes the level of support that Cisco ANA provides for basic physical components of network elements, as follows:

- [Information Model Objects \(IMOs\), page 32-1](#)
- [Service Alarms, page 32-4](#)

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [Chassis \(IChassis\)](#)
- [Shelf \(IShelf\)](#)
- [Module \(IModule\)](#)
- [Power Supply \(IPowerSupply\)](#)
- [Port Connector \(IPortConnector\)](#)

## Chassis

The [Chassis](#) object represents an equipment chassis. Its Contained Equipment Holders attribute binds it to other equipment holder objects, such as a [Shelf](#).

**Table 32-1**      **Chassis (IChassis)**

| Attribute Name              | Attribute Description                    | Scheme | Polling Interval |
|-----------------------------|------------------------------------------|--------|------------------|
| Description                 | Chassis description                      | Any    | Configuration    |
| Equipment Holder Type       | Equipment holder type ( <i>Chassis</i> ) | Any    | Configuration    |
| Contained Equipment Holders | Contained equipment holders              | Any    | Configuration    |
| Contained Equipments        | Contained equipment                      | Any    | Configuration    |
| Serial Number               | Serial number of the chassis             | Any    | Configuration    |

## Shelf

The [Shelf](#) object represents a shelf. Its Contained Equipment Holders and Contained Equipments attributes bind it to other equipment holders and equipment objects it contains.

**Table 32-2 Shelf (IShelf)**

| Attribute Name              | Attribute Description                  | Scheme | Polling Interval |
|-----------------------------|----------------------------------------|--------|------------------|
| Description                 | Chassis description                    | Any    | Configuration    |
| Status                      | Shelf status                           | Any    | Configuration    |
| Equipment Holder Type       | Equipment holder type ( <i>Shelf</i> ) | Any    | Configuration    |
| Contained Equipment Holders | Contained equipment holders            | Any    | Configuration    |
| Contained Equipments        | Contained equipment                    | Any    | Configuration    |
| Serial Number               | Serial number of the shelf             | Any    | Configuration    |

## Module

The [Module](#) object represents a module or board. Its Contained Equipment Holders and supported Physical Termination Points attributes bind it to other equipment holders (subslots) and supported physical termination points ([Port Connectors](#)) objects it may contain.

**Table 32-3 Module (IModule)**

| Attribute Name                        | Attribute Description                                                                                                                    | Scheme | Polling Interval |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Module Name                           | Module name                                                                                                                              | Any    | Configuration    |
| Module Description                    | Module description                                                                                                                       | Any    | Configuration    |
| Software Version                      | Software version                                                                                                                         | Any    | Configuration    |
| Operational Status                    | Operational status ( <i>Unknown, OK, Warning, Minor, Major, Critical, UnManaged, Enabled, Disabled, Information, Cleaning, Standby</i> ) | Any    | Configuration    |
| Hardware Type and Version             | Hardware type and version                                                                                                                | Any    | Configuration    |
| Managed IP Address                    | Managed IP address                                                                                                                       | Any    | Configuration    |
| Redundant Equipment                   | Redundant equipment number                                                                                                               | Any    | Configuration    |
| Configured Redundancy                 | Configured redundancy ( <i>Null, Working, Protecting, None</i> )                                                                         | Any    | Configuration    |
| Redundancy Status                     | Redundancy status ( <i>Null, Active, Standby, None</i> )                                                                                 | Any    | Configuration    |
| Operational Status Last Change        | Date of last operational status change                                                                                                   | Any    | Configuration    |
| Contained Equipment Holders           | Contained equipment holders                                                                                                              | Any    | Configuration    |
| Supported Physical Termination Points | Supported physical termination points                                                                                                    | Any    | Configuration    |
| Serial Number                         | Serial number of the module                                                                                                              | Any    | Configuration    |
| Slots Number                          | Number of slots in the module                                                                                                            | Any    | Configuration    |

## Power Supply

The [Power Supply](#) object represents a power supply. Its Contained Equipment Holders attribute binds it to other equipment holder objects it may contain.

**Table 32-4** *Power Supply (IPowerSupply)*

| Attribute Name                 | Attribute Description                                                                                                                    | Scheme | Polling Interval |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Operational Status             | Operational status ( <i>Unknown, OK, Warning, Minor, Major, Critical, UnManaged, Enabled, Disabled, Information, Cleaning, Standby</i> ) | Any    | Status           |
| Hardware Type and Version      | Hardware type and version                                                                                                                | Any    | Configuration    |
| Management IP Address          | Management IP address                                                                                                                    | Any    | Configuration    |
| Redundant Equipment            | Redundant equipment number                                                                                                               | Any    | Configuration    |
| Configured Redundancy          | Configured redundancy ( <i>Null, Working, Protecting, None</i> )                                                                         | Any    | Configuration    |
| Redundancy Status              | Redundancy status ( <i>Null, Active, Standby, None</i> )                                                                                 | Any    | Configuration    |
| Operational Status Last Change | Date of last operational status change                                                                                                   | Any    | Configuration    |
| Contained Equipment Holders    | Contained equipment holders                                                                                                              | Any    | Configuration    |

## Port Connector

The [Port Connector](#) object represents a port connector physical termination point. It is accessed by the [Module](#) containing it.

**Table 32-5** *Port Connector (IPortConnector)*

| Attribute Name                          | Attribute Description                                                                                                                                                                                                                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Location                                | Port connector location                                                                                                                                                                                                                                         | Any    | Configuration    |
| Alias                                   | Port alias                                                                                                                                                                                                                                                      | Any    | Configuration    |
| Type                                    | Port connector type ( <i>Unknown, BNC, RJ11, RJ45, Fiber Optic, RJ48, Fiber Optic FC, Fiber Optic SC, Fiber Optic ST, Fiber Optic LC, Internal, Backplane, Fiber Optics MT RJ, DB 15 Pin, SMB, DB 60 Pin, DB 50 Pin, 34-pin Winchester, Generic, DB 9 Pin</i> ) | Any    | Configuration    |
| Sub Ports                               | Subconnection termination points (currently being used only for Lucent SONET/SDH equipment)                                                                                                                                                                     | Any    | Configuration    |
| Supporting Equipment                    | Supporting equipment in which this port connector resides                                                                                                                                                                                                       | Any    | Configuration    |
| Contained Connection Termination Points | Bound connection termination points                                                                                                                                                                                                                             | Any    | Configuration    |

# Service Alarms

The following alarms are supported for this technology:

- Card Out/Card In
- Card Down/Card Up

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).



# CHAPTER 33

## Logical Components

This chapter describes the level of support that Cisco ANA provides for basic logical components required for network element modeling, as follows:

- [Information Model Objects \(IMOs\), page 33-1](#)
- [Service Alarms, page 33-4](#)

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [Managed Element \(IManagedElement\)](#)
- [Logical Root \(ILogicalRoot\)](#)
- [Physical Root \(IPhysicalRoot\)](#)
- [Managed IP \(IManagedIP\)](#)
- [Context \(IContext\)](#)
- [System Service \(ISystemService\)](#)

## Managed Element

The [Managed Element](#) object describes the root object of a modeled network element, from which all of its physical (chassis, slots, modules, port connectors) and logical (routing and switching entities, communication and physical termination point) component objects are accessed.

**Table 33-1**      **Managed Element (IManagedElement)**

| Attribute Name      | Attribute Description                                                                                                                                                                          | Scheme | Polling Interval |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| IP Address          | Management IP address                                                                                                                                                                          | Any    | Configuration    |
| Communication State | Communication state with the managed device and the gateway ( <i>Unknown, Device Unreachable, Agent Unreachable, Device Reachable, Agent Unloaded</i> )                                        | Any    | Configuration    |
| Investigation State | Investigation state of the VNE ( <i>Unknown, Initializing, Normal, Incomplete, Unsupported, Device Agent Shutting Down, Device Agent Maintenance, Device Agent Preparing for Maintenance</i> ) | Any    | Configuration    |

**Table 33-1** *Managed Element (IManagedElement) (continued)*

| Attribute Name                                          | Attribute Description                                                                                                                                                                                                                          | Scheme | Polling Interval |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Element Category                                        | Element category ( <i>Unknown, DSLAM, Switch, BRAS, Router, Ethernet Switch, Cloud, Metro Central, Server, EMS, Generic Device Agent, ICMP, PC, Printer, Netra, WiFi Element, Service Control Switch</i> )                                     | Any    | Configuration    |
| Element Type and its Key                                | Element type and its key mapped by the registry based on the SNMP system OID                                                                                                                                                                   | Any    | Configuration    |
| Logical and Physical Roots                              | Logical and physical roots of the VNE model                                                                                                                                                                                                    | Any    | Configuration    |
| Device Name                                             | Device name as configured by the user in the registry                                                                                                                                                                                          | Any    | Configuration    |
| System Name, Description, Location, Contact and Up Time | System name, description, location, contact and This section currently describes Cisco's QoS objects, although they appear as generic QoS objects that can be used by other vendors. taken from MIB II (RFC 1213)                              | Any    | Configuration    |
| Software Version                                        | Software version running on the network element                                                                                                                                                                                                | Any    | System           |
| Vendor Identity                                         | Vendor identity ( <i>Null, Alcatel, Cisco, Copper Mountain, Redback Networks, Marconi, Lucent, Nokia, ADC, TdSoft, RAD, Nortel Networks, ECI Telecom, Juniper Networks, Sheer Networks, SUN Microsystems, NEC, Huawei, Laurel, UTStarcom</i> ) | Any    | Configuration    |
| Memory and CPU Usage                                    | Memory and CPU usage                                                                                                                                                                                                                           | Any    | Status           |
| Agent Memory and Free Memory Sizes                      | Agent memory and free memory sizes                                                                                                                                                                                                             | Any    | Configuration    |
| Number of Device Components                             | Number of Device Components (DCs)                                                                                                                                                                                                              | Any    | Configuration    |
| Number of Logical Entries                               | Number of property holders that are not DCs                                                                                                                                                                                                    | Any    | Configuration    |

## Logical Root

The [Logical Root](#) and [Physical Root](#) objects aggregate or contain all the logical and physical components of a [Managed Element](#). They are accessed by the later logical and physical root attributes.

**Table 33-2** *Logical Root (ILogicalRoot)*

| Attribute Name                        | Attribute Description                                                                                                 | Scheme | Polling Interval |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Managed IPs List                      | Array of <a href="#">Managed IPs</a>                                                                                  | Any    | Configuration    |
| Contexts List                         | Array of <a href="#">Contexts</a>                                                                                     | Any    | Configuration    |
| Forwarding Components List            | Array of <a href="#">Forwarding Component Containers</a>                                                              | Any    | Configuration    |
| Traffic Descriptors List              | Array of <a href="#">Traffic Descriptor Containers</a>                                                                | Any    | Configuration    |
| Tunnel Containers List                | Array of <a href="#">Tunnel Containers</a>                                                                            | Any    | Configuration    |
| Services List                         | Array of <a href="#">System Services</a>                                                                              | Any    | Configuration    |
| Data Link Aggregation Containers List | Array of data link aggregations ( <a href="#">Link Aggregation Groups</a> , <a href="#">Cisco Ethernet Channels</a> ) | Any    | Configuration    |

## Physical Root

**Table 33-3** *Physical Root (IPhysicalRoot)*

| Attribute Name    | Attribute Description                                                                | Scheme | Polling Interval |
|-------------------|--------------------------------------------------------------------------------------|--------|------------------|
| Equipment Holders | Array of equipment holders such as <a href="#">Chassis</a> and <a href="#">Shelf</a> | Any    | Configuration    |

## Managed IP

The [Managed IP](#) object aggregates or contains all logical components of a [Managed Element](#) that are managed by one of the multiple managed IP addresses of this element. It is accessed by a [Logical Root](#).

**Table 33-4** *Managed IP (IManagedIP)*

| Attribute Name                                          | Attribute Description                                                                                                                                                                | Scheme | Polling Interval |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| System Name, Description, Location, Contact and Up Time | System name, description, location, contact and This section currently describes Cisco's QoS objects, although they appear as generic QoS objects that can be used by other vendors. | Any    | Configuration    |
| Software Version                                        | Software version                                                                                                                                                                     | Any    | Configuration    |
| Contexts List                                           | Array of <a href="#">Contexts</a>                                                                                                                                                    | Any    | Configuration    |
| Forwarding Components List                              | Array of <a href="#">Forwarding Component Containers</a>                                                                                                                             | Any    | Configuration    |
| Traffic Descriptors List                                | Array of <a href="#">Traffic Descriptor Containers</a>                                                                                                                               | Any    | Configuration    |
| Tunnel Containers List                                  | Array of <a href="#">Tunnel Containers</a>                                                                                                                                           | Any    | Configuration    |
| Services List                                           | Array of <a href="#">System Services</a>                                                                                                                                             | Any    | Configuration    |

## Context

The [Context](#) object aggregates or contains all the logical components of a [Managed Element](#) with a single context, such as a virtual router, and is accessed by a [Logical Root](#).

**Table 33-5** *Context (IContext)*

| Attribute Name                        | Attribute Description                                                                                                 | Scheme | Polling Interval |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Name                                  | Context name                                                                                                          | Any    | Configuration    |
| IP Address Pools                      | Array of <a href="#">IP Address Pools</a>                                                                             | Any    | Configuration    |
| Forwarding Components List            | Array of <a href="#">Forwarding Component Containers</a>                                                              | Any    | Configuration    |
| Traffic Descriptors List              | Array of <a href="#">Traffic Descriptor Containers</a>                                                                | Any    | Configuration    |
| Tunnel Containers List                | Array of <a href="#">Tunnel Containers</a>                                                                            | Any    | Configuration    |
| Data Link Aggregation Containers List | Array of data link aggregations ( <a href="#">Link Aggregation Groups</a> , <a href="#">Cisco Ethernet Channels</a> ) | Any    | Configuration    |

## System Service

The [System Service](#) object describes a single system service along with its status and This section currently describes Cisco's QoS objects, although they appear as generic QoS objects that can be used by other vendors.

, and is accessed by a [Logical Root](#).

**Table 33-6**      **System Service (ISystemService)**

| Attribute Name | Attribute Description                                                                                                                        | Scheme | Polling Interval |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Type           | Service type ( <i>Unknown, Radius, Network Time Protocol, Spanning Tree Protocol</i> )                                                       | Any    | Configuration    |
| Status         | Service status ( <i>Null, Running, Down, Reset, Initializing, Other</i> )                                                                    | Any    | Configuration    |
| Up Time        | Service This section currently describes Cisco's QoS objects, although they appear as generic QoS objects that can be used by other vendors. | Any    | Configuration    |

## Service Alarms

The following alarms are supported for base logical components:

- Component Unreachable/Component Reachable
- CPU Over Utilized/CPU Normal Use
- Device Unsupported
- Memory Over Utilized/Memory Normal Use

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).





## CHAPTER 34

# Common Components

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This chapter describes the level of support that Cisco ANA provides for components common to all network elements, as follows:

- [Information Model Objects \(IMOs\), page 34-1](#)
- [Network Topology, page 34-7](#)
- [Service Alarms, page 34-7](#)

## Information Model Objects (IMOs)

This section describes the following IMOs:

- [Physical Layer \(IPhysicalLayer\)](#)
- [Bridging Entity \(IBridge\)](#)
- [Bridging Entry \(IBridgeEntry\)](#)
- [VC Multiplexer \(EncapMux\)](#)
- [VC Encapsulation \(IVcBasedEncapsulation\)](#)
- [Virtual Connection Switching Entity \(IVcSwitchingEntity\)](#)
- [Virtual Cross Connection \(IVcCrossConnect\)](#)
- [Forwarding Component Container \(IFWComponentContainer\)](#)
- [Traffic Descriptor Container \(ITrafficDescriptorContainer\)](#)
- [Tunnel Container \(ITunnelContainer\)](#)

## Physical Layer

The [Physical Layer](#) object is bound by its Containing Termination Points attribute to a [Port Connector](#) object. It is accessed by the data link layer bound by its Contained Connection Termination Points attribute.

The polling interval for each of the four “Thresholds” attributes is marked as Not Applicable (N/A) because it does not originate from the modeled NE. Instead, it is taken from the TCA system of the VNE.


**Note**

The following attributes are configured in the registry and not retrieved from the device.

**Table 34-1**      **Physical Layer (IPhysicalLayer)**

| Attribute Name                             | Attribute Description                                                                                                                                                                                                                                                                                         | Scheme | Polling Interval |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Media Type                                 | Physical media type ( <i>Null, Thin Coax, Thick Coax, Fiber Optic, Multi Mode Fiber Optic, Single Mode Fiber Optic, Short Single Mode Fiber Optic, Long Single Mode Fiber Optic, UTP, STP, FTP, EIA/TIA-232, EIA/TIA-449, V.35, X.21, EIA/TIA-530, EIA/TIA-530A, Generic Serial, EIA/TIA-612/613, Other</i> ) | Any    | Configuration    |
| Clocking Source                            | Clocking source ( <i>Unknown, Other, Network, Internal, Loop Timed, External, None, Line, Back Plane, Adaptive Timing</i> )                                                                                                                                                                                   | Any    | Configuration    |
| Maximum Speed                              | Maximum supported speed with units specification                                                                                                                                                                                                                                                              | Any    | System           |
| Is Internal Port                           | Indicates an internal port, such as between module and backplane ( <i>True, False</i> )                                                                                                                                                                                                                       | Any    | Configuration    |
| Maximum and Minimum Discarded Thresholds   | Maximum and minimum discarded input bandwidth thresholds                                                                                                                                                                                                                                                      | Any    | N/A              |
| Discarded Bandwidth                        | Current discarded input bandwidth                                                                                                                                                                                                                                                                             | Any    | Configuration    |
| Maximum and Minimum Dropped Thresholds     | Maximum and minimum dropped output bandwidth thresholds                                                                                                                                                                                                                                                       | Any    | N/A              |
| Dropped Bandwidth                          | Current dropped output bandwidth                                                                                                                                                                                                                                                                              | Any    | Configuration    |
| Maximum and Minimum Input Thresholds       | Maximum and minimum utilized input bandwidth thresholds                                                                                                                                                                                                                                                       | Any    | N/A              |
| Input Bandwidth                            | Current utilized input bandwidth                                                                                                                                                                                                                                                                              | Any    | Configuration    |
| Maximum and Minimum Output Thresholds      | Maximum and minimum utilized output bandwidth thresholds                                                                                                                                                                                                                                                      | Any    | N/A              |
| Output Bandwidth                           | Current utilized output bandwidth                                                                                                                                                                                                                                                                             | Any    | Configuration    |
| Discarded and Received Input Data Counters | Discarded and received input octets and packets counters                                                                                                                                                                                                                                                      | Any    | Topology L1      |
| Dropped and Forwarded Output Data Counters | Dropped and forwarded output octets and packets counters                                                                                                                                                                                                                                                      | Any    | Topology L1      |
| Administrative Status                      | Administrative status ( <i>Unknown, Up, Down, Testing</i> )                                                                                                                                                                                                                                                   | Any    | Status           |
| Operational Status                         | Operational status ( <i>Unknown, Up, Down, Testing, Dormant, Not Present</i> )                                                                                                                                                                                                                                | Any    | Status           |
| Operational Status Last Change             | Date of last operational status change                                                                                                                                                                                                                                                                        | Any    | Configuration    |

**Table 34-1** *Physical Layer (IPhysicalLayer) (continued)*

| Attribute Name                          | Attribute Description                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------|--------|------------------|
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)          | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                             | Any    | N/A              |

## Bridging Entity

The [Bridging Entity](#) object describes the IEEE 802-based protocol-independent forwarding component of an IEEE 802 bridge or switch. It is bound by its Logical Sons attribute to all the data link layer objects (such as [Ethernet Interface](#)) among which this Bridging Entity is bridging or switching IEEE 802-based data link frames.

**Table 34-2** *Bridging Entity (IBridge)*

| Attribute Name | Attribute Description                                                                                                                                      | Scheme | Polling Interval |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Bridge Table   | Array of <a href="#">Bridging Entries</a>                                                                                                                  | Any    | Configuration    |
| Type           | Bridge type ( <i>Null, Automatic, Regular, Bridge Route</i> )                                                                                              | Any    | Configuration    |
| MAC Address    | Bridge internal MAC address used either for running Spanning Tree Protocol (STP) or for bridge network management                                          | Any    | Configuration    |
| IP Interface   | OID of the IP interface used mainly for routing traffic from that bridge                                                                                   | Any    | Configuration    |
| Name           | Bridging entity name                                                                                                                                       | Any    | Configuration    |
| Logical Sons   | Array of all IEEE 802-based data link interfaces among which this <a href="#">Bridging Entity</a> is bridging or switching IEEE 802-based data link frames | Any    | Configuration    |
| VLAN Type      | The type of VLAN                                                                                                                                           | Any    | Configuration    |

## Bridging Entry

The [Bridging Entry](#) object describes a domain-wide bridge table entry within a [Bridging Entity](#).

**Table 34-3** *Bridging Entry (IBridgeEntry)*

| Attribute Name          | Attribute Description                                                                                                                                                                                | Scheme | Polling Interval |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Destination MAC Address | Destination station MAC address                                                                                                                                                                      | Any    | Configuration    |
| Outgoing Interface      | Underlying outgoing interface ( <a href="#">Cisco Ethernet Channels</a> , <a href="#">Ethernet Interfaces</a> , <a href="#">Virtual LAN Interfaces</a> or <a href="#">Virtual LAN Multiplexers</a> ) | Any    | Configuration    |

## VC Multiplexer

The [VC Multiplexer](#) object is bound by its Containing Termination Points attribute to either an [ATM Interface](#) or a [Frame Relay Interface](#) object. It is accessed primarily by the data link layer [VC Encapsulations](#) bound by its Contained Connection Termination Points attribute.

**Table 34-4** *VC Multiplexer (EncapMux)*

| Attribute Name                          | Attribute Description                                                                                    | Scheme | Polling Interval |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------|--------|------------------|
| Virtual Connection Count                | Bound virtual connection count                                                                           | Any    | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                          | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points ( <a href="#">ATM Interface</a> or <a href="#">Frame Relay Interface</a> ) | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points ( <a href="#">VC Encapsulations</a> )                                | Any    | N/A              |

## VC Encapsulation

The data link layer [VC Encapsulation](#) object is bound by its Containing Termination Points attribute to an ATM or Frame Relay [VC Multiplexer](#) object. It is accessed primarily by a network layer object (such as an [IP Interface](#)), and also by the data link layer object (such as an [Ethernet Interface](#) or [PPP Encapsulation](#)) bound by its Contained Connection Termination Points attribute.

**Table 34-5** *VC Encapsulation (IVcBasedEncapsulation)*

| Attribute Name                          | Attribute Description                                                                                           | Scheme | Polling Interval |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------|------------------|
| Virtual Connection                      | Virtual connection ( <a href="#">ATM Virtual Connection</a> or <a href="#">Frame Relay Virtual Connection</a> ) | Any    | Configuration    |
| Binding Information                     | Binding information ( <i>User Name, ...</i> )                                                                   | Any    | Configuration    |
| Binding Status                          | Binding status ( <i>Not Bound, Bound</i> )                                                                      | Any    | Configuration    |
| IANA Type                               | Internet Assigned Numbers Authority (IANA) type of the sublayer                                                 | N/A    | N/A              |
| Containing Termination Points           | Underlying termination points (connection or physical)                                                          | Any    | N/A              |
| Contained Connection Termination Points | Bound connection termination points                                                                             | Any    | N/A              |

## Virtual Connection Switching Entity

The [Virtual Connection Switching Entity](#) object describes the standard forwarding component of an ATM or Frame Relay Switch. It is bound by its Logical Sons attribute to all the data link layer objects (such as [ATM Interfaces](#) or [Frame Relay Interfaces](#)) for which this [Virtual Connection Switching Entity](#) is switching cells or frames.

**Table 34-6** *Virtual Connection Switching Entity (IVcSwitchingEntity)*

| Attribute Name           | Attribute Description                                                                                                                                                                  | Scheme | Polling Interval |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Cross Connect Table      | Array of <a href="#">Virtual Cross Connections</a>                                                                                                                                     | Any    | Configuration    |
| Cross Connect Table Size | Size of the cross-connect table                                                                                                                                                        | Any    | Configuration    |
| Logical Sons             | Array of all <a href="#">ATM Interfaces</a> or <a href="#">Frame Relay Interfaces</a> for which this <a href="#">Virtual Connection Switching Entity</a> is switching cells or frames. | Any    | N/A              |

## Virtual Cross Connection

The [Virtual Cross Connection](#) object describes either a [Virtual Connection Switching Entity](#)-wide or an [ATM Interface](#)-specific Cross Connect table's entry.

**Table 34-7** *Virtual Cross Connection (IVcCrossConnect)*

| Attribute Name                        | Attribute Description                                                                                                               | Scheme | Polling Interval |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Ingress and Egress Virtual Connection | Ingress and egress virtual connections ( <a href="#">ATM Virtual Connection</a> or <a href="#">Frame Relay Virtual Connection</a> ) | Any    | Configuration    |
| Ingress and Egress Port               | Ingress and egress ports ( <i>Port Connectors</i> )                                                                                 | Any    | Configuration    |

## Forwarding Component Container

The [Forwarding Component Container](#) object aggregates a single type of Forwarding Component, such as a [Routing Entry](#), [Bridging Entity](#) or [Virtual Connection Switching Entity](#).

**Table 34-8** *Forwarding Component Container (IFWComponentContainer)*

| Attribute Name        | Attribute Description                                                                                                              | Scheme | Polling Interval |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Forwarding Components | Array of a single type of forwarding component                                                                                     | Any    | Configuration    |
| Type                  | Forwarding component ( <i>Null, Routing Entities, Bridges, VRFs, LSEs, VC Switching Entities, L2TP Peers, MPBGPs, IMA Groups</i> ) | Any    | Configuration    |

## Traffic Descriptor Container

The [Traffic Descriptor Container](#) object is basically a container of any table's entries. It aggregates a single type of Traffic Descriptor (such as [OSPF Entry](#) objects).

**Table 34-9** *Traffic Descriptor Container (ITrafficDescriptorContainer)*

| Attribute Name      | Attribute Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Scheme | Polling Interval |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|
| Traffic Descriptors | Array of a single type of traffic descriptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Any    | Configuration    |
| Type                | Descriptor type ( <i>Null, ATM Traffic Profiles, ADSL Traffic Descriptors, SDSL Traffic Descriptors, IDSL Traffic Descriptors, SHDSL Traffic Descriptors, MPLS Properties, CAC Profiles, ATM Access Profiles, OSPF Networks, BGP Neighbor, Access Lists, Tunnel Traffic Descriptors, QoS Policies, QoS Classes, IS-IS Database, QoS WRED, ATM Traffic Shaping Profile, Frame Relay Traffic Profiles, Rate Limit, Filter, Policer, IP Pools, ISAKMP Policies, IPsec Maps, Process List, Installed Software, L2TP Peer Group, L2TP Domain Group, QoS Object Table, QoS Class Map, QoS Policy Map, QoS Match Statements Table, QoS Queueing Config Table, QoS Service Policy Table, ADSL 2 Traffic Descriptors, ADSL 2 Spectrum Descriptors</i> ) | Any    | Configuration    |

## Tunnel Container

The [Tunnel Container](#) object aggregates instances of a single type of tunnel interface (either [MPLS TE Tunnel Interfaces](#) or [PTP Layer 2 MPLS Tunnel Interfaces](#)).

**Table 34-10** *Tunnel Container (ITunnelContainer)*

| Attribute Name | Attribute Description                                                                                           | Scheme | Polling Interval |
|----------------|-----------------------------------------------------------------------------------------------------------------|--------|------------------|
| Tunnel Edges   | Array of either <a href="#">PTP Layer 2 MPLS Tunnel Interfaces</a> or <a href="#">MPLS TE Tunnel Interfaces</a> | Any    | Configuration    |

# Network Topology

The Cisco Discovery Protocol (CDP), although proprietary, plays a major role in discovery of all Cisco network equipment. Cisco ANA uses it as part of the data link topology discovery for all Cisco network elements. It uses CDP by searching for the existence of local CDP neighbor signatures, gathered from the CDP process, in any remote side port of the same type.

LLDP, which is a standard discovery protocol for the data link layer, is also used for link discovery on the Cisco devices which support this protocol. Cisco ANA uses LLDP by searching for the existence of local LLDP neighbor signatures, gathered from the LLDP process, in any remote side port of the same type.

## Service Alarms

The following alarms are supported for this technology:

- Cloud Problem
- Discard Input Packets/Normal Discard Input Packets
- Dropped Output Packets/Normal Dropped Output Packets
- Link Down/Link Up
- Port Down/Port Up
- Receive Utilization/Receive Utilization Normal
- Transmit Utilization/Transmit Utilization Normal

For detailed information about alarms and correlation, see the [Cisco Active Network Abstraction 3.7 User Guide](#).







# CHAPTER 35

## Cisco ANA VNE Topology

This chapter describes the Cisco ANA VNE Topology, as follows:

- [Specifications, page 35-1](#)
- [Topology Types, page 35-7](#)

### Specifications

[Table 35-1](#) describes the types of topologies Cisco ANA supports and how Cisco ANA discovers and displays them. Discovery takes place in two phases:

1. Discovery of existing links.
2. For discovered links, verification that the links still exist.

The Topology Type column identifies the type of technology to which each Link Type is related.

The Link Type column displays the link type as exposed by Cisco ANA.

**Table 35-1** *Types of Topologies Supported by Cisco ANA*

| Topology Type | Link Type | Discovery Technique                                                                                        | Verification Technique                                                                   | Description                                                                                                                                                                                                                                                                               |
|---------------|-----------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATM           | ATM       | ATM VC Counters:<br>1. Same Active VCs<br>2. VC traffic signature; see <a href="#">Traffic Signature</a> . | Physical layer counters. See physical layer counters in <a href="#">Physical Layer</a> . | Active VCs—Each side identifies a set of active VCs and looks for a match with the same set on another port in the network. An active VC, is a VC that has a configured level of traffic.<br><br>VC Traffic Signatures—Based on the VCs counters; see <a href="#">Traffic Signature</a> . |
|               |           | CDP                                                                                                        | CDP. See <a href="#">CDP (Cisco Discovery Protocol)</a> .                                |                                                                                                                                                                                                                                                                                           |
|               |           | Static                                                                                                     | Static                                                                                   |                                                                                                                                                                                                                                                                                           |

**Table 35-1** *Types of Topologies Supported by Cisco ANA (continued)*

| Topology Type | Link Type | Discovery Technique                            | Verification Technique                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|-----------|------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATM           | PNNI      | PNNI Information                               | None                                                    | PNNI Information—In this technique, each port in the ATM switch is identified with two values: <ol style="list-style-type: none"> <li>1. Node ID.</li> <li>2. Port ID.</li> </ol>                                                                                                                                                                                                                                                                                                           |
| BFD           | BFD       | BFD session's source and destination addresses | BFD session's source and destination addresses          | In this technique, the BFD session's source and destination addresses are verified by matching them against the source and destination addresses of the potential adjacent neighbors. The matching is session source to neighbor destination and session destination to neighbor source, respectively, as one side's source is the other side's destination. This method assumes that multiple BFD sessions running on the same router cannot have the same source and destination address. |
| BGP           | BGP       | BGP Info                                       | BGP Info                                                | BGP Info—In this technique, the BGP identifier is used as the matching criterion.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Business      | Business  | N/A                                            | N/A                                                     | Business links are not discovered at the VNE level; they are created in the gateway. These links represent a relationship between any two objects in the model, which can be business or network related.                                                                                                                                                                                                                                                                                   |
| LAG           | LAG       | STP                                            | STP. See <a href="#">STP (Spanning Tree Protocol)</a> . | MAC—In this technique, the Ethernet port MAC is checked to see if it is the only one learned on the other Ethernet port (using bridge and ARP tables).                                                                                                                                                                                                                                                                                                                                      |
|               |           | MAC                                            | MAC                                                     | This technique discovers links between two routers and links between the router and switch, but not between two switches (includes the generic VNE).                                                                                                                                                                                                                                                                                                                                        |

**Table 35-1** *Types of Topologies Supported by Cisco ANA (continued)*

| Topology Type | Link Type   | Discovery Technique | Verification Technique                                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|-------------|---------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ethernet      | Ethernet    | MAC                 | Ethernet counters and physical layer counters; see physical layer counters in <a href="#">Physical Layer</a> . | MAC—In this technique, the Ethernet port MAC is checked to see if it is the only one learned on the other Ethernet port (using bridge and ARP tables).<br><br>This technique discovers links between two routers and links between the router and switch, but not between two switches (includes the generic VNE).<br><br>Ethernet Counters—Based on the Unicast Packets traffic signature, see <a href="#">Traffic Signature</a> . |
|               |             | CDP                 | CDP. See <a href="#">CDP (Cisco Discovery Protocol)</a> .                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               |             | LLDP                | LLDP. See <a href="#">LLDP (Link Layer Discovery Protocol)</a> .                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               |             | STP                 | STP. See <a href="#">STP (Spanning Tree Protocol)</a> .                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               |             | Static              | Static                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Frame Relay   | Frame Relay | Not Supported       | Physical layer counters. See physical layer counters in <a href="#">Physical Layer</a> .                       | Frame Relay links can be discovered dynamically only between Cisco devices with CDP enabled, or by using static or manual configuration (physical link discovery).                                                                                                                                                                                                                                                                  |
|               |             | CDP                 | CDP. See <a href="#">CDP (Cisco Discovery Protocol)</a> .                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               |             | Static              | Static                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| MPLS          | MPLS        | IP Information      | IP Information                                                                                                 | IP Information—In this technique, the IP addresses of the multiple MPLS interfaces are checked to see if they are in the same subnet (includes the generic VNE). For more information, see <a href="#">IPv4 IP Topology Testing</a> .                                                                                                                                                                                               |

**Table 35-1** *Types of Topologies Supported by Cisco ANA (continued)*

| Topology Type  | Link Type      | Discovery Technique                                                                                                                                  | Verification Technique                                                                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PPP or HDLC    | PPP or HDLC    | IP Information                                                                                                                                       | IP Information and physical layer counters. See physical layer counters in <a href="#">Physical Layer</a> . | IP Information—In this technique, the IP addresses of the multiple PPP or HDLC interfaces are checked to see if they are in the same subnet (includes the generic VNE). For more information, see <a href="#">IPv4 IP Topology Testing</a> .                                                                                                                                                                                                     |
|                |                | CDP                                                                                                                                                  | CDP. See <a href="#">CDP (Cisco Discovery Protocol)</a> .                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                |                | Static                                                                                                                                               | Static                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Physical Layer | Physical Layer | A physical link is not discovered independently. Physical links are created as a result of the discovery of Layer 2 links, such as ATM and Ethernet. | Physical Layer Counters                                                                                     | By default, the physical layer does not have specific techniques for discovery. Special cases are: <ul style="list-style-type: none"> <li>• Ports from the same device will not be connected.</li> <li>• Static topology may be used in the physical layer.</li> </ul> For more information, see <a href="#">Physical Layer</a> .                                                                                                                |
|                |                | Static                                                                                                                                               | Static                                                                                                      | Physical Layer Counters—Based on the port traffic signature, using octet-based, or octet- and packet-based traffic; see <a href="#">Traffic Signature</a> . <p><b>Note</b> In the discovery phase of physical topology, use the Same Device test. In this technique, the port is checked to see if it is in separate VNEs depending on the type of managed equipment.</p>                                                                        |
| PWE3           | Tunnel         | PWE3 Information                                                                                                                                     | PWE3 Information                                                                                            | PWE3 Information—In this technique, each pseudowire is identified by the following criteria: <ol style="list-style-type: none"> <li>1. Local and Remote router IP.</li> <li>2. Tunnel ID.</li> </ol> Matching between two pseudowire tunnels Pw1 and Pw2 is conducted by comparing: <ol style="list-style-type: none"> <li>1. The Pw1 local IP to the Pw2 remote IP and the Pw1 remote IP to the Pw2 local IP.</li> <li>2. Tunnel ID.</li> </ol> |

**Table 35-1** *Types of Topologies Supported by Cisco ANA (continued)*

| Topology Type | Link Type  | Discovery Technique    | Verification Technique | Description                                                                                                                                                                                                                                                                                                                             |
|---------------|------------|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GRE Tunnel    | Tunnel GRE | GRE Tunnel Information | GRE Tunnel Information | GRE Tunnel Information—In this technique, each GRE tunnel is identified by the following criteria: <ol style="list-style-type: none"> <li>1. Source IP.</li> <li>2. Destination IP.</li> </ol> Matching between two tunnels T1 and T2 is done by comparing the T1 source to the T2 destination and the T1 destination to the T2 source. |
| VPN (VRF)     | VPN        | Route Targets          | Route Targets          | Route Targets—In this technique, each VRF is identified with the set of its import and export route targets. <p>The matching criteria between two VRF entities will have at least one pair of import or export route targets of the one VRF to the export or import of the other VRF.</p>                                               |

## Physical Layer

In Cisco ANA's topology discovery implementation, physical layer (Layer 1) discovery is coupled with data link layer (Layer 2) discovery. By default, the physical layer does not have techniques for discovery, but rather complements the discovery of Layer 2, in the following ways:

- Ports from the same device are not connected (this validation is done in the physical layer).
- If static topology is configured, it is used in the physical layer.

In addition, the physical layer is used for topology verification (that is, if a link has already been discovered, it is tested periodically). This verification is done in the physical layer using counters. Physical layer counters are based on the port traffic signature, using octet-based or octet- and packet-based traffic.

## IPv4 IP Topology Testing

Cisco ANA uses IP testing to discover the topology for PPP/HDCL and MPLS technologies. In both cases, the IP test checks the IP configuration on the relevant interface(s) and verifies that there is a match. In this context, finding a match means that the IP configuration is compared using the *primary* IP subnet configured on the local and remote interfaces, and the local IP subnet is equal to or contained in the remote IP subnet.

Note that there is an inherent limitation in using only the primary address and mask to define the IP subnet to be compared. This can cause issues if two interfaces are connected but have more than one address and, in either or both cases, the primary is from a different subnet. For example: We have two devices, Device1 and Device2. POS2/1 on Device1 is connected to POS1/1 on Device2. Device1's configuration is:

```
interface POS2/1
  description Connected to POS1/1 on Device2
  encapsulation ppp ip address 10.0.0.1 255.255.255.252
  ip address 11.0.0.1 255.255.255.252 secondary
```

Device2's configuration is:

```
interface POS1/1 description Connected to POS2/1 on Device1
  encapsulation ppp ip address 11.0.0.2 255.255.255.252
  ip address 10.0.0.2 255.255.255.252 secondary
```

In this case, the two devices will *not* be connected.

## CDP (Cisco Discovery Protocol)

For Cisco devices, if CDP is enabled, its information will be used for discovery and verification. This includes any upper layer techniques, such as VC-related techniques in ATM or MAC in Ethernet. In this technique, the matching criteria is the CDP neighbor information.

## LLDP (Link Layer Discovery Protocol)

If LLDP is enabled, its information will be used for discovery and verification. In this technique, the matching criteria is the LLDP neighbor information.

## STP (Spanning Tree Protocol)

If STP is enabled between switches, it has the highest priority and its information will be used for discovery and verification. In this technique the STP port information is used in the following way: bridge ID, designated bridge, and port identifier are compared with the relevant remote information. If a match is found, a link is created.

**Note**

This STP discovery technique will work correctly only when the same STP protocol is running on both ports.

## Traffic Signature

Traffic signature is based on traffic pattern analysis. The underlying assumption of traffic pattern analysis is that network traffic variety ensures that every active link or active ATM VC in the network maintains a differential traffic “fingerprint”.

Consequently, any two connected ports or VCs will have similar trend functions, which can be matched within reliable statistical significance.

## Topology Types

The following topology types are described in this section:

- [ATM](#)
- [BFD](#)
- [BGP](#)
- [Business](#)
- [Ethernet](#)
- [LAG](#)
- [Frame Relay](#)
- [MPLS](#)
- [PPP or HDLC](#)
- [Physical Layer](#)
- [PWE3](#)
- [GRE Tunnel](#)
- [VPN](#)

### ATM

ATM topology represents a link between two ATM ports which are connected in the network. In the VNE model, the endpoints of the link are ATM IMOs ([ATM Interface \(IAtm\)](#)) which represent the ATM port or interface.

### BFD

BFD topology represents a BFD session, with verified BFD connectivity, between two endpoints in the network. In the VNE model, the endpoints of the link are the BFD Service IMOs ([BFD Service \(IBfdService\)](#)), which represent the BFD service running on the router.

## BGP

BGP topology represents a TCP connection between two BGP entities which facilitate the “BGP neighborhood” in the network. In the VNE model, the endpoints of the link are the MPBgp IMOs ([Multi Protocol BGP Entity](#)), which represent the BGP service running on the router.

## Business

Business topology does not represent any specific link or relationship in the network. It can represent the relationship between any two objects in the model, which can be a business object or network objects. These links are created in the Cisco ANA gateway.

## Ethernet

Ethernet topology represents a link between two Ethernet ports which are connected in the network. In the VNE model the endpoints of the link are Ethernet IMOs ([Ethernet Interface \(IEthernet\)](#)), which represent the Ethernet ports.

## LAG

LAG topology represents a link between two LAG or EtherChannel ports which are connected in the network. The underlying physical links do not have to be discovered for the LAG link to be discovered.

In the VNE model the endpoints of the link are indicated in the [Data Link Aggregation Container \(IDataLinkAggregationContainer\)](#) IMO, which points to the LAG or EtherChannel ports.

## Frame Relay

Frame Relay topology represents a link between two Frame Relay ports which are connected in the network. In the VNE model the endpoints of the link are FrameRelay IMOs ([Frame Relay Interface \(IFrameRelay/IFrTrunk\)](#)), which represent the Frame Relay ports.

## MPLS

MPLS topology represents adjacent MPLS interfaces in the network. This adjacency represents that these MPLS interfaces forward MPLS (labeled) traffic between them. Labels may be learned using discovery protocols, such as LDP or TDP (Cisco), or may be manually configured. In the VNE model the endpoints of the link are MPLS IMOs ([MPLS Interface \(IMpls\)](#)), which represent the MPLS interfaces.

## PPP or HDLC

PPP or HDLC topology represents a link between two PPP or HDLC ports which are connected in the network. In the VNE model the endpoints of the link are PPP and HDLC IMOs ([HDLC Encapsulation \(IEncapsulation\)](#)), which represent the ports.



## Physical Layer

Physical Layer topology represents a link between the physical layers of two ports connected in the network. In the VNE model the endpoints are IMOs which inherit from the physical layer (Layer 1) IMOs ([Serial Interface \(IPhysicalLayer\)](#)), such as [SONET/SDH Physical \(ISonetSdh\)](#) and [DS3 Channelized Interface \(IDS3PdhChannelized\)](#), which represent physical layers of a port.

## PWE3

PWE3 topology represents a link between the endpoints of an MPLS-based pseudowire tunnel in the network. In the VNE model the endpoints of the link are PTP Layer 2 MPLS tunnel IMOs ([PTP Layer 2 MPLS Tunnel Interface \(IPTPLayer2MplsTunnel\)](#)), which represent the pseudowire tunnel endpoints.

## GRE Tunnel

GRE Tunnel topology represents a link between the endpoints of a GRE tunnel in the network. In the VNE model the endpoints of the link are TunnelGre IMOs ([Generic Routing Encapsulation \(GRE\) Tunnel Interface \(ITunnelGRE\)](#)), which represent the GRE tunnel endpoints.

## VPN

VPN topology represents a link between two VRFs that are part of a VPN, meaning that VPN traffic can pass between customer sites connected to these VRFs. In the VNE model the endpoints of the link are VRF IMOs ([Virtual Routing Forwarding \(VRF\) Entity \(IVrf\)](#)), which represent the VRF forwarding entities in the network element.





## **PART 3**

### **Traps and Syslogs**





## CHAPTER 36

# Support Information for Cisco Traps

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This chapter provides detailed information about the traps supported in Cisco ANA. It presents this information in two forms:

- **Trap Tables**—A section devoted to the supported traps for each MIB (for example, [Cisco IOS V1 Traps](#)). Each of these sections contains a table listing the name of each Cisco ANA-supported trap in that MIB, along with its OID, varbinds, and a short description. The trap's Short Description is what you see in a ticket's Trap tabs in Cisco ANA EventVision. In the trap tables in this Reference Guide, each trap's Short Description is also a link to the trap's corresponding parameters.
- **Registry Parameter Tables**—A section devoted to the event types, event subtypes and Cisco ANA registry parameters for the traps supported in each MIB. There is one parameter table for every trap table (for example, [Cisco IOS V1 Trap Registry Parameters](#)). Each trap event can have multiple event subtypes, or states. The parameter tables indicate when each trap state is generated, and how Cisco ANA processes them (such as their severity, and whether they are ticketable, can be correlated, are autocleared, and so on).

Please note that SNMP V2 and V3 trap information is identical; the only difference is the transport and encryption options for each version. Cisco ANA natively supports SNMP V3 AuthNoPriv and AuthPriv options, but does not support SNMP informs.

This chapter includes the following sections:

- [Cisco ASR 9000 V2/V3 Traps, page 36-2](#)
- [Cisco IOS V1 Traps, page 36-4](#)
- [Cisco IOS V2/V3 Traps, page 36-18](#)
- [Cisco IOX V1 Traps, page 36-45](#)
- [Cisco IOX V2/V3 Traps, page 36-54](#)
- [Cisco MIB2 V1 Traps, page 36-70](#)
- [Cisco MIB2 V2/V3 Traps, page 36-74](#)
- [Cisco ASR 9000 V2/V3 Registry Parameters, page 36-84](#)
- [Cisco IOS V1 Trap Registry Parameters, page 36-85](#)
- [Cisco IOS V2/V3 Trap Registry Parameters, page 36-97](#)
- [Cisco IOX V1 Trap Registry Parameters, page 36-117](#)
- [Cisco IOX V2/V3 Trap Registry Parameters, page 36-125](#)

- [Cisco MIB2 V1 Trap Registry Parameters, page 36-136](#)
- [Cisco MIB2 V2/V3 Trap Registry Parameters, page 36-140](#)

**Note**

Cisco IOS devices, Cisco XR 12000 Series and the Cisco CRS-1 Carrier Routing System must be configured to send traps in SNMP V2.

## Cisco ASR 9000 V2/V3 Traps

[Table 36-1](#) lists the Cisco ASR 9000 SNMP V2/V3 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link in the Short Description column or see [Table 36-8](#).

**Table 36-1** Cisco ASR 9000 V2 Traps

| Trap Name               | Trap OID                 | Sub Type Varbind OID       | Sub Type Varbind Value | Description                                          | Short Description                                               |
|-------------------------|--------------------------|----------------------------|------------------------|------------------------------------------------------|-----------------------------------------------------------------|
| ciscoNtpSrvStatusChange | .1.3.6.1.4.1.9.9.168.0.1 | 1.3.6.1.4.1.9.9.168.1.1.11 | =1                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to Unknown</a>            |
| ciscoNtpSrvStatusChange | .1.3.6.1.4.1.9.9.168.0.1 | 1.3.6.1.4.1.9.9.168.1.1.11 | =2                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to notRunning</a>         |
| ciscoNtpSrvStatusChange | .1.3.6.1.4.1.9.9.168.0.1 | 1.3.6.1.4.1.9.9.168.1.1.11 | =3                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to notSynchronized</a>    |
| ciscoNtpSrvStatusChange | 1.3.6.1.4.1.9.9.168.0.1  | 1.3.6.1.4.1.9.9.168.1.1.11 | =4                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to syncToLocal</a>        |
| ciscoNtpSrvStatusChange | 1.3.6.1.4.1.9.9.168.0.1  | 1.3.6.1.4.1.9.9.168.1.1.11 | =5                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to syncToRefclock</a>     |
| ciscoNtpSrvStatusChange | 1.3.6.1.4.1.9.9.168.0.1  | 1.3.6.1.4.1.9.9.168.1.1.11 | =6                     | Sent whenever the value of cntpSysSrvStatus changes. | <a href="#">NTP Server Status Changes to syncToRemoteServer</a> |

**Table 36-1** Cisco ASR 9000 V2 Traps (continued)

| Trap Name           | Trap OID           | Sub Type Varbind OID | Sub Type Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Short Description                              |
|---------------------|--------------------|----------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| topologyChange      | 1.3.6.1.2.1.17.0.2 | N/A                  | N/A                    | Sent by a bridge when any of its configured ports transitions from the Learning state to the Forwarding state, or from the Forwarding state to the Blocking state. The trap is not sent if a newRoot trap is sent for the same transition. Implementation of this trap is optional.                                                                                                                                                                                                                                    | <a href="#">Spanning Tree Topology Changed</a> |
| dot1agCfmFaultAlarm | 1.0.8802.1.1.3.0.1 | N/A                  | N/A                    | Indicates that a MEP has lost contact with one or more MEPs. A fault alarm is sent to the management entity with the OID of the MEP that detected the fault. Whenever a MEP loses contact with one or more other MEPs, it may or may not generate a fault alarm to warn the system administrator of the problem, as controlled by the MEP Fault Notification Generator State Machine and associated Managed Objects. Only the highest-priority defect is reported in the fault alarm. (IEEE 802.1ag, clause 12.14.7.7) | <a href="#">dot1ag CFM Fault Alarm</a>         |

# Cisco IOS V1 Traps

Table 36-2 lists the Cisco IOS SNMP V1 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see Table 36-9.

**Table 36-2** Cisco IOS V1 Traps

| Trap Name                          | Generic Type | Specific Type | Enterprise OID         | SubType Varbind OID        | SubType Varbind Value | Description                                           | Short Description                                      |
|------------------------------------|--------------|---------------|------------------------|----------------------------|-----------------------|-------------------------------------------------------|--------------------------------------------------------|
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 3                     | cisco Environment Monitoring Temperature Notification | <a href="#">Critical Temperature</a>                   |
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 1                     | cisco Environment Monitoring Temperature Notification | <a href="#">Normal Temperature</a>                     |
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 6                     | cisco Environment Monitoring Temperature Notification | <a href="#">Not Functioning</a>                        |
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 5                     | cisco Environment Monitoring Temperature Notification | <a href="#">Not Present</a>                            |
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 4                     | cisco Environment Monitoring Temperature Notification | <a href="#">Critical Temperature - Device Shutdown</a> |
| ciscoEnvMonTemperatureNotification | 6            | 3             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | 2                     | cisco Environment Monitoring Temperature Notification | <a href="#">Temperature Rising</a>                     |
| ciscoEnvMonSupplyStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 3                     | cisco EnvMon Supply State Notification Trap           | <a href="#">Power Supply - Critical</a>                |
| ciscoEnvMonSupplyStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 1                     | cisco EnvMon Supply State Notification Trap           | <a href="#">Power Supply - Normal</a>                  |
| ciscoEnvMonSupplyStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 6                     | cisco EnvMon Supply State Notification Trap           | <a href="#">Power Supply - Not Functioning</a>         |
| ciscoEnvMonSupplyStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 5                     | cisco EnvMon Supply State Notification Trap           | <a href="#">Power Supply - Not Present</a>             |



**Table 36-2** Cisco IOS V1 Traps (continued)

| Trap Name                        | Generic Type | Specific Type | Enterprise OID         | SubType Varbind OID        | SubType Varbind Value | Description                                                                                                                                                        | Short Description                                 |
|----------------------------------|--------------|---------------|------------------------|----------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| ciscoEnvMonSuppStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 4                     | cisco EnvMon Supply State Notification Trap                                                                                                                        | <a href="#">Power Supply - Shutdown</a>           |
| ciscoEnvMonSuppStatusChangeNotif | 6            | 9             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | 2                     | cisco EnvMon Supply State Notification Trap                                                                                                                        | <a href="#">Power Supply - Warning</a>            |
| ciscoEnvMonFanNotification       | 6            | 4             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | != 1                  | cisco private fan down trap                                                                                                                                        | <a href="#">Fan down trap</a>                     |
| ciscoEnvMonFanNotification       | 6            | 4             | 1.3.6.1.4.1.9.9.13.3.0 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | 1                     | cisco private fan down trap                                                                                                                                        | <a href="#">Fan up trap</a>                       |
| rttMonTimeoutNotification        | 6            | 2             | 1.3.6.1.4.1.9.9.42.2.0 | N/A                        | N/A                   | Indicates the occurrence of a timeout for an RTT operation                                                                                                         | <a href="#">RTT Operation Timeout</a>             |
| rttMonThresholdNotification      | 6            | 3             | 1.3.6.1.4.1.9.9.42.2.0 | N/A                        | N/A                   | Indicates the occurrence of a threshold violation for an RTT operation                                                                                             | <a href="#">RTT Operation Threshold Violation</a> |
| topologyChange                   | 6            | 2             | 1.3.6.1.2.1.17         | N/A                        | N/A                   | Sent by a bridge when any of its configured ports transitions from the Learning state to the Forwarding state, or from the Forwarding state to the Blocking state. | <a href="#">dot1qBridge trap</a>                  |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name           | Generic Type | Specific Type | Enterprise OID      | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Short Description               |
|---------------------|--------------|---------------|---------------------|---------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| cEtherCfmCcMep Up   | 6            | 1             | 1.3.6.1.4.1.9.9.461 | N/A                 | N/A                   | <p>Sent when:</p> <ul style="list-style-type: none"> <li>A remote MEP first comes up (i.e., when we receive a CC message from that MEP for the first time).</li> <li>The device receives a CC message from a MEP for which it has an expired CCDB entry.</li> <li>A CC message is received for a remote MEP for which the device already has a CCDB entry and the port state in the received CC message is different from the cached previous state.</li> </ul> | <a href="#">Mep up trap</a>     |
| cEtherCfmCcMep Down | 6            | 2             | 1.3.6.1.4.1.9.9.461 | N/A                 | N/A                   | Sent when a remote MEP goes down, namely, the entry in CCDB corresponding to this MEP times out or the device receives a CC message with zero hold-time                                                                                                                                                                                                                                                                                                         | <a href="#">Mep down trap</a>   |
| coldStart           | 6            | 0             | 1.3.6.1.2.1.11.0    | N/A                 | N/A                   | Indicates that the sending protocol entity is reinitializing itself such that the agent's configuration or the protocol entity implementation may be altered.                                                                                                                                                                                                                                                                                                   | <a href="#">Cold start trap</a> |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name         | Generic Type | Specific Type | Enterprise OID          | SubType Varbind OID       | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                               | Short Description                                        |
|-------------------|--------------|---------------|-------------------------|---------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| MIB2 V1 link down | 2            | 0             | 1.3.6.1.6.3.1.1.5       | N/A                       | N/A                   | Indicates that the sending protocol entity recognizes a failure in one of the communication links represented in the agent's configuration. The Trap-PDU of type linkDown contains as the first element of its variable bindings, the name and value of the ifIndex instance for the affected interface.  | <a href="#">SNMP Link down</a>                           |
| MIB2 V1 link up   | 3            | 0             | 1.3.6.1.6.3.1.1.5       | N/A                       | N/A                   | Indicates that the sending protocol entity recognizes that one of the communication links represented in the agent's configuration has come up. The Trap-PDU of type linkUp contains as the first element of its variable-bindings the name and value of the ifIndex instance for the affected interface. | <a href="#">SNMP Link up</a>                             |
| imaFailureAlarm   | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6 | 10,12,15              | ima-Group-FailureAlarm v1                                                                                                                                                                                                                                                                                 | <a href="#">IMA Group Remote Failure</a>                 |
| imaFailureAlarm   | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6 | 14                    | ima-Group-FailureAlarm v1                                                                                                                                                                                                                                                                                 | <a href="#">IMA Group Remote insufficient links trap</a> |
| imaFailureAlarm   | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.5 | 1                     | ima-Group-Clearing Alarm v1                                                                                                                                                                                                                                                                               | <a href="#">IMA Group Up Trap</a>                        |
| imaFailureAlarm   | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6 | 11,16                 | ima-Group-FailureAlarm v1                                                                                                                                                                                                                                                                                 | <a href="#">IMA Group local Failure</a>                  |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                             | Generic Type | Specific Type | Enterprise OID          | SubType Varbind OID               | SubType Varbind Value | Description                                                                        | Short Description                            |
|---------------------------------------|--------------|---------------|-------------------------|-----------------------------------|-----------------------|------------------------------------------------------------------------------------|----------------------------------------------|
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 13                    | ima-Group-FailureAlarm v1                                                          | IMA Group local insufficient links trap      |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 2                     | ima Link ima-Link-FailureAlarm v1                                                  | Ima Link Loss of delay Frame Trap            |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 1                     | ima Link ima-Link-FailureAlarm v1                                                  | Ima Link Loss of ima Frame Trap              |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 5,7,9                 | ima Link ima-Link-FailureAlarm v1                                                  | Ima Link Rev Failure Trap                    |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 3                     | ima Link ima-Link-FailureAlarm v1                                                  | Ima Link Remote Failure Trap                 |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.5         | 1                     | ima-Link-ClearingAlarm v1                                                          | Ima Link Up Trap                             |
| imaFailureAlarm                       | 6            | 1             | 1.3.6.1.4.1.353.5.7.1.2 | 1.3.6.1.4.1.353.5.7.1.1.6         | 4,6,8                 | ima Link ima-Link-FailureAlarm v1                                                  | Ima Link Xmt Failure Trap                    |
| Cisco-UMT-state-change-v1             | 6            | 2             | 1.3.6.1.4.1.9.9.483     | N/A                               | N/A                   | The state of the connection between the UMTS interfaces.                           | Cisco UMT state Change trap                  |
| Cisco-GSM-state-change-trap-v1        | 6            | 1             | 1.3.6.1.4.1.9.9.483     | N/A                               | N/A                   | The state of the connection between the GSM interfaces                             | Cisco GSM state Change trap                  |
| Cisco-IPRAN-Backhaul-received-util-v1 | 6            | 3             | 1.3.6.1.4.1.9.9.483     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 1                     | When Rcvd. util changes to any of the status : acceptable, warning, overloaded.    | IPRAN Backhaul Received Util Acceptable Trap |
| Cisco-IPRAN-Backhaul-received-util-v1 | 6            | 3             | 1.3.6.1.4.1.9.9.483     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 2                     | When Rcvd. util changes froto any of the status : acceptable, warning, overloaded. | IPRAN Backhaul Received Util Warning Trap    |
| Cisco-IPRAN-Backhaul-received-util-v1 | 6            | 3             | 1.3.6.1.4.1.9.9.483     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 3                     | When Rcvd. util changes froto any of the status : acceptable, warning, overloaded. | IPRAN Backhaul Received Util Overloaded Trap |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                          | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID               | SubType Varbind Value | Description                                                                       | Short Description                                        |
|------------------------------------|--------------|---------------|----------------------|-----------------------------------|-----------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------|
| Cisco-IPRAN-Backhaul-sent-util-v1  | 6            | 4             | .1.3.6.1.4.1.9.9.483 | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 1                     | When sent util changes froto any of the status : acceptable, warning, overloaded. | IPRAN Backhaul Sent Util Acceptable Trap                 |
| Cisco-IPRAN-Backhaul-sent-util-v1  | 6            | 4             | .1.3.6.1.4.1.9.9.483 | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 2                     | When sent util changes froto any of the status : acceptable, warning, overloaded. | IPRAN Backhaul Sent Util Overloaded Trap                 |
| Cisco-IPRAN-Backhaul-sent-util-v1  | 6            | 4             | .1.3.6.1.4.1.9.9.483 | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 3                     | When sent util changes froto any of the status : acceptable, warning, overloaded. | IPRAN Backhaul Sent Util Warning Trap                    |
| rttMonConnectionChangeNotification | 6            | 1             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5      | 1                     | IPSLA echo ConnLoss Trap v2                                                       | Connection Loss detected by ipsla icmp echo trap         |
| rttMonConnectionChangeNotification | 6            | 1             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5      | 2                     | IPSLA echo ConnLoss Trap v2                                                       | Connection re-establish detected by ipsla icmp echo trap |
| rttMonTimeoutNotification          | 6            | 2             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6      | 1                     | IPSLA IP or LSP echo Timeout trap v2                                              | Timeout detected by ipsla icmp echo trap                 |
| rttMonTimeoutNotification          | 6            | 2             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6      | 2                     | IPSLA IP or LSP echo Timeout trap v2                                              | Connection re-establish detected by ipsla icmp echo trap |
| rttMonThresholdNotification        | 6            | 3             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7      | 1                     | IPSLA Threshold Notification trap v2                                              | Threshold crossing under trap                            |
| rttMonThresholdNotification        | 6            | 3             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7      | 2                     | IPSLA Threshold Notification trap v2                                              | Threshold crossing over trap                             |
| rttMonVerifyErrorNotification      | 6            | 4             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11     | 1                     | IPSLA Threshold Notification deprecated trap v2                                   | Data corruption in rtt operation trap                    |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                      | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID                                                                          | SubType Varbind Value | Description                                     | Short Description                                            |
|--------------------------------|--------------|---------------|----------------------|----------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------|--------------------------------------------------------------|
| rttMonVerifyError Notification | 6            | 4             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11                                                                | 2                     | IPSLA Threshold Notification deprecated trap v2 | Data corruption cleared in rtt operation trap                |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 1            | RTT MON notification                            | Connection Loss detected by ipsla icmp echo trap             |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 1        | RTT MON notification                            | Connection Loss detected by ipsla LSP icmp echo trap         |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 2            | RTT MON notification                            | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 2        | RTT MON notification                            | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 1            | RTT MON notification                            | Timeout detected by ipsla icmp echo trap                     |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 1        | RTT MON notification                            | Timeout detected by ipsla LSP icmp echo trap                 |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                      | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID                                                                          | SubType Varbind Value | Description                    | Short Description                                            |
|--------------------------------|--------------|---------------|----------------------|----------------------------------------------------------------------------------------------|-----------------------|--------------------------------|--------------------------------------------------------------|
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 2            | RTT MON notification           | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 2        | RTT MON notification           | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.19.1.10                                | 1, 1                  | RTT MON notification           | RTT threshold crossing over trap                             |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.19.1.10                                | 1, 2                  | RTT MON notification           | RTT threshold crossing under trap                            |
| rttMonLpdDiscoveryNotification | 6            | 6             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                                                | 1                     | IPSLA LPD Discovery trap v2    | IPSLA LSP path discovery failure trap                        |
| rttMonLpdDiscoveryNotification | 6            | 6             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                                                | 2                     | IPSLA LPD Discovery trap v2    | IPSLA LSP path rediscovery trap                              |
| rttMonLpdGrpStatusNotification | 6            | 7             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                                                | 3,4                   | IPSLA LDP Group Status trap v2 | IPSLA LDP group status failure trap                          |
| rttMonLpdGrpStatusNotification | 6            | 7             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                                                | 2                     | IPSLA LDP Group Status trap v2 | IPSLA LDP group status restoration trap                      |
| cmplsFrrProtected              | 6            | 1             | 1.3.6.1.4.1.9.1.0.98 | N/A                                                                                          | N/A                   | TE FRR trigger notification v1 | FRR Protected Trap                                           |
| cmplsFrrUnProtected            | 6            | 2             | 1.3.6.1.4.1.9.1.0.98 | N/A                                                                                          | N/A                   | TE FRR trigger notification v1 | FRR Unprotected Trap                                         |

**Table 36-2** Cisco IOS V1 Traps (continued)

| Trap Name | Generic Type | Specific Type | Enterprise OID          | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                               | Short Description       |
|-----------|--------------|---------------|-------------------------|---------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| cpwVcUp   | 6            | 2             | 1.3.6.1.4.1.9.1.0.106.2 | N/A                 | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state. | Pseudo wire tunnel up   |
| cpwVcDown | 6            | 1             | 1.3.6.1.4.1.9.1.0.106.2 | N/A                 | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state. | Pseudo wire tunnel down |



Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name               | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Short Description                                            |
|-------------------------|--------------|---------------|----------------------|---------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| vtpConfigRevNumberError | 6            | 1             | 1.3.6.1.4.1.9.9.46.2 | N/A                 | N/A                   | A configuration revision number error notification signifies that a device has incremented its vtpConfigRevNumberErrors counter. Generation of this notification is suppressed if the vtpNotificationsEnabled has the value 'false'. The device must throttle the generation of consecutive vtpConfigRevNumberError notifications so that there is at least a five-second gap between notification of this type. When notification are throttled, they are dropped, not queued for sending at a future time. (Note that 'generating' a notification means sending to all configured recipients | <a href="#">vtp configuration revision number error trap</a> |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name            | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Short Description                   |
|----------------------|--------------|---------------|----------------------|---------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| vtpConfigDigestError | 6            | 2             | 1.3.6.1.4.1.9.9.46.2 | N/A                 | N/A                   | A configuration digest error notification signifies that a device has incremented its vtpConfigDigestErrors counter. Generation of this notification is suppressed if the vtpNotificationsEnabled has the value 'false'. The device must throttle the generation of consecutive vtpConfigDigestError notifications so that there is at least a five-second gap between notification of this type. When notification are throttled, they are dropped, not queued for sending at a future time. (Note that 'generating' a notification means sending to all configured recipients). | vtp configuration digest error trap |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                   | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                        | Short Description                                   |
|-----------------------------|--------------|---------------|----------------------|---------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| vtpVersionOneDeviceDetected | 6            | 6             | 1.3.6.1.4.1.9.9.46.2 | N/A                 | N/A                   | A VTP version one device detected notification is generated by a device when:<br><br>A. A management domain has been put into version 2 mode (as accessed by managementDomainVersionInUse).<br><br>B. 15 minutes has passed since (A) occurred.<br><br>C. A version 1 PDU is detected on a trunk on the device that is in that management domain which has a lower revision number than the current configuration. | <a href="#">vtp VersionOne Device Detected trap</a> |
| vtpLocalModeChanged         | 6            | 8             | 1.3.6.1.4.1.9.9.46.2 | N/A                 | N/A                   | A vtpLocalModeChanged notification is generated by a device when the value of the object managementDomainLocalMode is changed.                                                                                                                                                                                                                                                                                     | <a href="#">vtp Local Mode Changed trap</a>         |
| vtpVersionInUseChanged      | 6            | 9             | 1.3.6.1.4.1.9.9.46.2 | N/A                 | N/A                   | A vtpVersionInUseChanged notification is generated by a device when the value of the object managementDomainVersionInUse is changed.                                                                                                                                                                                                                                                                               | <a href="#">vtp VersionInUse Changed trap</a>       |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                        | Generic Type | Specific Type | Enterprise OID            | SubType Varbind OID            | SubType Varbind Value | Description                                                                                                                                    | Short Description                                      |
|----------------------------------|--------------|---------------|---------------------------|--------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| vlanTrunkPortDynamicStatusChange | 6            | 7             | 1.3.6.1.4.1.9.9.46.2      | 1.3.6.1.4.1.9.9.46.1.6.1.1.14  | 1                     | A vlanTrunkPortDynamicStatusChange notification is generated by a device when the value of vlanTrunkPortDynamicStatus object has been changed. | Vlan trunk port dynamic status changed to trunking     |
| vlanTrunkPortDynamicStatusChange | 6            | 7             | 1.3.6.1.4.1.9.9.46.2      | 1.3.6.1.4.1.9.9.46.1.6.1.1.14  | 2                     | A vlanTrunkPortDynamicStatusChange notification is generated by a device when the value of vlanTrunkPortDynamicStatus object has been changed. | Vlan trunk port dynamic status changed to not trunking |
| crepLinkStatus                   | 6            | 1             | 1.3.6.1.4.1.9.9.601       | 1.3.6.1.4.1.9.9.601.1.2.1.1.3  | 5                     | Cisco REP link status change trap                                                                                                              | REP port state fully operational Trap                  |
| crepLinkStatus                   | 6            | 1             | 1.3.6.1.4.1.9.9.601       | 1.3.6.1.4.1.9.9.601.1.2.1.1.3  | !=5                   | Cisco REP link status change trap                                                                                                              | REP port state not operational Trap                    |
| crepPortRoleChange               | 6            | 3             | 1.3.6.1.4.1.9.9.601       | 1.3.6.1.4.1.9.9.601.1.2.1.1.4  | 1                     | Cisco REP port role change trap                                                                                                                | REP port role failed Trap                              |
| crepPortRoleChange               | 6            | 3             | 1.3.6.1.4.1.9.9.601       | 1.3.6.1.4.1.9.9.601.1.2.1.1.4  | !=1                   | Cisco REP port role change trap                                                                                                                | REP port role clear Trap                               |
| ciscoSonetVTStatusChange         | 6            | 4             | 1.3.6.1.4.1.9.9.126       | 1.3.6.1.2.1.10.39.3.1.1.1.2    | !=1                   | VT Status is down                                                                                                                              | Cisco Sonet vt status changed to error                 |
| ciscoSonetVTStatusChange         | 6            | 4             | 1.3.6.1.4.1.9.9.126       | 1.3.6.1.2.1.10.39.3.1.1.1.2    | 1                     | VT Status is down                                                                                                                              | Cisco Sonet vt status changed to clear                 |
| cEtherCfmCcMep Up                | 6            | 1             | 1.3.6.1.4.1.9.9.461.0.0.1 | N/A                            | N/A                   | mep up                                                                                                                                         | CFM cc mep up trap                                     |
| cEtherCfmCcMep Down              | 6            | 2             | 1.3.6.1.4.1.9.9.461.0.0.2 | 1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 5                     | timeout                                                                                                                                        | CFM cc mep down due to timeout trap                    |
| cEtherCfmCcMep Down              | 6            | 2             | 1.3.6.1.4.1.9.9.461.0.0.2 | 1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 4                     | lastgasp                                                                                                                                       | CFM cc mep down due to last gasp trap                  |

Table 36-2 Cisco IOS V1 Traps (continued)

| Trap Name                 | Generic Type | Specific Type | Enterprise OID             | SubType Varbind OID             | SubType Varbind Value | Description                              | Short Description                               |
|---------------------------|--------------|---------------|----------------------------|---------------------------------|-----------------------|------------------------------------------|-------------------------------------------------|
| cEtherCfmCcCross connect  | 6            | 3             | .1.3.6.1.4.1.9.9.461.0.0.3 | N/A                             | N/A                   | cross-connected service error trap       | CFM cc cross-connected service error trap       |
| cEtherCfmCcMep Down       | 6            | 2             | .1.3.6.1.4.1.9.9.461.0.0.2 | .1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 8                     | cross-connected service error trap clear | CFM cc cross-connected service error trap clear |
| cEtherCfmCcLoop           | 6            | 4             | .1.3.6.1.4.1.9.9.461.0.0.4 | N/A                             | N/A                   | loop trap                                | CFM cc loop trap                                |
| cEtherCfmCcMep Down       | 6            | 2             | .1.3.6.1.4.1.9.9.461.0.0.2 | .1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 7                     | loop trap clear                          | CFM cc loop trap clear                          |
| cEtherCfmCcConfigError    | 6            | 5             | .1.3.6.1.4.1.9.9.461.0.0.5 | N/A                             | N/A                   | config error trap                        | CFM cc config error trap                        |
| cEtherCfmCcMep Down       | 6            | 2             | .1.3.6.1.4.1.9.9.461.0.0.2 | .1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 6                     | config error trap clear                  | CFM cc config error trap clear                  |
| cEtherCfmXCheck Missing   | 6            | 6             | .1.3.6.1.4.1.9.9.461.0.0.6 | N/A                             | N/A                   | mep missing trap                         | CFM crossconnect mep missing trap               |
| cEtherCfmXCheck Unknown   | 6            | 7             | .1.3.6.1.4.1.9.9.461.0.0.7 | N/A                             | N/A                   | mep unknown trap                         | CFM crossconnect mep unknown trap               |
| cEtherCfmCcMep Down       | 6            | 2             | .1.3.6.1.4.1.9.9.461.0.0.2 | .1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 9                     | mep unknown trap clear                   | CFM crossconnect mep unknown trap clear         |
| cEtherCfmXCheck ServiceUp | 6            | 8             | .1.3.6.1.4.1.9.9.461.0.0.8 | N/A                             | N/A                   | ICfmServiceOid                           | CFM crossconnect mep service up trap            |

# Cisco IOS V2/V3 Traps

Table 36-3 lists the Cisco IOS SNMP V2/V3 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see Table 36-10.

**Table 36-3** Cisco IOS V2/V3 Traps

| Trap Name                   | Trap OID                 | SubType<br>Varbind OID  | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                       | Short Description                                   |
|-----------------------------|--------------------------|-------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| cbfDefineFile Completion    | 1.3.6.1.4.1.9.9.81.2.0.1 | N/A                     | N/A                      | A cbfDefineFileCompletion notification is sent on the following conditions: completion of a file consumption operation in case of ephemeral files; completion of file creation operation in case of volatile or permanent files; any error during file creation.                                                                                                                                                                                  | <a href="#">CBF File operation state indicator</a>  |
| cbgpBackwardTransition      | 1.3.6.1.4.1.9.9.187.0.2  | 1.3.6.1.4.1.9.9.187.0.2 | != (1 or 6)              | The cbgpBackwardTransition Event is generated when the BGP FSM moves from a higher numbered state to a lower numbered state. The bgpPeerRemoteAddr value is attached to the notification Object Identifier.                                                                                                                                                                                                                                       | <a href="#">Cisco BGP backward transition trap</a>  |
| cbgpFsmStateChange          | 1.3.6.1.4.1.9.9.187.0.1  | 1.3.6.1.4.1.9.9.187.0.2 | = 1                      | The BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                                                                                                                                                                                                                                                                                                                                              | <a href="#">Cisco BGP down trap</a>                 |
| cbgpFsmStateChange          | 1.3.6.1.4.1.9.9.187.0.1  | 1.3.6.1.4.1.9.9.187.0.2 | = 6                      | The BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                                                                                                                                                                                                                                                                                                                                              | <a href="#">Cisco BGP established trap</a>          |
| cbgpPrefixThresholdExceeded | 1.3.6.1.4.1.9.9.187.0.3  | N/A                     | N/A                      | The cbgpPrfexMaxThresholdExceeded notification is generated when prefix count exceeds the configured warning threshold on a session for an address family                                                                                                                                                                                                                                                                                         | <a href="#">Cisco BGP prefix threshold exceeded</a> |
| cbgpPrefixThresholdClear    | 1.3.6.1.4.1.9.9.187.0.4  | N/A                     | N/A                      | The cbgpPrefixThresholdClear notification is generated when prefix count drops below the configured clear threshold on a session for an address family once cbgpPrefixThresholdExceeded is generated. This won't be generated if the peer session goes down after the generation of bgpPrefixThresholdExceeded. The bgpPeerRemoteAddr, bgpPeerAddrFamilyAfi and cbgpPeerAddrFamilySafi values are attached to the notification Object Identifier. | <a href="#">Cisco BGP prefix threshold clear</a>    |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name               | Trap OID                   | Sub Type<br>Varbind OID       | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                             | Short Description                                 |
|-------------------------|----------------------------|-------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| ccCopyCompletion        | 1.3.6.1.4.1.9.9.9.6.2.1.1  | N/A                           | N/A                       | A ccCopyCompletion trap is sent at the completion of a config-copy request. The ccCopyFailCause is not instantiated, and hence not included in a trap, when the ccCopyState is success                                  | Config-copy request completion                    |
| ciscoConfigManEvent     | 1.3.6.1.4.1.9.9.4.3.2.0.1  | N/A                           | N/A                       | Notification of a configuration management event as recorded in ccmHistoryEventTable.                                                                                                                                   | Cisco Configuration management event notification |
| cefcFanTrayStatusChange | 1.3.6.1.4.1.9.9.1.17.2.0.6 | 1.3.6.1.4.1.9.9.117.1.4.1.1.1 | !=2                       | This notification is generated when the value of cefcFanTrayOperStatus changes.                                                                                                                                         | cefc fan-tray oper status down                    |
| cefcFanTrayStatusChange | 1.3.6.1.4.1.9.9.1.17.2.0.6 | 1.3.6.1.4.1.9.9.117.1.4.1.1.1 | =2                        | This notification is generated when the value of cefcFanTrayOperStatus changes.                                                                                                                                         | cefc fan-tray oper status up                      |
| cefcFRUInserted         | 1.3.6.1.4.1.9.9.1.17.2.0.3 | N/A                           | N/A                       | The cecfFRUInserted notification indicates that a FRU was inserted. The varbind for this notification indicates the entPhysicalIndex of the inserted FRU, and the entPhysicalIndex of the FRU's container.              | cefc FRU inserted                                 |
| cefcFRURemoved          | 1.3.6.1.4.1.9.9.1.17.2.0.4 | N/A                           | N/A                       | The cefcFRURemoved notification indicates that a FRU was removed. The varbind for this notification indicates the entPhysicalIndex of the removed FRU, and the entPhysicalIndex of the FRU's container.                 | cefc FRU removed                                  |
| cefcModuleStatusChange  | 1.3.6.1.4.1.9.9.1.17.2.0.1 | 1.3.6.1.4.1.9.9.117.1.2.1.1.2 | !=2                       | This notification is generated when the value of cefcModuleOperStatus changes. It can be utilized by an NMS to update the status of the module it is managing.                                                          | cefc module oper status down                      |
| cefcModuleStatusChange  | 1.3.6.1.4.1.9.9.1.17.2.0.1 | 1.3.6.1.4.1.9.9.117.1.2.1.1.2 | =2                        | This notification is generated when the value of cefcModuleOperStatus changes. It can be utilized by an NMS to update the status of the module it is managing.                                                          | cefc module oper status up                        |
| cefcPowerStatusChange   | 1.3.6.1.4.1.9.9.1.17.2.0.2 | 1.3.6.1.4.1.9.9.117.1.1.2.1.2 | !=2                       | The cefcFRUPowerStatusChange notification indicates that the power status of a FRU has changed. The varbind for this notification indicates the entPhysicalIndex of the FRU, and the new operational-status of the FRU. | cefc power status down                            |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                                | Trap OID                       | SubType<br>Varbind OID                | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                      | Short Description                                                         |
|------------------------------------------|--------------------------------|---------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| cefcPowerStatusChange                    | 1.3.6.1.4.1.9.9.1<br>17.2.0.2  | 1.3.6.1.4.1<br>.9.9.117.1.<br>1.2.1.2 | =2                       | The cefcFRUPowerStatusChange notification indicates that the power status of a FRU has changed. The varbind for this notification indicates the entPhysicalIndex of the FRU, and the new operational-status of the FRU.                                                          | <a href="#">cefc power status up</a>                                      |
| entSensorThresholdNotification           | 1.3.6.1.4.1.9.9.9<br>1.2.0.1   | N/A                                   | N/A                      | The sensor value crossed the threshold listed in entSensorThresholdTable. This notification is generated once each time the sensor value crosses the threshold.                                                                                                                  | <a href="#">sensor value crossed threshold in entSensorThresholdTable</a> |
| ciscoFlashCopyCompletionTrap             | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.1 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.1.1.8  | != (0 or 1 or 2)         | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                                                                                                | <a href="#">Cisco flash copy failed</a>                                   |
| ciscoFlashCopyCompletionTrap             | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.1 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.1.1.8  | =2                       | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                                                                                                | <a href="#">Cisco flash copy completion</a>                               |
| ciscoFlashCopyCompletionTrap             | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.1 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.1.1.8  | =(0 or 1)                | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                                                                                                | <a href="#">Cisco flash copy in progress</a>                              |
| ciscoFlashDeviceChangeTrap               | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.4 | N/A                                   | N/A                      | A ciscoFlashDeviceChangeTrap is sent whenever a removable Flash device is inserted or removed.                                                                                                                                                                                   | <a href="#">Cisco Flash device changed</a>                                |
| ciscoFlashDeviceInsertedNotification     | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.5 | N/A                                   | N/A                      | A ciscoFlashDeviceInsertedNotification is sent whenever a removable Flash device is inserted.                                                                                                                                                                                    | <a href="#">Cisco Flash device inserted</a>                               |
| ciscoFlashDeviceRemovedNotification      | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.6 | N/A                                   | N/A                      | A ciscoFlashDeviceRemovedNotification is sent whenever a removable Flash device is removed.                                                                                                                                                                                      | <a href="#">Cisco Flash device removed</a>                                |
| ciscoFlashDeviceInsertedNotificationRev1 | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.7 | N/A                                   | N/A                      | A ciscoFlashDeviceInsertedNotificationRev1 notification is sent whenever a removable Flash device is inserted. The ciscoFlashDeviceInsertedNotificationRev1 deprecates ciscoFlashDeviceInsertedNotification since it uses ciscoFlashDeviceName as a varbind which is deprecated. | <a href="#">Cisco Flash device inserted</a>                               |



Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                        | Trap OID                       | Sub Type<br>Varbind OID              | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                             | Short Description                               |
|----------------------------------|--------------------------------|--------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| ciscoFlashDeviceRemovedNotifRev1 | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.8 | N/A                                  | N/A                       | A ciscoFlashDeviceRemovedNotifRev1 notification is sent whenever a removable Flash device is removed. The ciscoFlashDeviceRemovedNotifRev1 deprecates ciscoFlashDeviceRemovedNotif since it uses ciscoFlashDeviceName as a varbind which is deprecated. | Cisco Flash device removed                      |
| ciscoFlashMiscOpCompletionTrap   | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.3 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.3.1.4 | != (1 or 2)               | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated.                                                    | Cisco Flash miscellaneous operation failed      |
| ciscoFlashMiscOpCompletionTrap   | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.3 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.3.1.4 | =2                        | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated.                                                    | Cisco Flash miscellaneous operation completed   |
| ciscoFlashMiscOpCompletionTrap   | 1.3.6.1.4.1.9.9.1<br>0.1.3.0.3 | 1.3.6.1.4.1<br>.9.9.10.1.2<br>.3.1.4 | =1                        | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated.                                                    | Cisco Flash miscellaneous operation in progress |
| chassisAlarmOff                  | 1.3.6.1.4.1.9.5.0.<br>6        | N/A                                  | N/A                       | chassis alarm trap                                                                                                                                                                                                                                      | chassis alarm off                               |
| chassisAlarmOn                   | 1.3.6.1.4.1.9.5.0.<br>5        | N/A                                  | N/A                       | chassis alarm trap                                                                                                                                                                                                                                      | chassis alarm on                                |
| cPimNbrLoss                      | 1.3.6.1.4.1.9.10.<br>119.0.2   | N/A                                  | N/A                       | A cPimNbrLoss trap signifies the loss of an adjacency with a neighbor. This trap should be generated when the neighbor timer expires, and the router has no other neighbors on the same interface with a lower IP address than itself.                  | Cisco PIM neighbor lost                         |
| ciscoPingCompletion              | 1.3.6.1.4.1.9.9.1<br>6.2.0.1   | N/A                                  | N/A                       | A ciscoPingCompleted trap is sent at the completion of a sequence of pings if such a trap was requested when the sequence was initiated.                                                                                                                | Cisco ping completion                           |
| ciscoSonetSectionStatusChange    | 1.3.6.1.4.1.9.9.1<br>26.0.1    | 1.3.6.1.2.1<br>.10.39.1.2.<br>1.1.1  | !=1                       | This notification is generated whenever the value of sonetSectionCurrentStatus changes to value more than 1.                                                                                                                                            | Cisco Sonet section status changed to error     |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                                 | Trap OID                      | SubType<br>Varbind OID              | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                 | Short Description                                             |
|-------------------------------------------|-------------------------------|-------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| ciscoSonetSectionStatusChange             | 1.3.6.1.4.1.9.9.1<br>26.0.1   | 1.3.6.1.2.1<br>.10.39.1.2.<br>1.1.1 | =1                       | This notification is generated whenever the value of sonetSectionCurrentStatus changes to value 1.                                                                                                                                                                                          | <a href="#">Cisco Sonet section status changed to clear</a>   |
| ciscoSonetLineStatusChange                | 1.3.6.1.4.1.9.9.1<br>26.0.2   | 1.3.6.1.2.1<br>.10.39.1.3.<br>1.1.1 | !=1                      | This notification is generated whenever the value of sonetLineCurrentStatus changes to value more than 1.                                                                                                                                                                                   | <a href="#">Cisco Sonet line status changed to error</a>      |
| ciscoSonetLineStatusChange                | 1.3.6.1.4.1.9.9.1<br>26.0.2   | 1.3.6.1.2.1<br>.10.39.1.3.<br>1.1.1 | =1                       | This notification is generated whenever the value of sonetLineCurrentStatus changes to value 1.                                                                                                                                                                                             | <a href="#">Cisco Sonet line status changed to clear</a>      |
| ciscoSonetPathStatusChange                | 1.3.6.1.4.1.9.9.1<br>26.0.3   | 1.3.6.1.2.1<br>.10.39.2.1.<br>1.1.2 | !=1                      | This notification is generated whenever the value of sonetPathCurrentStatus changes to value more than 1.                                                                                                                                                                                   | <a href="#">Cisco Sonet path status changed to error</a>      |
| ciscoSonetPathStatusChange                | 1.3.6.1.4.1.9.9.1<br>26.0.3   | 1.3.6.1.2.1<br>.10.39.2.1.<br>1.1.2 | =1                       | This notification is generated whenever the value of sonetPathCurrentStatus changes to value 1.                                                                                                                                                                                             | <a href="#">Cisco Sonet path status changed to clear</a>      |
| mplsLdpFailedInitSessionThresholdExceeded | 1.3.6.1.4.1.9.10.<br>65.2.0.1 | N/A                                 | N/A                      | This notification is generated when the value of the 'mplsLdpEntityPVLimitMismatchTrapEnable' object is 'enabled(1)' and the value of the object, 'mplsLdpEntityFailedInitSessionThreshold' has been exceeded.                                                                              | <a href="#">MPLS LDP init session threshold exceeded Trap</a> |
| mplsLdpSessionDown                        | 1.3.6.1.4.1.9.10.<br>65.2.0.4 | N/A                                 | N/A                      | Generation of this trap occurs when the 'mplsLdpSessionUpDownTrapEnable' object is 'enabled(1)' and the value of mplsLdpSessionState changes from 'operational(5)' to any other state.                                                                                                      | <a href="#">MPLS LDP session down Trap</a>                    |
| mplsLdpSessionUp                          | 1.3.6.1.4.1.9.10.<br>65.2.0.3 | N/A                                 | N/A                      | Generation of this trap occurs when the 'mplsLdpSessionUpDownTrapEnable' object is 'enabled(1)' and the value of mplsLdpSessionState changes from any state except 'nonexistent(1)' to 'operational'.                                                                                       | <a href="#">MPLS LDP session up Trap</a>                      |
| mplsTunnelUp                              | 1.3.6.1.3.95.3.0.<br>1        | N/A                                 | N/A                      | This notification is generated when a mplsTunnelOperStatus object for one of the configured tunnels is about to leave the down state and transition into some other state (but not into the notPresent state). This other state is indicated by the included value of mplsTunnelOperStatus. | <a href="#">MPLS TE tunnel up trap</a>                        |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                     | Trap OID                   | Sub Type<br>Varbind OID          | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                  | Short Description                                         |
|-------------------------------|----------------------------|----------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| mplsTunnelDown                | 1.3.6.1.3.95.3.0.2         | N/A                              | N/A                       | This notification is generated when a mplsTunnelOperStatus object for one of the configured tunnels is about to enter the down state from some other state (but not from the notPresent state). This other state is indicated by the included value of mplsTunnelOperStatus. | <a href="#">MPLS TE tunnel down trap</a>                  |
| mplsTunnelRerouted            | 1.3.6.1.3.95.3.0.3         | N/A                              | N/A                       | This notification is generated when a tunnel is rerouted or re-optimized. If the Actual Path is used, then this object MAY contain the new path for this tunnel some time after this trap is issued by the agent                                                             | <a href="#">MPLS TE tunnel rerouted trap</a>              |
| ciscoIpMRoutMissingHeartBeats | 1.3.6.1.4.1.9.10.2.3.1.0.1 | N/A                              | N/A                       | A notification is sent if a multicast router with this feature enabled failed to receive configured number of heartbeat packets from heartbeat sources within a configured time interval                                                                                     | <a href="#">Failed receive multicast router heartbeat</a> |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 2                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 1 is Disabled</a>             |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 5                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 1 is Standby Cold</a>         |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 9                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 1 is Standby Hot</a>          |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 2                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 2 is Disabled</a>             |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 5                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 2 is Standby Cold</a>         |
| ciscoRFProgressionNotif       | 1.3.6.1.4.1.9.9.1.76.2.0.2 | 1.3.6.1.4.1.9.9.176.1.1.4.0      | 9                         | VSL link goes down or one of the chassis reloads                                                                                                                                                                                                                             | <a href="#">Cisco VSS Shelf 2 is Standby Hot</a>          |
| cvsVSLConnectionChangeNotif   | 1.3.6.1.4.1.9.9.3.88.0.1   | 1.3.6.1.4.1.9.9.388.1.3.1.1.3.71 | 0                         | when VSL connection is down                                                                                                                                                                                                                                                  | <a href="#">VSL Connection Changed: Down</a>              |
| cvsVSLConnectionChangeNotif   | 1.3.6.1.4.1.9.9.3.88.0.1   | 1.3.6.1.4.1.9.9.388.1.3.1.1.3.71 | 1                         | when VSL connection is up                                                                                                                                                                                                                                                    | <a href="#">VSL Connection Change: Up</a>                 |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name          | Trap OID                  | SubType<br>Varbind OID         | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                   | Short Description                           |
|--------------------|---------------------------|--------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| topologyChange     | 1.3.6.1.2.1.17.0.2        | N/A                            | N/A                      | This Notification is sent by a bridge when any of its configured ports transitions from the Learning state to the Forwarding state, or from the Forwarding state to the Blocking state.                                                                                                                                                                                                                                                       | <a href="#">dot1qBridge trap</a>            |
| cEtherCfmCcMepUp   | 1.3.6.1.4.1.9.9.461.0.0.1 | N/A                            | N/A                      | This notification is generated in the following cases: when a remote MEP first comes up, that is when we receive CC message from that MEP for the first time; when the device receives a CC message from a MEP for which it has an expired CCDB entry; when a CC message is received for a remote MEP for which the device already has a CCDB entry and the port-state in the received CC message is different from the cached previous state | <a href="#">Mep up trap</a>                 |
| cEtherCfmCcMepDown | 1.3.6.1.4.1.9.9.461.0.0.2 | N/A                            | N/A                      | This notification is generated when a remote MEP goes down; i.e. the entry in CCDB corresponding to this MEP times out or the device receives a CC message with zero hold-time                                                                                                                                                                                                                                                                | <a href="#">Mep down trap</a>               |
| coldStart          | 1.3.6.1.2.1.11.0.0        | N/A                            | N/A                      | This trap signifies that the sending protocol entity is reinitializing itself such that the agent's configuration or the protocol entity implementation may be altered.                                                                                                                                                                                                                                                                       | <a href="#">Cold start trap</a>             |
| cHsrpStateChange   | 1.3.6.1.4.1.9.9.106.2.0.1 | 1.3.6.1.4.1.9.9.106.1.2.1.1.15 | = 5                      | A cHsrpStateChange notification is sent when a cHsrpGrpStandbyState transitions to either active or standby state, or leaves active or standby state. There will be only one notification issued when the state change is from standby to active and vice versa.                                                                                                                                                                              | <a href="#">Cisco hsrp state standby</a>    |
| cHsrpStateChange   | 1.3.6.1.4.1.9.9.106.2.0.1 | 1.3.6.1.4.1.9.9.106.1.2.1.1.15 | = ^                      | A cHsrpStateChange notification is sent when a cHsrpGrpStandbyState transitions to either active or standby state, or leaves active or standby state. There will be only one notification issued when the state change is from standby to active and vice versa.                                                                                                                                                                              | <a href="#">Cisco hsrp state non active</a> |
| cHsrpStateChange   | 1.3.6.1.4.1.9.9.106.2.0.1 | 1.3.6.1.4.1.9.9.106.1.2.1.1.15 | = 6                      | A cHsrpStateChange notification is sent when a cHsrpGrpStandbyState transitions to either active or standby state, or leaves active or standby state. There will be only one notification issued when the state change is from standby to active and vice versa.                                                                                                                                                                              | <a href="#">Cisco hsrp state active</a>     |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                  | Trap OID                  | Sub Type<br>Varbind OID    | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                            | Short Description                                                               |
|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 3                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Critical</a>        |
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 1                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Normal</a>          |
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 6                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Not Functioning</a> |
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 5                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Not Present</a>     |
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 4                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Shutdown</a>        |
| ciscoEnvMonFanNotification | 1.3.6.1.4.1.9.9.1.3.3.0.4 | 1.3.6.1.4.1.9.9.13.1.4.1.3 | = 2                       | A ciscoEnvMonFanNotification is sent if any one of the fans in the fan array (where existent) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | <a href="#">Cisco Environment Monitoring Fan Notification - Warning</a>         |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                              | Trap OID                  | SubType<br>Varbind OID     | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                            | Short Description                        |
|----------------------------------------|---------------------------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.1.3.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 3                      | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Redundant Supply State - Critical        |
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.1.3.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 1                      | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Redundant Supply State - Normal          |
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.1.3.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 6                      | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Redundant Supply State - Not Functioning |
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.1.3.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 5                      | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Redundant Supply State - Not Present     |
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.1.3.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 4                      | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Redundant Supply State - Shutdown        |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                              | Trap OID                 | Sub Type<br>Varbind OID    | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                            | Short Description                |
|----------------------------------------|--------------------------|----------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| ciscoEnvMonRedundantSupplyNotification | 1.3.6.1.4.1.9.9.13.3.0.5 | 1.3.6.1.4.1.9.9.13.1.5.1.3 | = 2                       | A ciscoEnvMonRedundantSupplyNotification is sent if the redundant power supply (where exists) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.                                                                                                 | Redundant Supply State - Warning |
| ciscoEnvMonTemperatureNotification     | 1.3.6.1.4.1.9.9.13.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | = 3                       | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Critical Temperature             |
| ciscoEnvMonTemperatureNotification     | 1.3.6.1.4.1.9.9.13.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | = 1                       | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Normal Temperature               |
| ciscoEnvMonTemperatureNotification     | 1.3.6.1.4.1.9.9.13.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | = 6                       | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Not Functioning                  |
| ciscoEnvMonTemperatureNotification     | 1.3.6.1.4.1.9.9.13.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6 | = 5                       | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification. | Not Present                      |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                          | Trap OID                  | SubType<br>Varbind OID       | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Short Description                      |
|------------------------------------|---------------------------|------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| ciscoEnvMonTemperatureNotification | 1.3.6.1.4.1.9.9.1.3.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6   | = 4                      | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.                                                                                                                      | Critical Temperature - Device Shutdown |
| ciscoEnvMonTemperatureNotification | 1.3.6.1.4.1.9.9.1.3.3.0.3 | 1.3.6.1.4.1.9.9.13.1.3.1.6   | = 2                      | A ciscoEnvMonTemperatureNotification is sent if the temperature measured at a given test point is outside the normal range for the test point (i.e. is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.                                                                                                                      | Temperature Rising                     |
| newRoot                            | 1.3.6.1.2.1.17.0.1        | N/A                          | N/A                      | The newRoot trap indicates that the sending agent has become the new root of the Spanning Tree; the trap is sent by a bridge soon after its election as the new root, e.g., upon expiration of the Topology Change Timer, immediately subsequent to its election. Implementation of this trap is optional.                                                                                                                                                                                                                  | new root trap                          |
| stpInconsistencyUpdate             | 1.3.6.1.4.1.9.9.8.2.2.0.1 | 1.3.6.1.4.1.9.9.82.1.3.1.1.3 | =1                       | A stpPortInconsistencyUpdate notification is sent by a bridge when an instance of stpInconsistentState is created or destroyed. That is, when an inconsistency is discovered in the VLAN's Spanning Tree for a particular port, or when such an inconsistency disappears. Note that the trap is not sent if the port transitions between different types of inconsistency. The stpInconsistentState value indicates the type of inconsistency which now exists/no longer exists for the relevant VLAN on the relevant port. | stp port inconsistency discovered      |



Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                  | Trap OID                 | Sub Type<br>Varbind OID      | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Short Description                 |
|----------------------------|--------------------------|------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| stpInconsistencyUpdate     | 1.3.6.1.4.1.9.9.82.2.0.1 | 1.3.6.1.4.1.9.9.82.1.3.1.1.4 | =2                        | A stpPortInconsistencyUpdate notification is sent by a bridge when an instance of stpInconsistentState is created or destroyed. That is, when an inconsistency is discovered in the VLAN's Spanning Tree for a particular port, or when such an inconsistency disappears. Note that the trap is not sent if the port transitions between different types of inconsistency. The stpInconsistentState value indicates the type of inconsistency which now exists/no longer exists for the relevant VLAN on the relevant port.                                                                     | stp port inconsistency resolved   |
| stpLoopInconsistencyUpdate | 1.3.6.1.4.1.9.9.82.2.0.3 | 1.3.6.1.4.1.9.9.82.1.8.2.1.3 | = 1                       | A stpLoopInconsistencyUpdate notification is sent by a bridge when an instance of stpLoopInconsistencyState is created or destroyed. That is, when a loop-inconsistency is discovered in the VLAN's or instance's Spanning Tree for a particular port, or when such a loop-inconsistency disappears. For creation, the value of stpLoopInconsistencyState in the notification is true(1); for deletion, the value is false(2). The object value of stpSpanningTreeType indicates which Spanning Tree protocol is running when an instance of stpLoopInconsistencyState is created or destroyed. | stp loop inconsistency discovered |
| stpLoopInconsistencyUpdate | 1.3.6.1.4.1.9.9.82.2.0.3 | 1.3.6.1.4.1.9.9.82.1.8.2.1.3 | = 2                       | A stpLoopInconsistencyUpdate notification is sent by a bridge when an instance of stpLoopInconsistencyState is created or destroyed. That is, when a loop-inconsistency is discovered in the VLAN's or instance's Spanning Tree for a particular port, or when such a loop-inconsistency disappears. For creation, the value of stpLoopInconsistencyState in the notification is true(1); for deletion, the value is false(2). The object value of stpSpanningTreeType indicates which Spanning Tree protocol is running when an instance of stpLoopInconsistencyState is created or destroyed. | stp loop inconsistency resolved   |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                  | Trap OID                 | SubType<br>Varbind OID       | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Short Description                                            |
|----------------------------|--------------------------|------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| stpRootInconsistencyUpdate | 1.3.6.1.4.1.9.9.82.2.0.2 | 1.3.6.1.4.1.9.9.82.1.5.2.1.3 | = 1                      | A stpRootInconsistencyUpdate notification is sent by a bridge when an instance of stpRootInconsistencyState is created or destroyed. That is, when an root-inconsistency is discovered in the VLAN's or instance's Spanning Tree for a particular port, or when such an root-inconsistency disappears. For creation, the value of stpRootInconsistencyState in the notification is true(1); for deletion, the value is false(2). The object value of stpSpanningTreeType indicates which Spanning Tree protocol is running when an instance of stpRootInconsistencyState is created or destroyed. | <a href="#">stp root inconsistency discovered</a>            |
| stpRootInconsistencyUpdate | 1.3.6.1.4.1.9.9.82.2.0.2 | 1.3.6.1.4.1.9.9.82.1.5.2.1.3 | = 2                      | A stpRootInconsistencyUpdate notification is sent by a bridge when an instance of stpRootInconsistencyState is created or destroyed. That is, when an root-inconsistency is discovered in the VLAN's or instance's Spanning Tree for a particular port, or when such an root-inconsistency disappears. For creation, the value of stpRootInconsistencyState in the notification is true(1); for deletion, the value is false(2). The object value of stpSpanningTreeType indicates which Spanning Tree protocol is running when an instance of stpRootInconsistencyState is created or destroyed. | <a href="#">stp root inconsistency resolved</a>              |
| vtpConfigRevNumberError    | 1.3.6.1.4.1.9.9.46.2.0.1 | N/A                          | N/A                      | A configuration revision number error notification signifies that a device has incremented its vtpConfigRevNumberErrors counter. Generation of this notification is suppressed if the vtpNotificationsEnabled has the value 'false'. The device must throttle the generation of consecutive vtpConfigRevNumberError notifications so that there is at least a five-second gap between notification of this type. When notification are throttled, they are dropped, not queued for sending at a future time. (Note that 'generating' a notification means sending to all configured recipients.)  | <a href="#">vtp configuration revision number error trap</a> |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                       | Trap OID                  | Sub Type<br>Varbind OID | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Short Description                                       |
|---------------------------------|---------------------------|-------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| vtpConfigDigestError            | 1.3.6.1.4.1.9.9.4.6.2.0.2 | N/A                     | N/A                       | A configuration digest error notification signifies that a device has incremented its vtpConfigDigestErrors counter. Generation of this notification is suppressed if the vtpNotificationsEnabled has the value 'false'. The device must throttle the generation of consecutive vtpConfigDigestError notifications so that there is at least a five-second gap between notification of this type. When notification are throttled, they are dropped, not queued for sending at a future time. (Note that 'generating' a notification means sending to all configured recipients). | <a href="#">vtp configuration digest error trap</a>     |
| ciscoEnvMonShutdownNotification | 1.3.6.1.4.1.9.9.13.3.0.1  | N/A                     | N/A                       | A ciscoEnvMonShutdownNotification is sent if the environmental monitor detects a test point reaching a critical state and is about to initiate a shutdown. This notification contains no objects so that it may be encoded and sent in the shortest amount of time possible. Even so, management applications should not rely on receiving such a notification as it may not be sent before the shutdown completes.                                                                                                                                                               | <a href="#">cisco EnvMon Shutdown Notification Trap</a> |
| caemTemperatureNotification     | 1.3.6.1.4.1.9.9.6.1.2.0.1 | N/A                     | N/A                       | A caemTemperatureNotification is sent if the over temperature condition is detected in the managed system. This is a replacement for the ciscoEnvMonTemperatureNotification trap because the information 'ciscoEnvMonTemperatureStatusValue' required by the trap is not available in the managed system.                                                                                                                                                                                                                                                                         | <a href="#">caem Temperature Notification Trap</a>      |
| caemVoltageNotification         | 1.3.6.1.4.1.9.9.6.1.2.0.2 | N/A                     | N/A                       | A caemVoltageNotification is sent if the over voltage condition is detected and ciscoEnvMonVoltageState is not set to 'notPresent' in the managed system. This is a replacement for the ciscoEnvMonVoltageNotification trap because the information 'ciscoEnvMonVoltageStatusValue' required by the trap is not available in the managed system.                                                                                                                                                                                                                                  | <a href="#">caem Voltage Notification Trap</a>          |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                        | Trap OID                      | SubType<br>Varbind OID                | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Short Description                                                      |
|----------------------------------|-------------------------------|---------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| cmnMacChangedNotification        | 1.3.6.1.4.1.9.9.2<br>15.2.0.1 | N/A                                   | N/A                      | This notification is generated when there is enough MAC address information to fully occupy a maximum size SNMP trap message. This notification is also generated when there is at least one MAC address changed or removed and the amount of time elapsed from the previous notification is greater than the maximum wait time denoted by cmnNotificationInterval object. If there are more MAC addresses information than can fit into one cmmHistTrapContent object, then multiple notifications will be generated. | <a href="#">cmn Mac Changed Notification Trap</a>                      |
| cmnMacMoveNotification           | 1.3.6.1.4.1.9.9.2<br>15.2.0.2 | N/A                                   | N/A                      | cmnMacMoveNotification is generated when a MAC address is moved between two interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                | <a href="#">cmn Mac Move Notification Trap</a>                         |
| vtpVersionOneDeviceDetected      | 1.3.6.1.4.1.9.9.4<br>6.2.0.6  | N/A                                   | N/A                      | A VTP version one device detected notification is generated by a device when: a) a management domain has been put into version 2 mode (as accessed by managementDomainVersionInUse). b) 15 minutes has passed since a). c) a version 1 PDU is detected on a trunk on the device that is in that management domain which has a lower revision number than the current configuration.                                                                                                                                    | <a href="#">vtp VersionOne Device Detected trap</a>                    |
| vtpLocalModeChanged              | 1.3.6.1.4.1.9.9.4<br>6.2.0.8  | N/A                                   | N/A                      | A vtpLocalModeChanged notification is generated by a device when the value of the object managementDomainLocalMode is changed.                                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">vtp Local Mode Changed trap</a>                            |
| vtpVersionInUseChanged           | 1.3.6.1.4.1.9.9.4<br>6.2.0.9  | N/A                                   | N/A                      | A vtpVersionInUseChanged notification is generated by a device when the value of the object managementDomainVersionInUse is changed.                                                                                                                                                                                                                                                                                                                                                                                   | <a href="#">vtp VersionInUse Changed trap</a>                          |
| vlanTrunkPortDynamicStatusChange | 1.3.6.1.4.1.9.9.4<br>6.2.0.7  | 1.3.6.1.4.1<br>.9.9.46.1.6<br>.1.1.14 | = 1                      | A vlanTrunkPortDynamicStatusChange notification is generated by a device when the value of vlanTrunkPortDynamicStatus object has been changed.                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">Vlan trunk port dynamic status changed to trunking</a>     |
| vlanTrunkPortDynamicStatusChange | 1.3.6.1.4.1.9.9.4<br>6.2.0.7  | 1.3.6.1.4.1<br>.9.9.46.1.6<br>.1.1.14 | 2                        | A vlanTrunkPortDynamicStatusChange notification is generated by a device when the value of vlanTrunkPortDynamicStatus object has been changed.                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">Vlan trunk port dynamic status changed to not trunking</a> |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                       | Trap OID                      | Sub Type<br>Varbind OID | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                 | Short Description                                              |
|---------------------------------|-------------------------------|-------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| cpsSecureMacAddrViolation       | 1.3.6.1.4.1.9.9.3<br>15.0.0.1 | N/A                     | N/A                       | The address violation notification is generated when port security address violation is detected on a secure non trunk, access interface (that carries a single vlan) and the cpsIfViolationAction is set to 'dropNotify'.  | <a href="#">cps Secure MacAddr Violation Trap</a>              |
| cpsIfVlanSecureMacAddrViolation | 1.3.6.1.4.1.9.9.3<br>15.0.0.3 | N/A                     | N/A                       | The address violation notification is generated when port security address violation is detected on a multi-vlan interface and the cpsIfViolationAction is set to 'dropNotify'.                                             | <a href="#">cps IfVlan Secure MacAddr Violation Trap</a>       |
| clcVlanMacLimitNotif            | 1.3.6.1.4.1.9.9.3<br>13.0.1   | N/A                     | N/A                       | Notification is sent when the number of MAC addresses (the value of clcFdbVlanMacUsage) has crossed the configured limit of MAC addresses (clcVlanMaxMacLimit) either rising above or falling below it.                     | <a href="#">cisco L2 Control VlanMacLimit Notif Trap</a>       |
| clcVlanMacLimitHighNotif        | 1.3.6.1.4.1.9.9.3<br>13.0.2   | N/A                     | N/A                       | Notification is sent when the number of MAC addresses (the value of clcFdbVlanMacUsage) has crossed the configured higher threshold limit of MAC addresses (clcVlanMacLimitHigh) either rising above or falling below it.   | <a href="#">cisco L2 Control VlanMacLimit High Notif Trap</a>  |
| clcIfMacLimitLowNotif           | 1.3.6.1.4.1.9.9.3<br>13.0.3   | N/A                     | N/A                       | Notification is sent when the number of MAC addresses (the value of clcFdbIfMacUsage) has crossed the configured lower threshold limit of MAC addresses (clcIfMacLimitLow) either rising above or falling below it.         | <a href="#">cisco L2 Control IfMacLimit Low Notif Trap</a>     |
| clcIfMacLimitHighNotif          | 1.3.6.1.4.1.9.9.3<br>13.0.4   | N/A                     | N/A                       | Notification is sent when the number of MAC addresses (the value of clcFdbIfMacUsage) has crossed the configured higher threshold limit of MAC addresses (clcIfMacLimitHigh) either rising above or falling below it.       | <a href="#">cisco L2 Control IfMacLimit High Notif Trap</a>    |
| clcIfVlanMacLimitLowNotif       | 1.3.6.1.4.1.9.9.3<br>13.0.5   | N/A                     | N/A                       | Notification is sent when the number of MAC addresses (the value of clcFdbIfVlanMacUsage) has crossed the configured lower threshold limit of MAC addresses (clcIfVlanMacLimitLow) either rising above or falling below it. | <a href="#">cisco L2 Control IfVlanMacLimit Low Notif Trap</a> |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                  | Trap OID                | SubType<br>Varbind OID  | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                             | Short Description                                               |
|----------------------------|-------------------------|-------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| clcIfVlanMacLimitHighNotif | 1.3.6.1.4.1.9.9.313.0.6 | N/A                     | N/A                      | Notification is sent when the number of MAC addresses (the value of clcFdbIfVlanMacUsage) has crossed the configured higher threshold limit of MAC addresses (clcIfVlanMacLimitHigh) either rising above or falling below it.                                                                           | <a href="#">cisco L2 Control IfVlanMacLimit High Notif Trap</a> |
| csbSourceAlertEvent        | 1.3.6.1.4.1.9.9.658.0.1 | 1.3.6.1.4.1.9.9.658.1.2 | = 1                      | This notification is generated when after SIP/H.248 call establishment with one party, the media packets are received from some unexpected source/party (or some wrong/unexpected IP address). This is to alert that some unwanted data packets are received by the system from an undesirable IP/port. | <a href="#">Cisco SBC source alert off trap</a>                 |
| csbSourceAlertEvent        | 1.3.6.1.4.1.9.9.658.0.1 | 1.3.6.1.4.1.9.9.658.1.2 | != (1 or 7)              | This notification is generated when after SIP/H.248 call establishment with one party, the media packets are received from some unexpected source/party (or some wrong/unexpected IP address). This is to alert that some unwanted data packets are received by the system from an undesirable IP/port. | <a href="#">Cisco SBC source alert on trap</a>                  |
| csbSourceAlertEvent        | 1.3.6.1.4.1.9.9.658.0.1 | 1.3.6.1.4.1.9.9.658.1.2 | = 7                      | This notification is generated when after SIP/H.248 call establishment with one party, the media packets are received from some unexpected source/party (or some wrong/unexpected IP address). This is to alert that some unwanted data packets are received by the system from an undesirable IP/port. | <a href="#">Cisco SBC source alert informational trap</a>       |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                     | Trap OID                | Sub Type<br>Varbind OID  | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Short Description                            |
|-------------------------------|-------------------------|--------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| csbDynamicBlackListEvent      | 1.3.6.1.4.1.9.9.658.0.2 | 1.3.6.1.4.1.9.9.658.1.2  | = 1                       | This notification is generated when a source is added to or removed from the blacklist table. Dynamic blacklists put in place automatically (subject to a set of configurable constraints) by the SBC when it detects an attempt to disrupt traffic flowing through it. Dynamic blacklisting does not require management interference. Blacklist table is restricted only to SBC service. This table is not made available to NM. For more Information on Dynamic Blacklisting refer to the following link:<br><a href="http://lbj.cisco.com/push_targets1/ucdit/cc/t/d/doc/product/ioxsoft/iox34/cgcr34/sbc_c34/sbc34dos.htm">http://lbj.cisco.com/push_targets1/ucdit/cc/t/d/doc/product/ioxsoft/iox34/cgcr34/sbc_c34/sbc34dos.htm</a> or Search cisco.com using keywords 'DoS Prevention and Dynamic Blacklisting'. | Cisco SBC dynamic blacklist trap             |
| csbAdjacencyStatus            | 1.3.6.1.4.1.9.9.658.0.3 | 1.3.6.1.4.1.9.9.658.1.2  | = 1                       | This notification is generated when an Adjacency is attached to (or detached from) the SBC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Cisco SBC adjacency state up trap            |
| csbAdjacencyStatus            | 1.3.6.1.4.1.9.9.658.0.3 | 1.3.6.1.4.1.9.9.658.1.2  | != (1 or 7)               | This notification is generated when an Adjacency is attached to (or detached from) the SBC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Cisco SBC adjacency state down trap          |
| csbAdjacencyStatus            | 1.3.6.1.4.1.9.9.658.0.3 | 1.3.6.1.4.1.9.9.658.1.2  | = 7                       | This notification is generated when an Adjacency is attached to (or detached from) the SBC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Cisco SBC adjacency state informational trap |
| csbServiceStateEvent          | 1.3.6.1.4.1.9.9.658.0.4 | 1.3.6.1.4.1.9.9.658.1.28 | = 1                       | This notification is generated when there is a change in the state of a service card. The changes in the service state are Active and Standby.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cisco SBC service state up trap              |
| csbServiceStateEvent          | 1.3.6.1.4.1.9.9.658.0.4 | 1.3.6.1.4.1.9.9.658.1.28 | = 3                       | This notification is generated when there is a change in the state of a service card. The changes in the service state are Active and Standby.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cisco SBC service state down trap            |
| csbServiceStateEvent          | 1.3.6.1.4.1.9.9.658.0.4 | 1.3.6.1.4.1.9.9.658.1.28 | = 2                       | This notification is generated when there is a change in the state of a service card. The changes in the service state are Active and Standby.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cisco SBC service state informational trap   |
| csbSystemCongestionAlarmEvent | 1.3.6.1.4.1.9.9.658.0.5 | 1.3.6.1.4.1.9.9.658.1.2  | = 1                       | This notification is generated when CPU/Memory congestion in SBC is raised or cleared.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Cisco SBC system congestion cleared trap     |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                     | Trap OID                 | SubType<br>Varbind OID  | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                | Short Description                                                    |
|-------------------------------|--------------------------|-------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| csbSystemCongestionAlarmEvent | 1.3.6.1.4.1.9.9.658.0.5  | 1.3.6.1.4.1.9.9.658.1.2 | != (1 or 7)              | This notification is generated when CPU/Memory congestion in SBC is raised or cleared.                                                                                                                                                                                                                     | <a href="#">Cisco SBC system congestion raised trap</a>              |
| csbSystemCongestionAlarmEvent | 1.3.6.1.4.1.9.9.658.0.5  | 1.3.6.1.4.1.9.9.658.1.2 | = 7                      | This notification is generated when CPU/Memory congestion in SBC is raised or cleared.                                                                                                                                                                                                                     | <a href="#">Cisco SBC system congestion informational trap</a>       |
| csbSLAViolationRev1           | 1.3.6.1.4.1.9.9.658.0.10 | 1.3.6.1.4.1.9.9.658.1.2 | = 1                      | This notification is generated when there is a violation of Service Level Agreement as described in the policy tables. The typical service level agreements include maximum number of calls allowed, max call rate, max bandwidth, and so on. This notification replaces the csbSLAViolation notification. | <a href="#">Cisco SBC SLA violation off trap</a>                     |
| csbSLAViolationRev1           | 1.3.6.1.4.1.9.9.658.0.10 | 1.3.6.1.4.1.9.9.658.1.2 | != (1 or 7)              | This notification is generated when there is a violation of Service Level Agreement as described in the policy tables. The typical service level agreements include maximum number of calls allowed, max call rate, max bandwidth, and so on. This notification replaces the csbSLAViolation notification. | <a href="#">Cisco SBC SLA violation on trap</a>                      |
| csbSLAViolations              | 1.3.6.1.4.1.9.9.658.0.10 | 1.3.6.1.4.1.9.9.658.1.2 | = 7                      | This notification is generated when there is a violation of Service Level Agreement as described in the policy tables. The typical service level agreements include maximum number of calls allowed, max call rate, max bandwidth and so on. This notification replaces the csbSLAViolation notification.  | <a href="#">Cisco SBC SLA violation informational trap</a>           |
| csbRadiusConnections          | 1.3.6.1.4.1.9.9.658.0.7  | 1.3.6.1.4.1.9.9.658.1.2 | = 1                      | This notification is generated when the connection to the radius server changes (connected or disconnected).                                                                                                                                                                                               | <a href="#">Cisco SBC radius connection state up trap</a>            |
| csbRadiusConnections          | 1.3.6.1.4.1.9.9.658.0.7  | 1.3.6.1.4.1.9.9.658.1.2 | != (1 or 7)              | This notification is generated when the connection to the radius server changes (connected or disconnected).                                                                                                                                                                                               | <a href="#">Cisco SBC radius connection state down trap</a>          |
| csbRadiusConnections          | 1.3.6.1.4.1.9.9.658.0.7  | 1.3.6.1.4.1.9.9.658.1.2 | = 7                      | This notification is generated when the connection to the radius server changes (connected or disconnected).                                                                                                                                                                                               | <a href="#">Cisco SBC radius connection state informational trap</a> |
| csbH248ControllerStatus       | 1.3.6.1.4.1.9.9.658.0.9  | 1.3.6.1.4.1.9.9.658.1.2 | = 1                      | This notification is generated when in distributed deployment model, a DBE is attached or detached from the SBC.                                                                                                                                                                                           | <a href="#">Cisco SBC H248 controller state up trap</a>              |
| csbH248ControllerStatus       | 1.3.6.1.4.1.9.9.658.0.9  | 1.3.6.1.4.1.9.9.658.1.2 | != (1 or 7)              | This notification is generated when in distributed deployment model, a DBE is attached or detached from the SBC.                                                                                                                                                                                           | <a href="#">Cisco SBC H248 controller state down trap</a>            |



Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                          | Trap OID                 | Sub Type<br>Varbind OID | Sub Type<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Short Description                                                  |
|------------------------------------|--------------------------|-------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| csbH248ControllerStatus            | 1.3.6.1.4.1.9.9.658.0.9  | 1.3.6.1.4.1.9.9.658.1.2 | = 7                       | This notification is generated when in distributed deployment model, a DBE is attached or detached from the SBC.                                                                                                                                                                                                                                                                                                                                                                                                                          | <a href="#">Cisco SBC H248 controller state informational trap</a> |
| rttMonConnectionChangeNotification | 1.3.6.1.4.1.9.9.42.2.0.1 | N/A                     | N/A                       | This notification is only valid when the RttMonRttType is 'echo' or 'pathEcho'. A rttMonConnectionChangeNotification indicates that a connection to a target (not to a hop along the path to a target) has failed on establishment or been lost and when reestablished. Precisely, this has resulted in rttMonCtrlOperConnectionLostOccurred changing value.                                                                                                                                                                              | <a href="#">RTT Connection Change</a>                              |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.42.2.0.2 | N/A                     | N/A                       | A rttMonTimeoutNotification indicates the occurrence of a timeout for a RTT operation, and it indicates the clearing of such a condition by a subsequent RTT operation. Precisely, this has resulted in rttMonCtrlOperTimeoutOccurred changing value. When the RttMonRttType is 'pathEcho', this notification will only be sent when the timeout occurs during an operation to the target and not to a hop along the path to the target. This also applies to the clearing of the timeout.                                                | <a href="#">RTT Operation Timeout</a>                              |
| rttMonThresholdNotification        | 1.3.6.1.4.1.9.9.42.2.0.3 | N/A                     | N/A                       | A rttMonThresholdNotification indicates the occurrence of a threshold violation for a RTT operation, and it indicates the previous violation has subsided for a subsequent RTT operation. Precisely, this has resulted in rttMonCtrlOperOverThresholdOccurred changing value. When the RttMonRttType is 'pathEcho', this notification will only be sent when the threshold violation occurs during an operation to the target and not to a hop along the path to the target. This also applies to the subsiding of a threshold condition. | <a href="#">RTT Operation Threshold Violation</a>                  |
| rttMonVerifyErrorNotification      | 1.3.6.1.4.1.9.9.42.2.0.4 | N/A                     | N/A                       | A rttMonVerifyErrorNotification indicates the occurrence of a data corruption in an RTT operation.                                                                                                                                                                                                                                                                                                                                                                                                                                        | <a href="#">RTT Verify Error</a>                                   |
| rttMonNotification                 | 1.3.6.1.4.1.9.9.42.2.0.5 | N/A                     | N/A                       | A rttMonNotification indicates the occurrence of a threshold violation, and it indicates the previous violation has subsided for a subsequent operation.                                                                                                                                                                                                                                                                                                                                                                                  | <a href="#">RTT threshold violation or clearance</a>               |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                      | Trap OID                        | SubType<br>Varbind OID            | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                        | Short Description                                        |
|--------------------------------|---------------------------------|-----------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| rttMonLpdDiscoveryNotification | 1.3.6.1.4.1.9.9.4<br>2.2.0.6    | N/A                               | N/A                      | A rttMonLpdDiscoveryNotification indicates that the LSP Path Discovery to the target PE has failed, and it also indicates the clearing of such condition. Precisely this has resulted in rttMonLpdGrpStatsLPDFailOccurred changing value. When the rttMonLpdGrpStatsLPDFailOccurred is 'false', the instance value for rttMonLpdGrpStatsLPDFailCause is not valid. | <a href="#">RTT Lpd Discovery</a>                        |
| rttMonLpdGrpStatusNotification | 1.3.6.1.4.1.9.9.4<br>2.2.0.7    | N/A                               | N/A                      | A rttMonLpdGrpStatusNotification indicates that the LPD Group status rttMonLpdGrpStatsGroupStatus has changed indicating some connectivity change to the target PE. This has resulted in rttMonLpdGrpStatsGroupStatus changing value.                                                                                                                              | <a href="#">RTT Lpd Grp Status</a>                       |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 10,12,15                 | ima-Group-FailureAlarm v2                                                                                                                                                                                                                                                                                                                                          | <a href="#">IMA Group Remote Failure</a>                 |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 14                       | ima-Group-FailureAlarm v2                                                                                                                                                                                                                                                                                                                                          | <a href="#">IMA Group Remote insufficient links trap</a> |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.5 | 1                        | ima-Group-ClearingAlarm v2                                                                                                                                                                                                                                                                                                                                         | <a href="#">IMA Group Up Trap</a>                        |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 11,16                    | ima-Group-FailureAlarm v2                                                                                                                                                                                                                                                                                                                                          | <a href="#">IMA Group local Failure</a>                  |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 13                       | ima-Group-FailureAlarm v2                                                                                                                                                                                                                                                                                                                                          | <a href="#">IMA Group local insufficient links trap</a>  |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 2                        | ima Link FailureAlarm v2                                                                                                                                                                                                                                                                                                                                           | <a href="#">Ima Link Loss of delay Frame Trap</a>        |
| imaFailureAlarm                | 1.3.6.1.4.1.353.5<br>.7.1.2.0.1 | 1.3.6.1.4.1<br>.353.5.7.1.<br>1.6 | 1                        | ima Link FailureAlarm v2                                                                                                                                                                                                                                                                                                                                           | <a href="#">Ima Link Loss of ima Frame Trap</a>          |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                             | Trap OID                    | Sub Type<br>Varbind OID           | Sub Type<br>Varbind Value | Description                                                                        | Short Description                                                |
|---------------------------------------|-----------------------------|-----------------------------------|---------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------|
| imaFailureAlarm                       | 1.3.6.1.4.1.353.5.7.1.2.0.1 | 1.3.6.1.4.1.353.5.7.1.1.6         | 5,7,9                     | ima Link FailureAlarm v2                                                           | <a href="#">Ima Link Rcv Failure Trap</a>                        |
| imaFailureAlarm                       | 1.3.6.1.4.1.353.5.7.1.2.0.1 | 1.3.6.1.4.1.353.5.7.1.1.6         | 3                         | ima Link FailureAlarm v2                                                           | <a href="#">Ima Link Remote Failure Trap</a>                     |
| imaFailureAlarm                       | 1.3.6.1.4.1.353.5.7.1.2.0.1 | 1.3.6.1.4.1.353.5.7.1.1.5         | 1                         | ima-Link-ClearingAlarm v2                                                          | <a href="#">Ima Link Up Trap</a>                                 |
| imaFailureAlarm                       | 1.3.6.1.4.1.353.5.7.1.2.0.1 | 1.3.6.1.4.1.353.5.7.1.1.6         | 4,6,8                     | ima Link FailureAlarm v2                                                           | <a href="#">Ima Link Xmt Failure Trap</a>                        |
| Cisco-UMT-state-change-v2             | 1.3.6.1.4.1.9.9.483.0.2     | N/A                               | N/A                       | The state of the connection between the UMTS interfaces.                           | <a href="#">Cisco UMT state Change trap</a>                      |
| Cisco-GSM-state-change-trap-v2        | 1.3.6.1.4.1.9.9.483.0.1     | N/A                               | N/A                       | The state of the connection between the GSM interfaces.                            | <a href="#">Cisco GSM state Change trap</a>                      |
| Cisco-IPRAN-Backhaul-received-util-v2 | 1.3.6.1.4.1.9.9.483.0.3     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 1                         | When Rcvd. util changes froto any of the status : acceptable, warning, overloaded. | <a href="#">IPRAN Backhaul Received Util Acceptable Trap</a>     |
| Cisco-IPRAN-Backhaul-received-util-v2 | 1.3.6.1.4.1.9.9.483.0.3     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 2                         | When Rcvd. util changes froto any of the status : acceptable, warning, overloaded. | <a href="#">IPRAN Backhaul Received Util Warning Trap</a>        |
| Cisco-IPRAN-Backhaul-received-util-v2 | 1.3.6.1.4.1.9.9.483.0.3     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.3 | 3                         | When Rcvd. util changes froto any of the status : acceptable, warning, overloaded. | <a href="#">IPRAN Backhaul Received Util Overloaded Trap</a>     |
| Cisco-IPRAN-Backhaul-sent-util-v2     | 1.3.6.1.4.1.9.9.483.0.4     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 1                         | When sent util changes froto any of the status : acceptable, warning, overloaded.  | <a href="#">IPRAN Backhaul Sent Util Acceptable Trap</a>         |
| Cisco-IPRAN-Backhaul-sent-util-v2     | 1.3.6.1.4.1.9.9.483.0.4     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 2                         | When sent util changes froto any of the status : acceptable, warning, overloaded.  | <a href="#">IPRAN Backhaul Sent Util Overloaded Trap</a>         |
| Cisco-IPRAN-Backhaul-sent-util-v2     | 1.3.6.1.4.1.9.9.483.0.4     | 1.3.6.1.4.1.9.9.483.1.2.2.1.1.1.4 | 3                         | When sent util changes froto any of the status : acceptable, warning, overloaded.  | <a href="#">IPRAN Backhaul Sent Util Warning Trap</a>            |
| rttMonConnectionChange Notification   | 1.3.6.1.4.1.9.9.42.2.0.1    | 1.3.6.1.4.1.9.9.42.1.2.9.1.5      | 1                         | IPSLA echo ConnLoss Trap v2                                                        | <a href="#">Connection Loss detected by ipsla icmp echo trap</a> |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                          | Trap OID                     | SubType<br>Varbind OID                                                                                                     | SubType<br>Varbind Value | Description                                     | Short Description                                        |
|------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|----------------------------------------------------------|
| rttMonConnectionChangeNotification | 1.3.6.1.4.1.9.9.4<br>2.2.0.1 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.5                                                                                       | 2                        | IPSLA echo ConnLoss Trap v2                     | Connection re-establish detected by ipsla icmp echo trap |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.4<br>2.2.0.2 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.6                                                                                       | 1                        | IPSLA IP or LSP echo Timeout trap v2            | Timeout detected by ipsla icmp echo trap                 |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.4<br>2.2.0.2 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.6                                                                                       | 2                        | IPSLA IP or LSP echo Timeout trap v2            | Connection re-establish detected by ipsla icmp echo trap |
| rttMonThresholdNotification        | 1.3.6.1.4.1.9.9.4<br>2.2.0.3 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.7                                                                                       | 1                        | IPSLA Threshold Notification trap v2            | Threshold crossing under trap                            |
| rttMonThresholdNotification        | 1.3.6.1.4.1.9.9.4<br>2.2.0.3 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.7                                                                                       | 2                        | IPSLA Threshold Notification trap v2            | Threshold crossing over trap                             |
| rttMonVerifyErrorNotification      | 1.3.6.1.4.1.9.9.4<br>2.2.0.4 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.11                                                                                      | 1                        | IPSLA Threshold Notification deprecated trap v2 | Data corruption in rtt operation trap                    |
| rttMonVerifyErrorNotification      | 1.3.6.1.4.1.9.9.4<br>2.2.0.4 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.9.1.11                                                                                      | 2                        | IPSLA Threshold Notification deprecated trap v2 | Data corruption cleared in rtt operation trap            |
| rttMonNotification                 | 1.3.6.1.4.1.9.9.4<br>2.2.0.5 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.19.1.2,<br>1.3.6.1.4.1<br>.9.9.42.1.2<br>.2.1.33,<br>1.3.6.1.4.1<br>.9.9.42.1.2<br>.19.1.10 | 8, null, 1               | RTT MON notification                            | Connection Loss detected by ipsla icmp echo trap         |
| rttMonNotification                 | 1.3.6.1.4.1.9.9.4<br>2.2.0.5 | 1.3.6.1.4.1<br>.9.9.42.1.2<br>.19.1.2,<br>1.3.6.1.4.1<br>.9.9.42.1.2<br>.2.1.33,<br>1.3.6.1.4.1<br>.9.9.42.1.2<br>.19.1.10 | 8, not null, 1           | RTT MON notification                            | Connection Loss detected by ipsla LSP icmp echo trap     |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name          | Trap OID                  | SubType<br>Varbind OID                                                                             | SubType<br>Varbind Value | Description          | Short Description                                            |
|--------------------|---------------------------|----------------------------------------------------------------------------------------------------|--------------------------|----------------------|--------------------------------------------------------------|
| rttMonNotification | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 2               | RTT MON notification | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 2           | RTT MON notification | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 1               | RTT MON notification | Timeout detected by ipsla icmp echo trap                     |
| rttMonNotification | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 1           | RTT MON notification | Timeout detected by ipsla LSP icmp echo trap                 |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                        | Trap OID                  | SubType<br>Varbind OID                                                                             | SubType<br>Varbind Value | Description                    | Short Description                                            |
|----------------------------------|---------------------------|----------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|--------------------------------------------------------------|
| rttMonNotification               | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 2               | RTT MON notification           | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification               | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 2           | RTT MON notification           | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification               | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10                                   | 1, 1                     | RTT MON notification           | RTT threshold crossing over trap                             |
| rttMonNotification               | 1.3.6.1.4.1.9.9.4.2.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10                                   | 1, 2                     | RTT MON notification           | RTT threshold crossing under trap                            |
| rttMonLpdDiscoveryNotification   | 1.3.6.1.4.1.9.9.4.2.2.0.6 | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                                                      | 1                        | IPSLA LPD Discovery trap v2    | IPSLA LSP path discovery failure trap                        |
| rttMonLpdDiscoveryNotification   | 1.3.6.1.4.1.9.9.4.2.2.0.6 | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                                                      | 2                        | IPSLA LPD Discovery trap v2    | IPSLA LSP path rediscovery trap                              |
| rttMonLpdGroupStatusNotification | 1.3.6.1.4.1.9.9.4.2.2.0.7 | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                                                      | 3,4                      | IPSLA LDP Group Status trap v2 | IPSLA LDP group status failure trap                          |
| rttMonLpdGroupStatusNotification | 1.3.6.1.4.1.9.9.4.2.2.0.7 | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                                                      | 2                        | IPSLA LDP Group Status trap v2 | IPSLA LDP group status restoration trap                      |

Table 36-3 Cisco IOS V2/V3 Traps (continued)

| Trap Name                | Trap OID                  | Sub Type<br>Varbind OID        | Sub Type<br>Varbind Value | Description                                                                                                                                                                 | Short Description                                      |
|--------------------------|---------------------------|--------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| cmplsFrrProtected        | 1.3.6.1.4.1.9.10.98.0.1   |                                |                           | TE FRR trigger notification - protected trap v2                                                                                                                             | <a href="#">FRR Protected Trap</a>                     |
| cmplsFrrUnProtected      | 1.3.6.1.4.1.9.10.98.0.2   |                                |                           | TE FRR trigger notification - unprotected trap v2                                                                                                                           | <a href="#">FRR Unprotected Trap</a>                   |
| cpwVcUp                  | 1.3.6.1.4.1.9.10.106.2.2  | N/A                            | N/A                       | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state.   | <a href="#">Pseudo wire tunnel up</a>                  |
| cpwVcDown                | 1.3.6.1.4.1.9.10.106.2.1  | N/A                            | N/A                       | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the down(2) state from some other state. | <a href="#">Pseudo wire tunnel down</a>                |
| crepLinkStatus           | 1.3.6.1.4.1.9.9.601.0.1   | 1.3.6.1.4.1.9.9.601.1.2.1.1.3  | 5                         | Cisco REP link status change trap                                                                                                                                           | <a href="#">REP port state fully operational Trap</a>  |
| crepLinkStatus           | 1.3.6.1.4.1.9.9.601.0.1   | 1.3.6.1.4.1.9.9.601.1.2.1.1.3  | !=5                       | Cisco REP link status change trap                                                                                                                                           | <a href="#">REP port state not operational Trap</a>    |
| crepPortRoleChange       | 1.3.6.1.4.1.9.9.601.0.3   | 1.3.6.1.4.1.9.9.601.1.2.1.1.4  | 1                         | Cisco REP port role change trap                                                                                                                                             | <a href="#">REP port role failed Trap</a>              |
| crepPortRoleChange       | 1.3.6.1.4.1.9.9.601.0.3   | 1.3.6.1.4.1.9.9.601.1.2.1.1.4  | !=1                       | Cisco REP port role change trap                                                                                                                                             | <a href="#">REP port role clear Trap</a>               |
| ciscoSonetVTStatusChange | 1.3.6.1.4.1.9.9.126.0.4   | 1.3.6.1.2.1.10.39.3.1.1.1.2    | !=1                       | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to error</a> |
| ciscoSonetVTStatusChange | 1.3.6.1.4.1.9.9.126.0.4   | 1.3.6.1.2.1.10.39.3.1.1.1.2    | 1                         | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to clear</a> |
| cEtherCfmCcMepUp         | 1.3.6.1.4.1.9.9.461.0.0.1 |                                |                           | mep up                                                                                                                                                                      | <a href="#">CFM cc mep up trap</a>                     |
| cEtherCfmCcMepDown       | 1.3.6.1.4.1.9.9.461.0.0.2 | 1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 5                         | timeout                                                                                                                                                                     | <a href="#">CFM cc mep down due to timeout trap</a>    |
| cEtherCfmCcMepDown       | 1.3.6.1.4.1.9.9.461.0.0.2 | 1.3.6.1.4.1.9.9.461.1.1.2.1.16 | 4                         | lastgasp                                                                                                                                                                    | <a href="#">CFM cc mep down due to last gasp trap</a>  |

**Table 36-3** Cisco IOS V2/V3 Traps (continued)

| Trap Name                        | Trap OID                       | SubType<br>Varbind OID                  | SubType<br>Varbind Value | Description                              | Short Description                                        |
|----------------------------------|--------------------------------|-----------------------------------------|--------------------------|------------------------------------------|----------------------------------------------------------|
| cEtherCfmCc<br>Crossconnect      | .1.3.6.1.4.1.9.9.4<br>61.0.0.3 | N/A                                     | N/A                      | cross-connected service error trap       | CFM cc<br>cross-connected<br>service error trap          |
| cEtherCfmCc<br>MepDown           | .1.3.6.1.4.1.9.9.4<br>61.0.0.2 | .1.3.6.1.4.<br>1.9.9.461.<br>1.1.2.1.16 | 8                        | cross-connected service error trap clear | CFM cc<br>cross-connected<br>service error trap<br>clear |
| cEtherCfmCc<br>Loop              | .1.3.6.1.4.1.9.9.4<br>61.0.0.4 | N/A                                     | N/A                      | loop trap                                | CFM cc loop trap                                         |
| cEtherCfmCc<br>MepDown           | .1.3.6.1.4.1.9.9.4<br>61.0.0.2 | .1.3.6.1.4.<br>1.9.9.461.<br>1.1.2.1.16 | 7                        | loop trap clear                          | CFM cc loop trap<br>clear                                |
| cEtherCfmCc<br>ConfigError       | .1.3.6.1.4.1.9.9.4<br>61.0.0.5 | N/A                                     | N/A                      | config error trap                        | CFM cc config<br>error trap                              |
| cEtherCfmCc<br>MepDown           | .1.3.6.1.4.1.9.9.4<br>61.0.0.2 | .1.3.6.1.4.<br>1.9.9.461.<br>1.1.2.1.16 | 6                        | config error trap clear                  | CFM cc config<br>error trap clear                        |
| cEtherCfmXC<br>heckMissing       | .1.3.6.1.4.1.9.9.4<br>61.0.0.6 | N/A                                     | N/A                      | mep missing trap                         | CFMcrossconnect<br>mep missing trap                      |
| cEtherCfmXC<br>heckUnknown       | .1.3.6.1.4.1.9.9.4<br>61.0.0.7 | N/A                                     | N/A                      | mep unknown trap                         | CFMcrossconnect<br>mep unknown trap                      |
| cEtherCfmCc<br>MepDown           | .1.3.6.1.4.1.9.9.4<br>61.0.0.2 | .1.3.6.1.4.<br>1.9.9.461.<br>1.1.2.1.16 | 9                        | mep unknown trap clear                   | CFMcrossconnect<br>mep unknown trap<br>clear             |
| cEtherCfmXC<br>heckServiceU<br>p | .1.3.6.1.4.1.9.9.4<br>61.0.0.8 | N/A                                     | N/A                      | mep service up trap                      | CFMcrossconnect<br>mep service up<br>trap                |



# Cisco IOX V1 Traps

Table 36-4 lists the Cisco IOX SNMP V1 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see Table 36-11.

**Table 36-4** Cisco IOX V1 Traps

| Trap Name         | Generic Type | Specific Type | Enterprise OID          | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                              | Short Description                       |
|-------------------|--------------|---------------|-------------------------|---------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| cpwVcUp           | 6            | 2             | 1.3.6.1.4.1.9.10.10.6.2 | N/A                 | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state.                                                                                                                                                | <a href="#">Pseudo wire tunnel up</a>   |
| cpwVcDown         | 6            | 1             | 1.3.6.1.4.1.9.10.10.6.2 | N/A                 | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state.                                                                                                                                                | <a href="#">Pseudo wire tunnel down</a> |
| MIB2 V1 link down | 2            | 0             | 1.3.6.1.6.3.1.1.5       | N/A                 | N/A                   | A linkDown trap signifies that the sending protocol entity recognizes a failure in one of the communication links represented in the agent's configuration. The Trap-PDU of type linkDown contains as the first element of its variable-bindings, the name and value of the ifIndex instance for the affected interface. | <a href="#">SNMP Link down</a>          |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                          | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID           | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                              | Short Description                                                        |
|------------------------------------|--------------|---------------|----------------------|-------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| MIB2 V1 link up                    | 3            | 0             | 1.3.6.1.6.3.1.1.5    | N/A                           | N/A                   | A linkUp trap signifies that the sending protocol entity recognizes that one of the communication links represented in the agent's configuration has come up. The Trap-PDU of type linkUp contains as the first element of its variable-bindings, the name and value of the ifIndex instance for the affected interface. | <a href="#">SNMP Link up</a>                                             |
| rttMonConnectionChangeNotification | 6            | 1             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5  | 1                     | IPSLA echo ConnLoss Trap v2                                                                                                                                                                                                                                                                                              | <a href="#">Connection Loss detected by ipsla icmp echo trap</a>         |
| rttMonConnectionChangeNotification | 6            | 1             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5  | 2                     | IPSLA echo ConnLoss Trap v2                                                                                                                                                                                                                                                                                              | <a href="#">Connection re-establish detected by ipsla icmp echo trap</a> |
| rttMonTimeoutNotification          | 6            | 2             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6  | 1                     | IPSLA IP or LSP echo Timeout trap v2                                                                                                                                                                                                                                                                                     | <a href="#">Timeout detected by ipsla icmp echo trap</a>                 |
| rttMonTimeoutNotification          | 6            | 2             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6  | 2                     | IPSLA IP or LSP echo Timeout trap v2                                                                                                                                                                                                                                                                                     | <a href="#">Connection re-establish detected by ipsla icmp echo trap</a> |
| rttMonThresholdNotification        | 6            | 3             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7  | 1                     | IPSLA Threshold Notification trap v2                                                                                                                                                                                                                                                                                     | <a href="#">Threshold crossing under trap</a>                            |
| rttMonThresholdNotification        | 6            | 3             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7  | 2                     | IPSLA Threshold Notification trap v2                                                                                                                                                                                                                                                                                     | <a href="#">Threshold crossing over trap</a>                             |
| rttMonVerifyErrorNotification      | 6            | 4             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11 | 1                     | IPSLA Threshold Notification deprecated trap v2                                                                                                                                                                                                                                                                          | <a href="#">Data corruption in rtt operation trap</a>                    |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                      | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID                                                                          | SubType Varbind Value | Description                                     | Short Description                                            |
|--------------------------------|--------------|---------------|----------------------|----------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------|--------------------------------------------------------------|
| rttMonVerifyError Notification | 6            | 4             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11                                                                | 2                     | IPSLA Threshold Notification deprecated trap v2 | Data corruption cleared in rtt operation trap                |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 1            | RTT MON notification                            | Connection Loss detected by ipsla icmp echo trap             |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 1        | RTT MON notification                            | Connection Loss detected by ipsla LSP icmp echo trap         |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 2            | RTT MON notification                            | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 2        | RTT MON notification                            | Connection re-establish detected by ipsla LSP icmp echo trap |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name          | Generic Type | Specific Type | Enterprise OID       | SubType Varbind OID                                                                          | SubType Varbind Value | Description          | Short Description                                            |
|--------------------|--------------|---------------|----------------------|----------------------------------------------------------------------------------------------|-----------------------|----------------------|--------------------------------------------------------------|
| rttMonNotification | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 1            | RTT MON notification | Timeout detected by ipsla icmp echo trap                     |
| rttMonNotification | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 1        | RTT MON notification | Timeout detected by ipsla LSP icmp echo trap                 |
| rttMonNotification | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 2            | RTT MON notification | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, not null, 2        | RTT MON notification | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification | 6            | 5             | 1.3.6.1.4.1.9.9.42.2 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.2.1.33, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 1, 1                  | RTT MON notification | RTT threshold crossing over trap                             |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                      | Generic Type | Specific Type | Enterprise OID         | SubType Varbind OID                                           | SubType Varbind Value | Description                                                                                                                                                               | Short Description                       |
|--------------------------------|--------------|---------------|------------------------|---------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| rttMonNotification             | 6            | 5             | 1.3.6.1.4.1.9.9.42.2   | 1.3.6.1.4.1.9.9.42.1.2.19.1.2, 1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 1, 2                  | RTT MON notification                                                                                                                                                      | RTT threshold crossing under trap       |
| rttMonLpdDiscoveryNotification | 6            | 6             | 1.3.6.1.4.1.9.9.42.2   | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                 | 1                     | IPSLA LPD Discovery trap v2                                                                                                                                               | IPSLA LSP path discovery failure trap   |
| rttMonLpdDiscoveryNotification | 6            | 6             | 1.3.6.1.4.1.9.9.42.2   | 1.3.6.1.4.1.9.9.42.1.3.7.1.13                                 | 2                     | IPSLA LPD Discovery trap v2                                                                                                                                               | IPSLA LSP path rediscovery trap         |
| rttMonLpdGrpStatusNotification | 6            | 7             | 1.3.6.1.4.1.9.9.42.2   | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                 | 3,4                   | IPSLA LDP Group Status trap v2                                                                                                                                            | IPSLA LDP group status failure trap     |
| rttMonLpdGrpStatusNotification | 6            | 7             | 1.3.6.1.4.1.9.9.42.2   | 1.3.6.1.4.1.9.9.42.1.3.7.1.16                                 | 2                     | IPSLA LDP Group Status trap v2                                                                                                                                            | IPSLA LDP group status restoration trap |
| cmplsFrrProtected              | 6            | 1             | 1.3.6.1.4.1.9.10.98    | N/A                                                           | N/A                   | TE FRR trigger notification v1                                                                                                                                            | FRR Protected Trap                      |
| cmplsFrrUnProtected            | 6            | 2             | 1.3.6.1.4.1.9.10.98    | N/A                                                           | N/A                   | TE FRR trigger notification v1                                                                                                                                            | FRR Unprotected Trap                    |
| cpwVcUp                        | 6            | 2             | 1.3.6.1.4.1.9.10.106.2 | N/A                                                           | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state. | Pseudo wire tunnel up                   |
| cpwVcDown                      | 6            | 1             | 1.3.6.1.4.1.9.10.106.2 | N/A                                                           | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state. | Pseudo wire tunnel down                 |
| DSX1 V1 Line Status Change     | 6            | 1             | 1.3.6.1.2.1.10.18.15   | 1.3.6.1.2.1.10.18.6.1.10.17                                   | 2                     | Indicates the line status of dsx1 interface                                                                                                                               | DSX1 Far end LOF                        |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                  | Generic Type | Specific Type | Enterprise OID        | SubType Varbind OID         | SubType Varbind Value | Description                                 | Short Description                         |
|----------------------------|--------------|---------------|-----------------------|-----------------------------|-----------------------|---------------------------------------------|-------------------------------------------|
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4                     | Indicates the line status of dsx1 interface | DSX1 Near end sending LOF Indication      |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 8                     | Indicates the line status of dsx1 interface | DSX1 Far end sending AIS                  |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 16                    | Indicates the line status of dsx1 interface | DSX1 Near end sending AIS                 |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 32                    | Indicates the line status of dsx1 interface | DSX1 Near end LOF                         |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 64                    | Indicates the line status of dsx1 interface | DSX1 Near end Loss of Signal              |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 128                   | Indicates the line status of dsx1 interface | DSX1 Near end is looped                   |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 256                   | Indicates the line status of dsx1 interface | DSX1 E1 TS16 AIS                          |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 512                   | Indicates the line status of dsx1 interface | DSX1 Far End Sending TS16 LOMF            |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1024                  | Indicates the line status of dsx1 interface | DSX1 Near End Sending TS16 LOMF           |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 2048                  | Indicates the line status of dsx1 interface | DSX1 Near End detects a test code         |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4096                  | Indicates the line status of dsx1 interface | DSX1 any line status not defined here     |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 8192                  | Indicates the line status of dsx1 interface | DSX1 Near End in Unavailable Signal State |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 16384                 | Indicates the line status of dsx1 interface | DSX1 Carrier Equipment Out of Service     |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                  | Generic Type | Specific Type | Enterprise OID        | SubType Varbind OID         | SubType Varbind Value                                                                                                  | Description                                 | Short Description                                                    |
|----------------------------|--------------|---------------|-----------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------|
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 32768                                                                                                                  | Indicates the line status of dsx1 interface | <a href="#">DSX1 DS2 Payload AIS</a>                                 |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 65536                                                                                                                  | Indicates the line status of dsx1 interface | <a href="#">DSX1 DS2 Performance Threshold Exceeded</a>              |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 4096 or 8192 or 16384 or 32768 or 65536 or 1) | Indicates the line status of dsx1 interface | <a href="#">DSX1 combination of bitmaps due to multiple failures</a> |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1                                                                                                                      | Indicates the line status of dsx1 interface | <a href="#">DSX1 No alarm present</a>                                |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2                                                                                                                      | Indicates the line status of dsx1 interface | <a href="#">DSX3 Receiving Yellow/Remote Alarm Indication</a>        |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 4                                                                                                                      | Indicates the line status of dsx1 interface | <a href="#">DSX3 Transmitting Yellow/Remote Alarm Indication</a>     |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 8                                                                                                                      | Indicates the line status of dsx1 interface | <a href="#">DSX3 Receiving AIS failure state</a>                     |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 16                                                                                                                     | Indicates the line status of dsx1 interface | <a href="#">DSX3 Transmitting AIS</a>                                |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 32                                                                                                                     | Indicates the line status of dsx1 interface | <a href="#">DSX3 Receiving LOF failure state</a>                     |

Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                  | Generic Type | Specific Type | Enterprise OID         | SubType Varbind OID         | SubType Varbind Value                                                       | Description                                                                                                                                                                        | Short Description                                    |
|----------------------------|--------------|---------------|------------------------|-----------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 64                                                                          | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Receiving LOS failure state                     |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 128                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Looping the received signal                     |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 256                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Receiving a Test Pattern                        |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 512                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 any line status not defined here                |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1024                                                                        | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Near End in Unavailable Signal State            |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2048                                                                        | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Carrier Equipment Out of Service                |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 1) | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 combination of bitmaps due to multiple failures |
| DSX3 V1 Line Status Change | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1                                                                           | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 No alarm present                                |
| entConfigChange            | 6            | 1             | 1.3.6.1.2.1.47.2       | N/A                         | N/A                                                                         | An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls. | Entity table configuration changed                   |



Table 36-4 Cisco IOX V1 Traps (continued)

| Trap Name                              | Generic Type | Specific Type | Enterprise OID      | SubType Varbind OID         | SubType Varbind Value | Description                                                                                                                                                                 | Short Description                                      |
|----------------------------------------|--------------|---------------|---------------------|-----------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Frame-Relay dlci status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32   | 1.3.6.1.2.1.10.32.2.1.3     | 1                     | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status invalid trap</a>            |
| Frame-Relay dlci status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32   | 1.3.6.1.2.1.10.32.2.1.3     | 3                     | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status inactive trap</a>           |
| Frame-Relay dlci status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32   | 1.3.6.1.2.1.10.32.2.1.3     | 2                     | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status active trap</a>             |
| ciscoSonetVTStatusChange               | 6            | 4             | 1.3.6.1.4.1.9.9.126 | 1.3.6.1.2.1.10.39.3.1.1.1.2 | !=1                   | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to error</a> |
| ciscoSonetVTStatusChange               | 6            | 4             | 1.3.6.1.4.1.9.9.126 | 1.3.6.1.2.1.10.39.3.1.1.1.2 | 1                     | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to clear</a> |

# Cisco IOX V2/V3 Traps

Table 36-5 lists the Cisco IOX SNMP V2/V3 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see Table 36-12.

**Table 36-5** Cisco IOX V2/V3 Traps

| Trap Name                   | Trap OID                | SubType Varbind OID     | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                       | Short Description                                   |
|-----------------------------|-------------------------|-------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| cbfDefineFileCompletion     | 1.3.6.1.4.1.9.9.187.0.1 | N/A                     | N/A                   | A cbfDefineFileCompletion notification is sent on the following conditions :                                                                                                                                                                                                                                                                                                                                                                      | <a href="#">CBF File operation state indicator</a>  |
| cbgpBackwardTransition      | 1.3.6.1.4.1.9.9.187.0.2 | 1.3.6.1.4.1.9.9.187.0.2 | != (1 or 6)           | The cbgpBackwardTransition Event is generated when the BGP FSM moves from a higher numbered state to a lower numbered state. The bgpPeerRemoteAddr value is attached to the notification Object Identifier.                                                                                                                                                                                                                                       | <a href="#">Cisco BGP backward transition trap</a>  |
| cbgpFsmStateChange          | 1.3.6.1.4.1.9.9.187.0.1 | 1.3.6.1.4.1.9.9.187.0.2 | = 1                   | The BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                                                                                                                                                                                                                                                                                                                                              | <a href="#">Cisco BGP down trap</a>                 |
| cbgpFsmStateChange          | 1.3.6.1.4.1.9.9.187.0.1 | 1.3.6.1.4.1.9.9.187.0.2 | = 6                   | The BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                                                                                                                                                                                                                                                                                                                                              | <a href="#">Cisco BGP established trap</a>          |
| cbgpPrefixThresholdExceeded | 1.3.6.1.4.1.9.9.187.0.3 | N/A                     | N/A                   | The cbgpPrfexMaxThresholdExceeded notification is generated when prefix count exceeds the configured warning threshold on a session for an address family                                                                                                                                                                                                                                                                                         | <a href="#">Cisco BGP prefix threshold exceeded</a> |
| cbgpPrefixThresholdClear    | 1.3.6.1.4.1.9.9.187.0.4 | N/A                     | N/A                   | The cbgpPrefixThresholdClear notification is generated when prefix count drops below the configured clear threshold on a session for an address family once cbgpPrefixThresholdExceeded is generated. This won't be generated if the peer session goes down after the generation of bgpPrefixThresholdExceeded. The bgpPeerRemoteAddr, bgpPeerAddrFamilyAfi and cbgpPeerAddrFamilySafi values are attached to the notification Object Identifier. | <a href="#">Cisco BGP prefix threshold clear</a>    |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name               | Trap OID                  | SubType Varbind OID         | SubType Varbind Value | Description                                                                                                                                                                                                             | Short Description                              |
|-------------------------|---------------------------|-----------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| ccCopyCompletion        | 1.3.6.1.4.1.9.9.96.2.1.1  | N/A                         | N/A                   | A ccCopyCompletion trap is sent at the completion of a config-copy request. The ccCopyFailCause is not instantiated, and hence not included in a trap, when the ccCopyState is success                                  | <a href="#">Config-copy request completion</a> |
| cefcFanTrayStatusChange | 1.3.6.1.4.1.9.9.117.2.0.6 | 1.3.6.1.4.1.9.9.117.1.4.1.1 | !=2                   | This notification is generated when the value of cefcFanTrayOperStatus changes.                                                                                                                                         | <a href="#">cefc fan-tray oper status down</a> |
| cefcFanTrayStatusChange | 1.3.6.1.4.1.9.9.117.2.0.6 | 1.3.6.1.4.1.9.9.117.1.4.1.1 | =2                    | This notification is generated when the value of cefcFanTrayOperStatus changes.                                                                                                                                         | <a href="#">cefc fan-tray oper status up</a>   |
| cefcFRUInserted         | 1.3.6.1.4.1.9.9.117.2.0.3 | N/A                         | N/A                   | The cefcFRUInserted notification indicates that a FRU was inserted. The varbind for this notification indicates the entPhysicalIndex of the inserted FRU, and the entPhysicalIndex of the FRU's container.              | <a href="#">cefc FRU inserted</a>              |
| cefcFRURemoved          | 1.3.6.1.4.1.9.9.117.2.0.4 | N/A                         | N/A                   | The cefcFRURemoved notification indicates that a FRU was removed. The varbind for this notification indicates the entPhysicalIndex of the removed FRU, and the entPhysicalIndex of the FRU's container.                 | <a href="#">cefc FRU removed</a>               |
| cefcModuleStatusChange  | 1.3.6.1.4.1.9.9.117.2.0.1 | 1.3.6.1.4.1.9.9.117.1.2.1.1 | !=2                   | This notification is generated when the value of cefcModuleOperStatus changes. It can be utilized by an NMS to update the status of the module it is managing.                                                          | <a href="#">cefc module oper status down</a>   |
| cefcModuleStatusChange  | 1.3.6.1.4.1.9.9.117.2.0.1 | 1.3.6.1.4.1.9.9.117.1.2.1.1 | =2                    | This notification is generated when the value of cefcModuleOperStatus changes. It can be utilized by an NMS to update the status of the module it is managing.                                                          | <a href="#">cefc module oper status up</a>     |
| cefcPowerStatusChange   | 1.3.6.1.4.1.9.9.117.2.0.2 | 1.3.6.1.4.1.9.9.117.1.1.2.1 | !=2                   | The cefcFRUPowerStatusChange notification indicates that the power status of a FRU has changed. The varbind for this notification indicates the entPhysicalIndex of the FRU, and the new operational-status of the FRU. | <a href="#">cefc power status down</a>         |
| cefcPowerStatusChange   | 1.3.6.1.4.1.9.9.117.2.0.2 | 1.3.6.1.4.1.9.9.117.1.1.2.1 | =2                    | The cefcFRUPowerStatusChange notification indicates that the power status of a FRU has changed. The varbind for this notification indicates the entPhysicalIndex of the FRU, and the new operational-status of the FRU. | <a href="#">cefc power status up</a>           |

**Table 36-5** Cisco I/OX V2/V3 Traps (continued)

| Trap Name                       | Trap OID                   | SubType Varbind OID           | SubType Varbind Value | Description                                                                                                                                                                                        | Short Description                                                   |
|---------------------------------|----------------------------|-------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| cfhBundleDownedLinkNotification | 1.3.6.1.4.1.9.9.257.0.3    | 1.3.6.1.4.1.9.9.257.1.2.1.1.3 | !=1                   | Fabric bundle link notification. This notification is sent if the value of cfhBundleOperStatus is 'up' and the value of cfhBundleDownedLinks is changed from 0 to nonzero or from nonzero to zero. | <a href="#">cfh bundle link status down</a>                         |
| cfhBundleDownedLinkNotification | 1.3.6.1.4.1.9.9.257.0.3    | 1.3.6.1.4.1.9.9.257.1.2.1.1.3 | =1                    | Fabric bundle link notification. This notification is sent if the value of cfhBundleOperStatus is 'up' and the value of cfhBundleDownedLinks is changed from 0 to nonzero or from nonzero to zero. | <a href="#">cfh bundle link status up</a>                           |
| cfhBundleStateNotification      | 1.3.6.1.4.1.9.9.257.0.2    | 1.3.6.1.4.1.9.9.257.1.3.3.1.4 | =2                    | Fabric bundle operational state change notification. This notification is sent when the cfhBundleOperStatus state transition occurs.                                                               | <a href="#">cfh Fabric bundle operational state changed to Down</a> |
| cfhBundleStateNotification      | 1.3.6.1.4.1.9.9.257.0.2    | 1.3.6.1.4.1.9.9.257.1.3.3.1.4 | =1                    | Fabric bundle operational state change notification. This notification is sent when the cfhBundleOperStatus state transition occurs.                                                               | <a href="#">cfh Fabric bundle operational state changed to Up</a>   |
| cfhPlaneStateNotification       | 1.3.6.1.4.1.9.9.257.0.1    | 1.3.6.1.4.1.9.9.257.1.2.1.1.3 | !=1                   | Fabric plane operational state change notification. This notification is sent when the fabric plane operational state transition occurs.                                                           | <a href="#">cfh Fabric plane status down</a>                        |
| cfhPlaneStateNotification       | 1.3.6.1.4.1.9.9.257.0.1    | 1.3.6.1.4.1.9.9.257.1.2.1.1.3 | =1                    | Fabric plane operational state change notification. This notification is sent when the fabric plane operational state transition occurs.                                                           | <a href="#">cfh Fabric plane status up</a>                          |
| ciscoConfigManagementEvent      | 1.3.6.1.4.1.9.9.43.2.0.1   | N/A                           | N/A                   | Notification of a configuration management event as recorded in ccmHistoryEventTable.                                                                                                              | <a href="#">Cisco Configuration management event notification</a>   |
| ciscoFlashCopyCompletionTrap    | 1.3.6.1.4.1.9.9.10.1.3.0.1 | 1.3.6.1.4.1.9.9.10.1.2.1.1.8  | != (0 or 1 or 2)      | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                  | <a href="#">Cisco flash copy failed</a>                             |
| ciscoFlashCopyCompletionTrap    | 1.3.6.1.4.1.9.9.10.1.3.0.1 | 1.3.6.1.4.1.9.9.10.1.2.1.1.8  | =2                    | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                  | <a href="#">Cisco flash copy completion</a>                         |
| ciscoFlashCopyCompletionTrap    | 1.3.6.1.4.1.9.9.10.1.3.0.1 | 1.3.6.1.4.1.9.9.10.1.2.1.1.8  | = (0 or 1)            | A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.                                                  | <a href="#">Cisco flash copy in progress</a>                        |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name                      | Trap OID                   | SubType Varbind OID          | SubType Varbind Value | Description                                                                                                                                                                                          | Short Description                               |
|--------------------------------|----------------------------|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| ciscoFlashDeviceChangeTrap     | 1.3.6.1.4.1.9.9.10.1.3.0.4 | N/A                          | N/A                   | A ciscoFlashDeviceChangeTrap is sent whenever a removable Flash device is inserted or removed.                                                                                                       | Cisco Flash device changed                      |
| ciscoFlashDeviceInsertedNotif  | 1.3.6.1.4.1.9.9.10.1.3.0.5 | N/A                          | N/A                   | A ciscoFlashDeviceInsertedNotif notification is sent whenever a removable Flash device is inserted.                                                                                                  | Cisco Flash device inserted                     |
| ciscoFlashDeviceRemovedNotif   | 1.3.6.1.4.1.9.9.10.1.3.0.6 | N/A                          | N/A                   | A ciscoFlashDeviceRemovedNotif notification is sent whenever a removable Flash device is removed.                                                                                                    | Cisco Flash device removed                      |
| ciscoFlashMiscOpCompletionTrap | 1.3.6.1.4.1.9.9.10.1.3.0.3 | 1.3.6.1.4.1.9.9.10.1.2.3.1.4 | != (1 or 2)           | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated. | Cisco Flash miscellaneous operation failed      |
| ciscoFlashMiscOpCompletionTrap | 1.3.6.1.4.1.9.9.10.1.3.0.3 | 1.3.6.1.4.1.9.9.10.1.2.3.1.4 | =2                    | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated. | Cisco Flash miscellaneous operation completed   |
| ciscoFlashMiscOpCompletionTrap | 1.3.6.1.4.1.9.9.10.1.3.0.3 | 1.3.6.1.4.1.9.9.10.1.2.3.1.4 | =1                    | A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated. | Cisco Flash miscellaneous operation in progress |
| ciscoPingCompletion            | 1.3.6.1.4.1.9.9.16.2.0.1   | N/A                          | N/A                   | A ciscoPingCompleted trap is sent at the completion of a sequence of pings if such a trap was requested when the sequence was initiated.                                                             | Cisco ping completion                           |
| ciscoSonetSectionStatusChange  | 1.3.6.1.4.1.9.9.126.0.1    | 1.3.6.1.2.1.1.0.39.1.2.1.1.1 | !=1                   | This notification is generated whenever the value of sonetSectionCurrentStatus changes to value more than 1.                                                                                         | Cisco Sonet section status changed to error     |
| ciscoSonetSectionStatusChange  | 1.3.6.1.4.1.9.9.126.0.1    | 1.3.6.1.2.1.1.0.39.1.2.1.1.1 | =1                    | This notification is generated whenever the value of sonetSectionCurrentStatus changes to value 1.                                                                                                   | Cisco Sonet section status changed to clear     |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name                              | Trap OID                         | SubType Varbind OID                 | SubType Varbind Value | Description                                                                                                                                                                                                                            | Short Description                                                          |
|----------------------------------------|----------------------------------|-------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| ciscoSonetLine<br>StatusChange         | 1.3.6.1.4.1.<br>9.9.126.0.2      | 1.3.6.1.2.1.1<br>0.39.1.3.1.1.<br>1 | !=1                   | This notification is generated whenever the value of sonetLineCurrentStatus changes to value more than 1.                                                                                                                              | <a href="#">Cisco Sonet line status changed to error</a>                   |
| ciscoSonetLine<br>StatusChange         | 1.3.6.1.4.1.<br>9.9.126.0.2      | 1.3.6.1.2.1.1<br>0.39.1.3.1.1.<br>1 | =1                    | This notification is generated whenever the value of sonetLineCurrentStatus changes to value 1.                                                                                                                                        | <a href="#">Cisco Sonet line status changed to clear</a>                   |
| ciscoSonetPath<br>StatusChange         | 1.3.6.1.4.1.<br>9.9.126.0.3      | 1.3.6.1.2.1.1<br>0.39.2.1.1.1.<br>2 | !=1                   | This notification is generated whenever the value of sonetPathCurrentStatus changes to value more than 1.                                                                                                                              | <a href="#">Cisco Sonet path status changed to error</a>                   |
| ciscoSonetPath<br>StatusChange         | 1.3.6.1.4.1.<br>9.9.126.0.3      | 1.3.6.1.2.1.1<br>0.39.2.1.1.1.<br>2 | =1                    | This notification is generated whenever the value of sonetPathCurrentStatus changes to value 1.                                                                                                                                        | <a href="#">Cisco Sonet path status changed to clear</a>                   |
| clogMessageG<br>enerated               | 1.3.6.1.4.1.<br>9.9.41.2.0.1     | N/A                                 | N/A                   | When a syslog message is generated by the device a clogMessageGenerated notification is sent. The sending of these notifications can be enabled/disabled via the clogNotificationsEnabled object.                                      | <a href="#">Cisco syslog message generated</a>                             |
| cPimNbrLoss                            | 1.3.6.1.4.1.<br>9.10.119.0.<br>2 | N/A                                 | N/A                   | A cPimNbrLoss trap signifies the loss of an adjacency with a neighbor. This trap should be generated when the neighbor timer expires, and the router has no other neighbors on the same interface with a lower IP address than itself. | <a href="#">Cisco PIM neighbor lost</a>                                    |
| entSensorThres<br>holdNotificatio<br>n | 1.3.6.1.4.1.<br>9.9.91.2.0.1     | N/A                                 | N/A                   | The sensor value crossed the threshold listed in entSensorThresholdTable. This notification is generated once each time the sensor value crosses the threshold                                                                         | <a href="#">sensor value crossed threshold in entSensorThreshold Table</a> |
| rttMonNotificat<br>ion                 | 1.3.6.1.4.1.<br>9.9.42.2.0.5     | N/A                                 | N/A                   | A rttMonNotification indicates the occurrence of a threshold violation, and it indicates the previous violation has subsided for a subsequent operation.                                                                               | <a href="#">RTT threshold violation or clearance</a>                       |
| cpwVcUp                                | 1.3.6.1.4.1.<br>9.10.106.2.<br>2 | N/A                                 | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state.                                                              | <a href="#">Pseudo wire tunnel up</a>                                      |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name          | Trap OID                  | SubType Varbind OID         | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                              | Short Description                    |
|--------------------|---------------------------|-----------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| cpwVcDown          | 1.3.6.1.4.1.9.10.106.2.1  | N/A                         | N/A                   | This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the down(2) state from some other state.                                                                                                                                                              | Pseudo wire tunnel down              |
| ciscoRFSwact Notif | 1.3.6.1.4.1.9.9.176.2.0.1 | 1.3.6.1.4.1.9.9.176.1.1.8.0 | 1                     | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB. | Cisco RF Swap Status - Unsupported   |
| ciscoRFSwact Notif | 1.3.6.1.4.1.9.9.176.2.0.1 | 1.3.6.1.4.1.9.9.176.1.1.8.0 | 2                     | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB. | Cisco RF Swap Status - None          |
| ciscoRFSwact Notif | 1.3.6.1.4.1.9.9.176.2.0.1 | 1.3.6.1.4.1.9.9.176.1.1.8.0 | 3                     | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB. | Cisco RF Swap Status - Not Known     |
| ciscoRFSwact Notif | 1.3.6.1.4.1.9.9.176.2.0.1 | 1.3.6.1.4.1.9.9.176.1.1.8.0 | 4                     | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB. | Cisco RF Swap Status - UserInitiated |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name             | Trap OID                          | SubType<br>Varbind OID          | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                      | Short Description                                             |
|-----------------------|-----------------------------------|---------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| ciscoRFSwact<br>Notif | 1.3.6.1.4.1.<br>9.9.176.2.0.<br>1 | 1.3.6.1.4.1.9.<br>9.176.1.1.8.0 | 5                        | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB.                                                                                                         | <a href="#">Cisco RF Swap Status - UserForced</a>             |
| ciscoRFSwact<br>Notif | 1.3.6.1.4.1.<br>9.9.176.2.0.<br>1 | 1.3.6.1.4.1.9.<br>9.176.1.1.8.0 | 6                        | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB.                                                                                                         | <a href="#">Cisco RF Swap Status - ActiveUnitFailed</a>       |
| ciscoRFSwact<br>Notif | 1.3.6.1.4.1.<br>9.9.176.2.0.<br>1 | 1.3.6.1.4.1.9.<br>9.176.1.1.8.0 | 7                        | A SWACT notification is sent by the newly active redundant unit whenever a switch of activity occurs. In the case where a SWACT event may be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity. sysUpTime is the same sysUpTime defined in the RFC-1213 MIB.                                                                                                         | <a href="#">Cisco RF Swap Status - ActiveUnitRemoved</a>      |
| cefcUnrecognizedFRU   | 1.3.6.1.4.1.<br>9.9.117.2.0.<br>5 | N/A                             | N/A                      | The cefcUnrecognizedFRU notification indicates that a FRU was inserted whose product ID is not supported. The varbind for this notification indicates the entPhysicalIndex of the inserted FRU, the entPhysicalClass this FRU belongs to, the entPhysicalVendorType of this FRU, the entPhysicalName of the FRU, the entPhysicalModelName of the inserted FRU, and the cefcPhysicalStatus telling the reason code for sending this notification. | <a href="#">cefc FRU inserted with unsupported product ID</a> |



Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name                          | Trap OID                  | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Short Description                         |
|------------------------------------|---------------------------|---------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| cefcPowerSupplyOutputChange        | 1.3.6.1.4.1.9.9.117.2.0.7 | N/A                 | N/A                   | The notification indicates that the power supply's output capacity has changed. This notification is triggered whenever one instance of the power supply's cefcPSOutputModeInOperation has transitioned from 'false' to 'true'.                                                                                                                                                                                                                                                             | cefc Power supply output capacity changed |
| rttMonConnectionChangeNotification | 1.3.6.1.4.1.9.9.42.2.0.1  | N/A                 | N/A                   | This notification is only valid when the RttMonRttType is 'echo' or 'pathEcho'. A rttMonConnectionChangeNotification indicates that a connection to a target (not to a hop along the path to a target) has failed on establishment or been lost and when reestablished. Precisely, this has resulted in rttMonCtrlOperConnectionLostOccurred changing value.                                                                                                                                | RTT Connection Change                     |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.42.2.0.2  | N/A                 | N/A                   | A rttMonTimeoutNotification indicates the occurrence of a timeout for a RTT operation, and it indicates the clearing of such a condition by a subsequent RTT operation. Precisely, this has resulted in rttMonCtrlOperTimeoutOccurred changing value. When the RttMonRttType is 'path Echo', this notification will only be sent when the timeout occurs during an operation to the target and not to a hop along the path to the target. This also applies to the clearing of the timeout. | RTT Operation Timeout                     |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name                      | Trap OID                 | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Short Description                                    |
|--------------------------------|--------------------------|---------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| rttMonThresholdNotification    | 1.3.6.1.4.1.9.9.42.2.0.3 | N/A                 | N/A                   | A rttMonThresholdNotification indicates the occurrence of a threshold violation for a RTT operation, and it indicates the previous violation has subsided for a subsequent RTT operation. Precisely, this has resulted in rttMonCtrlOperOverThresholdOccurred changing value. When the RttMonRttType is 'path Echo', this notification will only be sent when the threshold violation occurs during an operation to the target and not to a hop along the path to the target. This also applies to the subsiding of a threshold condition. | <a href="#">RTT Operation Threshold Violation</a>    |
| rttMonVerifyErrorNotification  | 1.3.6.1.4.1.9.9.42.2.0.4 | N/A                 | N/A                   | A rttMonVerifyErrorNotification indicates the occurrence of a data corruption in an RTT operation.                                                                                                                                                                                                                                                                                                                                                                                                                                         | <a href="#">RTT Verify Error</a>                     |
| rttMonNotification             | 1.3.6.1.4.1.9.9.42.2.0.5 | N/A                 | N/A                   | A rttMonNotification indicates the occurrence of a threshold violation, and it indicates the previous violation has subsided for a subsequent operation.                                                                                                                                                                                                                                                                                                                                                                                   | <a href="#">RTT threshold violation or clearance</a> |
| rttMonLpdDiscoveryNotification | 1.3.6.1.4.1.9.9.42.2.0.6 | N/A                 | N/A                   | A rttMonLpdDiscoveryNotification indicates that the LSP Path Discovery to the target PE has failed, and it also indicates the clearing of such condition. Precisely this has resulted in rttMonLpdGrpStatsLPDFailOccurred changing value. When the rttMonLpdGrpStatsLPDFailOccurred is 'false', the instance value for rttMonLpdGrpStatsLPDFailCause is not valid.                                                                                                                                                                         | <a href="#">RTT Lpd Discovery</a>                    |
| rttMonLpdGrpStatusNotification | 1.3.6.1.4.1.9.9.42.2.0.7 | N/A                 | N/A                   | A rttMonLpdGrpStatusNotification indicates that the LPD Group status rttMonLpdGrpStatsGroupStatus has changed indicating some connectivity change to the target PE. This has resulted in rttMonLpdGrpStatsGroupStatus changing value.                                                                                                                                                                                                                                                                                                      | <a href="#">RTT Lpd Grp Status</a>                   |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name                          | Trap OID                 | SubType Varbind OID           | SubType Varbind Value | Description                                                                                                                       | Short Description                                        |
|------------------------------------|--------------------------|-------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| cbgpBackwardTransition             | 1.3.6.1.4.1.9.9.187.0.2  | 1.3.6.1.4.1.9.9.187.0.2       | = 1                   | The cbgpBackwardTransition Event is generated when the IPv6 BGP FSM moves from a higher numbered state to a lower numbered state. | IPv6 BGP down trap                                       |
| cbgpFsmStateChange                 | 1.3.6.1.4.1.9.9.187.0.1  | 1.3.6.1.4.1.9.9.187.0.1       | != (1 or 6)           | The IPv6 BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                         | ipv6 BGP FSM state changed trap                          |
| cbgpFsmStateChange                 | 1.3.6.1.4.1.9.9.187.0.1  | 1.3.6.1.4.1.9.9.187.0.1       | = 6                   | The IPv6 BGP cbgpFsmStateChange notification is generated for every BGP FSM state change.                                         | IPv6 BGP established trap                                |
| rttMonConnectionChangeNotification | 1.3.6.1.4.1.9.9.42.2.0.1 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5  | 1                     | IPSLA echo ConnLoss Trap v2                                                                                                       | Connection Loss detected by ipsla icmp echo trap         |
| rttMonConnectionChangeNotification | 1.3.6.1.4.1.9.9.42.2.0.1 | 1.3.6.1.4.1.9.9.42.1.2.9.1.5  | 2                     | IPSLA echo ConnLoss Trap v2                                                                                                       | Connection re-establish detected by ipsla icmp echo trap |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.42.2.0.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6  | 1                     | IPSLA IP or LSP echo Timeout trap v2                                                                                              | Timeout detected by ipsla icmp echo trap                 |
| rttMonTimeoutNotification          | 1.3.6.1.4.1.9.9.42.2.0.2 | 1.3.6.1.4.1.9.9.42.1.2.9.1.6  | 2                     | IPSLA IP or LSP echo Timeout trap v2                                                                                              | Connection re-establish detected by ipsla icmp echo trap |
| rttMonThresholdNotification        | 1.3.6.1.4.1.9.9.42.2.0.3 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7  | 1                     | IPSLA Threshold Notification trap v2                                                                                              | Threshold crossing under trap                            |
| rttMonThresholdNotification        | 1.3.6.1.4.1.9.9.42.2.0.3 | 1.3.6.1.4.1.9.9.42.1.2.9.1.7  | 2                     | IPSLA Threshold Notification trap v2                                                                                              | Threshold crossing over trap                             |
| rttMonVerifyErrorNotification      | 1.3.6.1.4.1.9.9.42.2.0.4 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11 | 1                     | IPSLA Threshold Notification deprecated trap v2                                                                                   | Data corruption in rtt operation trap                    |
| rttMonVerifyErrorNotification      | 1.3.6.1.4.1.9.9.42.2.0.4 | 1.3.6.1.4.1.9.9.42.1.2.9.1.11 | 2                     | IPSLA Threshold Notification deprecated trap v2                                                                                   | Data corruption cleared in rtt operation trap            |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name          | Trap OID                 | SubType<br>Varbind OID                                                                             | SubType<br>Varbind Value | Description          | Short Description                                            |
|--------------------|--------------------------|----------------------------------------------------------------------------------------------------|--------------------------|----------------------|--------------------------------------------------------------|
| rttMonNotification | 1.3.6.1.4.1.9.9.42.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 1               | RTT MON notification | Connection Loss detected by ipsla icmp echo trap             |
| rttMonNotification | 1.3.6.1.4.1.9.9.42.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 1           | RTT MON notification | Connection Loss detected by ipsla LSP icmp echo trap         |
| rttMonNotification | 1.3.6.1.4.1.9.9.42.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, null, 2               | RTT MON notification | Connection re-establish detected by ipsla icmp echo trap     |
| rttMonNotification | 1.3.6.1.4.1.9.9.42.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 8, not null, 2           | RTT MON notification | Connection re-establish detected by ipsla LSP icmp echo trap |
| rttMonNotification | 1.3.6.1.4.1.9.9.42.2.0.5 | 1.3.6.1.4.1.9.9.42.1.2.19.1.2,<br>1.3.6.1.4.1.9.9.42.1.2.2.1.33,<br>1.3.6.1.4.1.9.9.42.1.2.19.1.10 | 7, null, 1               | RTT MON notification | Timeout detected by ipsla icmp echo trap                     |

Table 36-5 Cisco IOX V2/V3 Traps (continued)

| Trap Name                      | Trap OID                     | SubType<br>Varbind OID                                                                                                     | SubType<br>Varbind Value | Description                 | Short Description                                                     |
|--------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------|-----------------------------------------------------------------------|
| rttMonNotification             | 1.3.6.1.4.1.<br>9.9.42.2.0.5 | 1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.2,<br>1.3.6.1.4.1.9.<br>9.42.1.2.2.1.<br>33,<br>1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.10 | 7, not null, 1           | RTT MON notification        | Timeout detected by<br>ipsla LSP icmp echo<br>trap                    |
| rttMonNotification             | 1.3.6.1.4.1.<br>9.9.42.2.0.5 | 1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.2,<br>1.3.6.1.4.1.9.<br>9.42.1.2.2.1.<br>33,<br>1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.10 | 7, null, 2               | RTT MON notification        | Connection<br>re-establish detected<br>by ipsla icmp echo<br>trap     |
| rttMonNotification             | 1.3.6.1.4.1.<br>9.9.42.2.0.5 | 1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.2,<br>1.3.6.1.4.1.9.<br>9.42.1.2.2.1.<br>33,<br>1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.10 | 7, not null, 2           | RTT MON notification        | Connection<br>re-establish detected<br>by ipsla LSP icmp<br>echo trap |
| rttMonNotification             | 1.3.6.1.4.1.<br>9.9.42.2.0.5 | 1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.2,<br>1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.10                                           | 1, 1                     | RTT MON notification        | RTT threshold<br>crossing over trap                                   |
| rttMonNotification             | 1.3.6.1.4.1.<br>9.9.42.2.0.5 | 1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.2,<br>1.3.6.1.4.1.9.<br>9.42.1.2.19.1<br>.10                                           | 1, 2                     | RTT MON notification        | RTT threshold<br>crossing under trap                                  |
| rttMonLpdDiscoveryNotification | 1.3.6.1.4.1.<br>9.9.42.2.0.6 | 1.3.6.1.4.1.9.<br>9.42.1.3.7.1.<br>13                                                                                      | 1                        | IPSLA LPD Discovery trap v2 | IPSLA LSP path<br>discovery failure<br>trap                           |
| rttMonLpdDiscoveryNotification | 1.3.6.1.4.1.<br>9.9.42.2.0.6 | 1.3.6.1.4.1.9.<br>9.42.1.3.7.1.<br>13                                                                                      | 2                        | IPSLA LPD Discovery trap v2 | IPSLA LSP path<br>rediscovery trap                                    |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name                              | Trap OID                         | SubType<br>Varbind OID                | SubType<br>Varbind Value | Description                                                                                                                                                                             | Short Description                             |
|----------------------------------------|----------------------------------|---------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| rttMonLpdGrp<br>StatusNotificati<br>on | 1.3.6.1.4.1.<br>9.9.42.2.0.7     | 1.3.6.1.4.1.9.<br>9.42.1.3.7.1.<br>16 | 3,4                      | IPSLA LDP Group Status trap v2                                                                                                                                                          | IPSLA LDP group<br>status failure trap        |
| rttMonLpdGrp<br>StatusNotificati<br>on | 1.3.6.1.4.1.<br>9.9.42.2.0.7     | 1.3.6.1.4.1.9.<br>9.42.1.3.7.1.<br>16 | 2                        | IPSLA LDP Group Status trap v2                                                                                                                                                          | IPSLA LDP group<br>status restoration<br>trap |
| cmplsFrrProtect<br>ed                  | 1.3.6.1.4.1.<br>9.10.98.0.1      | N/A                                   | N/A                      | TE FRR trigger notification - protected<br>trap v2                                                                                                                                      | FRR Protected Trap                            |
| cmplsFrrUnPro<br>tected                | 1.3.6.1.4.1.<br>9.10.98.0.2      | N/A                                   | N/A                      | TE FRR trigger notification -<br>unprotected trap v2                                                                                                                                    | FRR Unprotected<br>Trap                       |
| cpwVcUp                                | 1.3.6.1.4.1.<br>9.10.106.2.<br>2 | N/A                                   | N/A                      | This notification is generated when the<br>cpwVcOperStatus object for one or<br>more contiguous entries in<br>cpwVcTable are about to enter the<br>up(1) state from some other state.   | Pseudo wire tunnel<br>up                      |
| cpwVcDown                              | 1.3.6.1.4.1.<br>9.10.106.2.<br>1 | N/A                                   | N/A                      | This notification is generated when the<br>cpwVcOperStatus object for one or<br>more contiguous entries in<br>cpwVcTable are about to enter the<br>down(2) state from some other state. | Pseudo wire tunnel<br>down                    |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 2                        | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Far end LOF                              |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 4                        | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Near end<br>sending LOF<br>Indication    |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 8                        | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Far end<br>sending AIS                   |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 16                       | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Near end<br>sending AIS                  |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 32                       | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Near end<br>LOF                          |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 64                       | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Near end<br>Loss of Signal               |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 128                      | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 Near end is<br>looped                    |
| DSX1 V1 Line<br>Status Change          | 1.3.6.1.2.1.<br>10.18.15.0.<br>1 | 1.3.6.1.2.1.1<br>0.18.6.1.10.1<br>7   | 256                      | Indicates the line status of dsx1<br>interface                                                                                                                                          | DSX1 E1 TS16 AIS                              |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name                  | Trap OID                 | SubType Varbind OID         | SubType Varbind Value                                                                                                 | Description                                 | Short Description                                    |
|----------------------------|--------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------|
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 512                                                                                                                   | Indicates the line status of dsx1 interface | DSX1 Far End Sending TS16 LOMF                       |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1024                                                                                                                  | Indicates the line status of dsx1 interface | DSX1 Near End Sending TS16 LOMF                      |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 2048                                                                                                                  | Indicates the line status of dsx1 interface | DSX1 Near End detects a test code                    |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4096                                                                                                                  | Indicates the line status of dsx1 interface | DSX1 any line status not defined here                |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 8192                                                                                                                  | Indicates the line status of dsx1 interface | DSX1 Near End in Unavailable Signal State            |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 16384                                                                                                                 | Indicates the line status of dsx1 interface | DSX1 Carrier Equipment Out of Service                |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 32768                                                                                                                 | Indicates the line status of dsx1 interface | DSX1 DS2 Payload AIS                                 |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 65536                                                                                                                 | Indicates the line status of dsx1 interface | DSX1 DS2 Performance Threshold Exceeded              |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | !(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 4096 or 8192 or 16384 or 32768 or 65536 or 1) | Indicates the line status of dsx1 interface | DSX1 combination of bitmaps due to multiple failures |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1                                                                                                                     | Indicates the line status of dsx1 interface | DSX1 No alarm present                                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2                                                                                                                     | Indicates the line status of dsx3 interface | DSX3 Receiving Yellow/Remote Alarm Indication        |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 4                                                                                                                     | Indicates the line status of dsx3 interface | DSX3 Transmitting Yellow/Remote Alarm Indication     |

**Table 36-5** Cisco IOX V2/V3 Traps (continued)

| Trap Name                  | Trap OID                 | SubType<br>Varbind OID      | SubType<br>Varbind Value                                                    | Description                                                                                                                                                                        | Short Description                                    |
|----------------------------|--------------------------|-----------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 8                                                                           | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Receiving AIS failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 16                                                                          | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Transmitting AIS                                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 32                                                                          | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Receiving LOF failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 64                                                                          | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Receiving LOS failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 128                                                                         | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Looping the received signal                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 256                                                                         | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Receiving a Test Pattern                        |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 512                                                                         | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 any line status not defined here                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1024                                                                        | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Near End in Unavailable Signal State            |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2048                                                                        | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 Carrier Equipment Out of Service                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 1) | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 combination of bitmaps due to multiple failures |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.15.0.1 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1                                                                           | Indicates the line status of dsx3 interface                                                                                                                                        | DSX3 No alarm present                                |
| entConfigChange            | 1.3.6.1.2.1.47.2.0.1     | N/A                         | N/A                                                                         | An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls. | Entity table configuration changed                   |



**Table 36-5** *Cisco IOX V2/V3 Traps (continued)*

| Trap Name                                    | Trap OID                     | SubType<br>Varbind OID              | SubType<br>Varbind Value | Description                                                                                                                                                                 | Short Description                                      |
|----------------------------------------------|------------------------------|-------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Frame-Relay<br>dlci status<br>change trap v1 | 1.3.6.1.2.1.<br>10.32.0.1    | 1.3.6.1.2.1.1<br>0.32.2.1.3         | 1                        | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status invalid trap</a>            |
| Frame-Relay<br>dlci status<br>change trap v1 | 1.3.6.1.2.1.<br>10.32.0.1    | 1.3.6.1.2.1.1<br>0.32.2.1.3         | 3                        | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status inactive trap</a>           |
| Frame-Relay<br>dlci status<br>change trap v1 | 1.3.6.1.2.1.<br>10.32.0.1    | 1.3.6.1.2.1.1<br>0.32.2.1.3         | 2                        | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status active trap</a>             |
| ciscoSonetVTS<br>tatusChange                 | .1.3.6.1.4.1<br>.9.9.126.0.4 | 1.3.6.1.2.1.1<br>0.39.3.1.1.1.<br>2 | !=1                      | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to error</a> |
| ciscoSonetVTS<br>tatusChange                 | .1.3.6.1.4.1<br>.9.9.126.0.4 | 1.3.6.1.2.1.1<br>0.39.3.1.1.1.<br>2 | 1                        | VT Status is down                                                                                                                                                           | <a href="#">Cisco Sonet vt status changed to clear</a> |

# Cisco MIB2 V1 Traps

Table 36-6 lists the Cisco MIB2 SNMP V1 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see Table 36-13.

**Table 36-6** Cisco MIB2 V1 Traps

| Trap Name                   | Generic Type | Specific Type | Enterprise OID        | SubType Varbind OID         | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                                              | Short Description                                    |
|-----------------------------|--------------|---------------|-----------------------|-----------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| dummy ticket on sun servers | N/A          | N/A           | 1.3.6.1.4.1.42        | N/A                         | N/A                   | This type will handle all traps sent from SUN server (the OID is the SUN SNMP mib)                                                                                                                                                                                                                                       | <a href="#">dummy ticket trap</a>                    |
| MIB2 V1 link down           | 2            | 0             | 1.3.6.1.6.3.1.1.5     | N/A                         | N/A                   | A linkDown trap signifies that the sending protocol entity recognizes a failure in one of the communication links represented in the agent's configuration. The Trap-PDU of type linkDown contains as the first element of its variable-bindings, the name and value of the ifIndex instance for the affected interface. | <a href="#">SNMP Link down</a>                       |
| MIB2 V1 link up             | 3            | 0             | 1.3.6.1.6.3.1.1.5     | N/A                         | N/A                   | A linkUp trap signifies that the sending protocol entity recognizes that one of the communication links represented in the agent's configuration has come up. The Trap-PDU of type linkUp contains as the first element of its variable-bindings, the name and value of the ifIndex instance for the affected interface. | <a href="#">SNMP Link up</a>                         |
| DSX1 V1 Line Status Change  | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 2                     | Indicates the line status of dsx1 interface                                                                                                                                                                                                                                                                              | <a href="#">DSX1 Far end LOF</a>                     |
| DSX1 V1 Line Status Change  | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4                     | Indicates the line status of dsx1 interface                                                                                                                                                                                                                                                                              | <a href="#">DSX1 Near end sending LOF Indication</a> |
| DSX1 V1 Line Status Change  | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 8                     | Indicates the line status of dsx1 interface                                                                                                                                                                                                                                                                              | <a href="#">DSX1 Far end sending AIS</a>             |
| DSX1 V1 Line Status Change  | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 16                    | Indicates the line status of dsx1 interface                                                                                                                                                                                                                                                                              | <a href="#">DSX1 Near end sending AIS</a>            |
| DSX1 V1 Line Status Change  | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 32                    | Indicates the line status of dsx1 interface                                                                                                                                                                                                                                                                              | <a href="#">DSX1 Near end LOF</a>                    |

Table 36-6 Cisco MIB2 V1 Traps (continued)

| Trap Name                  | Generic Type | Specific Type | Enterprise OID        | SubType Varbind OID         | SubType Varbind Value | Description                                 | Short Description                         |
|----------------------------|--------------|---------------|-----------------------|-----------------------------|-----------------------|---------------------------------------------|-------------------------------------------|
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 64                    | Indicates the line status of dsx1 interface | DSX1 Near end Loss of Signal              |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 128                   | Indicates the line status of dsx1 interface | DSX1 Near end is looped                   |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 256                   | Indicates the line status of dsx1 interface | DSX1 E1 TS16 AIS                          |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 512                   | Indicates the line status of dsx1 interface | DSX1 Far End Sending TS16 LOMF            |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1024                  | Indicates the line status of dsx1 interface | DSX1 Near End Sending TS16 LOMF           |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 2048                  | Indicates the line status of dsx1 interface | DSX1 Near End detects a test code         |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4096                  | Indicates the line status of dsx1 interface | DSX1 any line status not defined here     |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 8192                  | Indicates the line status of dsx1 interface | DSX1 Near End in Unavailable Signal State |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 16384                 | Indicates the line status of dsx1 interface | DSX1 Carrier Equipment Out of Service     |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 32768                 | Indicates the line status of dsx1 interface | DSX1 DS2 Payload AIS                      |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 65536                 | Indicates the line status of dsx1 interface | DSX1 DS2 Performance Threshold Exceeded   |

**Table 36-6** Cisco MIB2 V1 Traps (continued)

| Trap Name                  | Generic Type | Specific Type | Enterprise OID        | SubType Varbind OID         | SubType Varbind Value                                                                                                  | Description                                 | Short Description                                    |
|----------------------------|--------------|---------------|-----------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------|
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 4096 or 8192 or 16384 or 32768 or 65536 or 1) | Indicates the line status of dsx1 interface | DSX1 combination of bitmaps due to multiple failures |
| DSX1 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.18.1.5 | 1.3.6.1.2.1.10.18.6.1.10.17 | 1                                                                                                                      | Indicates the line status of dsx1 interface | DSX1 No alarm present                                |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2                                                                                                                      | Indicates the line status of dsx1 interface | DSX3 Receiving Yellow/Remote Alarm Indication        |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 4                                                                                                                      | Indicates the line status of dsx1 interface | DSX3 Transmitting Yellow/Remote Alarm Indication     |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 8                                                                                                                      | Indicates the line status of dsx1 interface | DSX3 Receiving AIS failure state                     |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 16                                                                                                                     | Indicates the line status of dsx1 interface | DSX3 Transmitting AIS                                |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 32                                                                                                                     | Indicates the line status of dsx1 interface | DSX3 Receiving LOF failure state                     |
| DSX3 V1 Line Status Change | 6            | 1             | 1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 64                                                                                                                     | Indicates the line status of dsx1 interface | DSX3 Receiving LOS failure state                     |

Table 36-6 Cisco MIB2 V1 Traps (continued)

| Trap Name                              | Generic Type | Specific Type | Enterprise OID         | SubType Varbind OID         | SubType Varbind Value                                                       | Description                                                                                                                                                                        | Short Description                                    |
|----------------------------------------|--------------|---------------|------------------------|-----------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 128                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Looping the received signal                     |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 256                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Receiving a Test Pattern                        |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 512                                                                         | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 any line status not defined here                |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1024                                                                        | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Near End in Unavailable Signal State            |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 2048                                                                        | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 Carrier Equipment Out of Service                |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 1) | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 combination of bitmaps due to multiple failures |
| DSX3 V1 Line Status Change             | 6            | 1             | .1.3.6.1.2.1.10.30.1.5 | 1.3.6.1.2.1.10.30.5.1.10.17 | 1                                                                           | Indicates the line status of dsx1 interface                                                                                                                                        | DSX3 No alarm present                                |
| entConfigChange                        | 6            | 1             | 1.3.6.1.2.1.47.2       | N/A                         | N/A                                                                         | An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls. | Entity table configuration changed                   |
| Frame-Relay dlci status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32      | 1.3.6.1.2.1.10.32.2.1.3     | 1                                                                           | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states.        | FR DLCI status invalid trap                          |

**Table 36-6** Cisco MIB2 V1 Traps (continued)

| Trap Name                             | Generic Type | Specific Type | Enterprise OID    | SubType Varbind OID     | SubType Varbind Value | Description                                                                                                                                                                 | Short Description                            |
|---------------------------------------|--------------|---------------|-------------------|-------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Frame-Relay dlc status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32 | 1.3.6.1.2.1.10.32.2.1.3 | 3                     | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status inactive trap</a> |
| Frame-Relay dlc status change trap v1 | 6            | 1             | 1.3.6.1.2.1.10.32 | 1.3.6.1.2.1.10.32.2.1.3 | 2                     | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | <a href="#">FR DLCI status active trap</a>   |

## Cisco MIB2 V2/V3 Traps

[Table 36-7](#) lists the Cisco MIB2 SNMP V2/V3 traps supported in Cisco ANA. For associated event types, event subtypes, and Cisco ANA registry parameters, use the link under Short Description or see [Table 36-14](#).

**Table 36-7** Cisco MIB2 V2/V3 Traps

| Trap Name             | Trap OID             | SubType Varbind OID  | SubType Varbind Value | Description                                                                                                                           | Short Description                         |
|-----------------------|----------------------|----------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| bgpBackwardTransition | 1.3.6.1.2.1.15.7.2   | N/A                  | N/A                   | The BGPBackwardTransition Event is generated when the BGP FSM moves from a higher numbered state to a lower numbered state.           | <a href="#">BGP down trap</a>             |
| bgpEstablished        | 1.3.6.1.2.1.15.7.1   | 1.3.6.1.2.1.15.3.1.2 | = 6                   | The BGP Established event is generated when the BGP FSM enters the ESTABLISHED state.                                                 | <a href="#">BGP established trap</a>      |
| mteEventSetFailure    | 1.3.6.1.2.1.88.2.0.5 | N/A                  | N/A                   | Notification that an attempt to do a set in response to an event has failed.                                                          | <a href="#">mte event set failure</a>     |
| mteTriggerFalling     | 1.3.6.1.2.1.88.2.0.3 | N/A                  | N/A                   | Notification that the falling threshold was met for triggers with mteTriggerType 'threshold'                                          | <a href="#">Cisco mte trigger falling</a> |
| mteTriggerFired       | 1.3.6.1.2.1.88.2.0.1 | N/A                  | N/A                   | Notification that the trigger indicated by the object instances has fired, for triggers with mteTriggerType 'boolean' or 'existence'. | <a href="#">mte trigger fired</a>         |
| mteTriggerRising      | 1.3.6.1.2.1.88.2.0.2 | N/A                  | N/A                   | Notification that the rising threshold was met for triggers with mteTriggerType 'threshold'                                           | <a href="#">Cisco mte trigger rising</a>  |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name             | Trap OID             | SubType<br>Varbind OID | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                              | Short Description                  |
|-----------------------|----------------------|------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| entConfigChange       | 1.3.6.1.2.1.47.2.0.1 | N/A                    | N/A                      | An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.                                                                                                                                       | Entity table configuration changed |
| coldStart             | 1.3.6.1.6.3.1.1.5.1  | N/A                    | N/A                      | A coldStart trap signifies that the SNMP entity, supporting a notification originator application, is reinitializing itself and that its configuration may have been altered.                                                                                                                                            | Cold start trap                    |
| warmStart             | 1.3.6.1.6.3.1.1.5.2  | N/A                    | N/A                      | A warmStart trap signifies that the SNMP entity, supporting a notification originator application, is reinitializing itself such that its configuration is unaltered                                                                                                                                                     | Warm start trap                    |
| authenticationFailure | 1.3.6.1.6.3.1.1.5.5  | N/A                    | N/A                      | An authenticationFailure trap signifies that the SNMP entity has received a protocol message that is not properly authenticated. While all implementations of SNMP entities MAY be capable of generating this trap, the snmpEnableAuthenTraps object indicates whether this trap will be generated.                      | SNMP authentication failure        |
| linkDown              | 1.3.6.1.6.3.1.1.5.3  | N/A                    | N/A                      | A linkDown trap signifies that the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links is about to enter the down state from some other state (but not from the notPresent state). This other state is indicated by the included value of ifOperStatus.   | SNMP Link down                     |
| linkUp                | 1.3.6.1.6.3.1.1.5.4  | N/A                    | N/A                      | A linkUp trap signifies that the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links left the down state and transitioned into some other state (but not into the notPresent state). This other state is indicated by the included value of ifOperStatus. | SNMP Link up                       |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name             | Trap OID               | SubType Varbind OID   | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                   | Short Description                            |
|-----------------------|------------------------|-----------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| ipv6IfStateChange     | 1.3.6.1.2.1.55.2.0.1   | N/A                   | N/A                   | An ipv6IfStateChange notification signifies that there has been a change in the state of an ipv6 interface. This notification should be generated when the interface's operational status transitions to or from the up(1) state                                                              | ipv6 interface state changed                 |
| ospfIfStateChange     | 1.3.6.1.2.1.14.16.2.16 | 1.3.6.1.2.1.14.7.1.12 | = 1                   | An ospfIfStateChange trap signifies that there has been a change in the state of a non virtualOSPF interface. This trap should be generated when the interface state regresses (e.g., goes from Dr to Down) or progresses to a terminal state (i.e., Point-to-Point, DR Other, Dr, or Backup) | OSPF interface state changed to Down         |
| ospfIfStateChange     | 1.3.6.1.2.1.14.16.2.16 | 1.3.6.1.2.1.14.7.1.12 | != 1                  | An ospfIfStateChange trap signifies that there has been a change in the state of a non virtualOSPF interface. This trap should be generated when the interface state regresses (e.g., goes from Dr to Down) or progresses to a terminal state (i.e., Point-to-Point, DR Other, Dr, or Backup) | OSPF interface state changed to Up           |
| ospfVirtIfStateChange | 1.3.6.1.2.1.14.16.2.1  | N/A                   | N/A                   | An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF virtual interface. This trap should be generated when the inter-face state regresses (e.g., goes from Point-to-Point to Down) or progresses to a terminal state (i.e., Point-to-Point).              | OSPF virtual interface state changed to Down |
| ospfNbrStateChange    | 1.3.6.1.2.1.14.16.2.2  | 1.3.6.1.2.1.14.10.1.6 | != 8                  | An ospfNbrStateChange trap signifies that there has been a change in the state of a non virtual OSPF neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., 2-Way or Full).    | OSPF neighbor state down                     |



Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name              | Trap OID              | SubType Varbind OID   | SubType Varbind Value | Description                                                                                                                                                                                                                                                                                | Short Description                          |
|------------------------|-----------------------|-----------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| ospfNbrStateChange     | 1.3.6.1.2.1.14.16.2.2 | 1.3.6.1.2.1.14.10.1.6 | = 8                   | An ospfNbrStateChange trap signifies that there has been a change in the state of a non virtual OSPF neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., 2-Way or Full). | OSPF neighbor state up                     |
| ospfVirtNbrStateChange | 1.3.6.1.2.1.14.16.2.3 | 1.3.6.1.2.1.14.11.1.5 | != 8                  | An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF virtual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full).              | OSPF virtual neighbor state down           |
| ospfVirtNbrStateChange | 1.3.6.1.2.1.14.16.2.3 | 1.3.6.1.2.1.14.11.1.5 | = 8                   | An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF virtual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full).              | OSPF virtual neighbor state up             |
| ospfIfConfigError      | 1.3.6.1.2.1.14.16.2.4 | N/A                   | N/A                   | An ospfIfConfigError trap signifies that a packet has been received on a non virtual interface from a router whose configuration parameters conflict with this router's configuration parameters.                                                                                          | OSPF interface configuration error         |
| ospfVirtIfConfigError  | 1.3.6.1.2.1.14.16.2.5 | N/A                   | N/A                   | An ospfConfigError trap signifies that a packet has been received on a virtual interface from a router whose configuration parameters conflict with this router's configuration parameters.                                                                                                | OSPF virtual interface configuration error |
| ospfIfAuthFailure      | 1.3.6.1.2.1.14.16.2.6 | N/A                   | N/A                   | An ospfIfAuthFailure trap signifies that a packet has been received on a non virtual interface from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type.                                                       | OSPF interface authentication failure      |

**Table 36-7** Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                            | Trap OID                  | SubType Varbind OID | SubType Varbind Value | Description                                                                                                                                                                                                                                                                   | Short Description                               |
|--------------------------------------|---------------------------|---------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| ospfVirtIfAuthFailure                | 1.3.6.1.2.1.14.16.2.7     | N/A                 | N/A                   | An ospfVirtIfAuthFailure trap signifies that a packet has been received on a virtual interface from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type.                                          | OSPF virtual interface authentication failure   |
| ospfIfRxBadPacket                    | 1.3.6.1.2.1.14.16.2.8     | N/A                 | N/A                   | An ospfIfRxBadPacket trap signifies that an OSPF packet has been received on a non virtual interface that cannot be parsed.                                                                                                                                                   | OSPF bad packet received                        |
| ospfVirtIfRxBadPacket                | 1.3.6.1.2.1.14.16.2.9     | N/A                 | N/A                   | An ospfRxBadPacket trap signifies that an OSPF packet has been received on a virtual interface that cannot be parsed.                                                                                                                                                         | OSPF bad packet received on virtual interface   |
| ospfTxRetransmit                     | 1.3.6.1.2.1.14.16.2.10    | N/A                 | N/A                   | An ospfTxRetransmit trap signifies that an OSPF packet has been retransmitted on a non virtual interface.                                                                                                                                                                     | OSPF packet retransmitted                       |
| ospfVirtIfTxRetransmit               | 1.3.6.1.2.1.14.16.2.11    | N/A                 | N/A                   | An ospfTxRetransmit trap signifies that an OSPF packet has been retransmitted on a virtual interface.                                                                                                                                                                         | OSPF packet retransmitted on virtual interface  |
| ospfOriginateLsa                     | 1.3.6.1.2.1.14.16.2.12    | N/A                 | N/A                   | An ospfOriginateLsa trap signifies that a new LSA has been originated by this router. This trap should not be invoked for simple refreshes of LSAs (which happens every 30 minutes), but instead will only be invoked when an LSA is (re)originated due to a topology change. | OSPF new LSA originated                         |
| ospfMaxAgeLsa                        | 1.3.6.1.2.1.14.16.2.13    | N/A                 | N/A                   | An ospfMaxAgeLsa trap signifies that one of the LSA in the router's link-state database has aged to MaxAge.                                                                                                                                                                   | OSPF LSA aged to MaxAge                         |
| mplsL3VpnNumVrfRouteMaxThreshCleared | 1.3.6.1.2.1.10.166.11.0.6 | N/A                 | N/A                   | This notification is generated only after the number of routes contained by the specified VRF exceeds or attempts to exceed the maximum allowed value as indicated by mplsVrfMaxRouteThreshold, and then falls below this value.                                              | mpls l3 vpn numvrf routemax thresh cleared Trap |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                                   | Trap OID                  | SubType<br>Varbind OID | SubType<br>Varbind Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Short Description                                                    |
|---------------------------------------------|---------------------------|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| mplsL3VpnVrfDown                            | 1.3.6.1.2.1.10.166.11.0.2 | N/A                    | N/A                      | This notification is generated when:<br>a. One interface is associated with this VRF, and the ifOperStatus of this interface changes from up(1) to down(2). b. Multiple interfaces are associated with this VRF, and the ifOperStatus of all except one of these interfaces is equal to up(1), and the ifOperStatus of that interface changes from up(1) to down(2).c. The last interface with ifOperStatus equal to up(1) is disassociated from a VRF                              | <a href="#">mpls l3 vpn vrf Down Trap</a>                            |
| mplsL3VpnVrfNumVrfRouteMaxThresholdExceeded | 1.3.6.1.2.1.10.166.11.0.4 | N/A                    | N/A                      | This notification is generated when the number of routes contained by the specified VRF exceeds or attempts to exceed the maximum allowed value as indicated by mplsL3VpnVrfMaxRouteThreshold.                                                                                                                                                                                                                                                                                      | <a href="#">mpls l3 vpn vrf numvrf routemax thresh exceeded Trap</a> |
| mplsL3VpnVrfRouteMidThresholdExceeded       | 1.3.6.1.2.1.10.166.11.0.3 | N/A                    | N/A                      | This notification is generated when the number of routes contained by the specified VRF exceeds the value indicated by mplsL3VpnVrfMidRouteThreshold.                                                                                                                                                                                                                                                                                                                               | <a href="#">mpls l3 vpn vrf routemid thresh exceeded Trap</a>        |
| mplsL3VpnVrfUp                              | 1.3.6.1.2.1.10.166.11.0.1 | N/A                    | N/A                      | This notification is generated when:<br>a. No interface is associated with this VRF, and the first (and only first) interface associated with it has its ifOperStatus change to up(1).<br>b. One interface is associated with this VRF, and the ifOperStatus of this interface changes to up(1).<br>c. Multiple interfaces are associated with this VRF, and the ifOperStatus of all interfaces is down(2), and the first of those interfaces has its ifOperStatus change to up(1). | <a href="#">mpls l3 vpn vrf Up Trap</a>                              |
| mplsLdpInitSessionThresholdExceeded         | 1.3.6.1.2.1.10.166.4.0.1  | N/A                    | N/A                      | generated when the value of the 'mplsLdpEntityInitSessionThreshold' object is not zero, and the number of Session Initialization messages exceeds the value of the 'mplsLdpEntityInitSessionThreshold' object                                                                                                                                                                                                                                                                       | <a href="#">MPLS LDP init session threshold exceeded Trap</a>        |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                  | Trap OID                 | SubType Varbind OID         | SubType Varbind Value | Description                                                                                                                                                                                                                                                           | Short Description                                    |
|----------------------------|--------------------------|-----------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| mplsLdpSessionDown         | 1.3.6.1.2.1.10.166.4.0.4 | N/A                         | N/A                   | sent when the value of 'mplsLdpSessionState' leaves the 'operational(5)' state                                                                                                                                                                                        | <a href="#">MPLS LDP session down Trap</a>           |
| mplsLdpSessionUp           | 1.3.6.1.2.1.10.166.4.0.3 | N/A                         | N/A                   | sent when the value of 'mplsLdpSessionState' enters the 'operational(5)' state                                                                                                                                                                                        | <a href="#">MPLS LDP session up Trap</a>             |
| mplsTunnelRerouted         | 1.3.6.1.2.1.10.166.3.0.3 | N/A                         | N/A                   | generated when a tunnel is rerouted. If the mplsTunnelARHopTable is used, then this tunnel instance's entry in the mplsTunnelARHopTable MAY contain the new path for this tunnel some time after this trap is issued by the agent                                     | <a href="#">MPLS TE tunnel rerouted trap</a>         |
| mplsTunnelReoptimized      | 1.3.6.1.2.1.10.166.3.0.4 | N/A                         | N/A                   | generated when a tunnel is reoptimized. If the mplsTunnelARHopTable is used, then this tunnel instance's entry in the mplsTunnelARHopTable MAY contain the new path for this tunnel some time after this trap is issued by the agent                                  | <a href="#">MPLS TE tunnel reoptimized trap</a>      |
| mplsTunnelDown             | 1.3.6.1.2.1.10.166.3.0.2 | N/A                         | N/A                   | generated when a mplsTunnelOperStatus object for one of the configured tunnels is about to enter the down state from some other state (but not from the notPresent state). This other state is indicated by the included value of mplsTunnelOperStatus                | <a href="#">MPLS TE tunnel down</a>                  |
| mplsTunnelUp               | 1.3.6.1.2.1.10.166.3.0.1 | N/A                         | N/A                   | generated when a mplsTunnelOperStatus object for one of the configured tunnels is about to leave the down state and transition into some other state (but not into the notPresent state). This other state is indicated by the included value of mplsTunnelOperStatus | <a href="#">MPLS TE tunnel up</a>                    |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 2                     | Indicates the line status of dsx1 interface                                                                                                                                                                                                                           | <a href="#">DSX1 Far end LOF</a>                     |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.15.0.1 | 1.3.6.1.2.1.10.18.6.1.10.17 | 4                     | Indicates the line status of dsx1 interface                                                                                                                                                                                                                           | <a href="#">DSX1 Near end sending LOF Indication</a> |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                  | Trap OID                  | SubType<br>Varbind OID        | SubType<br>Varbind Value | Description                                 | Short Description                         |
|----------------------------|---------------------------|-------------------------------|--------------------------|---------------------------------------------|-------------------------------------------|
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 8                        | Indicates the line status of dsx1 interface | DSX1 Far end sending AIS                  |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 16                       | Indicates the line status of dsx1 interface | DSX1 Near end sending AIS                 |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 32                       | Indicates the line status of dsx1 interface | DSX1 Near end LOF                         |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 64                       | Indicates the line status of dsx1 interface | DSX1 Near end Loss of Signal              |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 128                      | Indicates the line status of dsx1 interface | DSX1 Near end is looped                   |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 256                      | Indicates the line status of dsx1 interface | DSX1 E1 TS16 AIS                          |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 512                      | Indicates the line status of dsx1 interface | DSX1 Far End Sending TS16 LOMF            |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 1024                     | Indicates the line status of dsx1 interface | DSX1 Near End Sending TS16 LOMF           |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 2048                     | Indicates the line status of dsx1 interface | DSX1 Near End detects a test code         |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 4096                     | Indicates the line status of dsx1 interface | DSX1 any line status not defined here     |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 8192                     | Indicates the line status of dsx1 interface | DSX1 Near End in Unavailable Signal State |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 16384                    | Indicates the line status of dsx1 interface | DSX1 Carrier Equipment Out of Service     |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 32768                    | Indicates the line status of dsx1 interface | DSX1 DS2 Payload AIS                      |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 65536                    | Indicates the line status of dsx1 interface | DSX1 DS2 Performance Threshold Exceeded   |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                  | Trap OID                  | SubType<br>Varbind OID        | SubType<br>Varbind Value                                                                                               | Description                                 | Short Description                                    |
|----------------------------|---------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------|
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 4096 or 8192 or 16384 or 32768 or 65536 or 1) | Indicates the line status of dsx1 interface | DSX1 combination of bitmaps due to multiple failures |
| DSX1 V1 Line Status Change | 1.3.6.1.2.1.10.18.1.5.0.1 | 1.3.6.1.2.1.1.0.18.6.1.10.1.7 | 1                                                                                                                      | Indicates the line status of dsx1 interface | DSX1 No alarm present                                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 2                                                                                                                      | Indicates the line status of dsx3 interface | DSX3 Receiving Yellow/Remote Alarm Indication        |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 4                                                                                                                      | Indicates the line status of dsx3 interface | DSX3 Transmitting Yellow/Remote Alarm Indication     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 8                                                                                                                      | Indicates the line status of dsx3 interface | DSX3 Receiving AIS failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 16                                                                                                                     | Indicates the line status of dsx3 interface | DSX3 Transmitting AIS                                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 32                                                                                                                     | Indicates the line status of dsx3 interface | DSX3 Receiving LOF failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 64                                                                                                                     | Indicates the line status of dsx3 interface | DSX3 Receiving LOS failure state                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 128                                                                                                                    | Indicates the line status of dsx3 interface | DSX3 Looping the received signal                     |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 256                                                                                                                    | Indicates the line status of dsx3 interface | DSX3 Receiving a Test Pattern                        |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 512                                                                                                                    | Indicates the line status of dsx3 interface | DSX3 any line status not defined here                |
| DSX3 V1 Line Status Change | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 1024                                                                                                                   | Indicates the line status of dsx3 interface | DSX3 Near End in Unavailable Signal State            |

Table 36-7 Cisco MIB2 V2/V3 Traps (continued)

| Trap Name                              | Trap OID                  | SubType<br>Varbind OID        | SubType<br>Varbind Value                                                    | Description                                                                                                                                                                 | Short Description                                    |
|----------------------------------------|---------------------------|-------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| DSX3 V1 Line Status Change             | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 2048                                                                        | Indicates the line status of dsx3 interface                                                                                                                                 | DSX3 Carrier Equipment Out of Service                |
| DSX3 V1 Line Status Change             | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | !=(2 or 4 or 8 or 16 or 32 or 64 or 128 or 256 or 512 or 1024 or 2048 or 1) | Indicates the line status of dsx3 interface                                                                                                                                 | DSX3 combination of bitmaps due to multiple failures |
| DSX3 V1 Line Status Change             | 1.3.6.1.2.1.10.30.1.5.0.1 | 1.3.6.1.2.1.1.0.30.5.1.10.1.7 | 1                                                                           | Indicates the line status of dsx3 interface                                                                                                                                 | DSX3 No alarm present                                |
| Frame-Relay dlci status change trap v1 | 1.3.6.1.2.1.10.32.0.1     | 1.3.6.1.2.1.1.0.32.2.1.3      | 1                                                                           | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | FR DLCI status invalid trap                          |
| Frame-Relay dlci status change trap v1 | 1.3.6.1.2.1.10.32.0.1     | 1.3.6.1.2.1.1.0.32.2.1.3      | 3                                                                           | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | FR DLCI status inactive trap                         |
| Frame-Relay dlci status change trap v1 | 1.3.6.1.2.1.10.32.0.1     | 1.3.6.1.2.1.1.0.32.2.1.3      | 2                                                                           | This trap indicates that the indicated Virtual Circuit has changed state. It has either been created or invalidated, or has toggled between the active and inactive states. | FR DLCI status active trap                           |

# Cisco ASR 9000 V2/V3 Registry Parameters

Table 36-8 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco ASR 9000 SNMP V2/V3 traps shown in Table 36-1.

**Table 36-8** Cisco ASR 9000 V2/V3 Trap Registry Parameters

| Short Description                                      | Event Type                         | Event Subtype                 | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|------------------------------------|-------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>NTP Server Status Changes to Unknown</b>            | cisco ntp server notification      | unknown                       | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>NTP Server Status Changes to notRunning</b>         | cisco ntp server notification      | notRunning                    | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>NTP Server Status Changes to notSynchronized</b>    | cisco ntp server notification      | notSynchronized               | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>NTP Server Status Changes to syncToLocal</b>        | cisco ntp server notification      | syncToLocal                   | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>NTP Server Status Changes to syncToRefclock</b>     | cisco ntp server notification      | syncToRefclock                | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>NTP Server Status Changes to syncToRemoteServer</b> | cisco ntp server notification      | syncToRemoteServer            | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Spanning Tree Topology Changed</b>                  | Spanning-Tree-Topology-Change-Trap | Spanning-Tree-Topology-Change | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>dot1ag CFM Fault Alarm</b>                          | dot1ag cfm fault alarm trap        | dot1ag cfm fault alarm trap   | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |



# Cisco IOS V1 Trap Registry Parameters

Table 36-9 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOX SNMP V1 traps shown in Table 36-2.

**Table 36-9** Cisco IOS V1 Trap Registry Parameters

| Short Description                             | Event Type                                            | Event Subtype  | Expedited Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------|-------------------------------------------------------|----------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Critical Temperature</b>                   | cisco-Environment-Monitoring-Temperature-Notification | critical       | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | cri      | F             | T           | F        |
| <b>Normal Temperature</b>                     | cisco-Environment-Monitoring-Temperature-Notification | normal         | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Not Functioning</b>                        | cisco-Environment-Monitoring-Temperature-Notification | notFunctioning | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>Not Present</b>                            | cisco-Environment-Monitoring-Temperature-Notification | notPresent     | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>Critical Temperature - Device Shutdown</b> | cisco-Environment-Monitoring-Temperature-Notification | shutdown       | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | cri      | F             | T           | F        |
| <b>Temperature Rising</b>                     | cisco-Environment-Monitoring-Temperature-Notification | warning        | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| <b>Power Supply - Critical</b>                | cisco-EnvMon-Supply-State-Notification-Trap           | critical       | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| <b>Power Supply - Normal</b>                  | cisco-EnvMon-Supply-State-Notification-Trap           | normal         | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| <b>Power Supply - Not Functioning</b>         | cisco-EnvMon-Supply-State-Notification-Trap           | notFunctioning | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Power Supply - Not Present</b>             | cisco-EnvMon-Supply-State-Notification-Trap           | notPresent     | N                 | IManaged Element        | T             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                 | Event Type                                  | Event Subtype                     | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------|---------------------------------------------|-----------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Power Supply - Shutdown           | cisco-EnvMon-Supply-State-Notification-Trap | shutdown                          | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| Power Supply - Warning            | cisco-EnvMon-Supply-State-Notification-Trap | warning                           | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| Fan down trap                     | fan down trap                               | fan down trap                     | N                 | IManaged Element        | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| Fan up trap                       | fan down trap                               | fan up trap                       | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| RTT Operation Timeout             | RTT Operation Timeout                       | RTT Operation Timeout             | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| RTT Operation Threshold Violation | RTT Operation Threshold Violation           | RTT Operation Threshold Violation | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| dot1qBridge trap                  | dot1qBridge trap                            | dot1qBridge trap                  | N                 | IManaged Element        | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Mep up trap                       | mep trap                                    | mep up                            | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Mep down trap                     | mep trap                                    | mep down                          | N                 | IManaged Element        | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| Cold start trap                   | cold start trap                             | cold start trap                   | N                 | IManaged Element        | F             | F         | T                      | 190000 | F          | info     | T             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description | Event Type     | Event Subtype  | Expedites Polling                                                                                                                                                                                                                                               | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------|----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| SNMP Link down    | snmp link down | snmp link down | ce-efp-status-telnet/mtop-mlppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mps/traffic engineering tunnel information/basetech-ll dp-neighbors-s nmp/basetech-c dp-neighbors-s nmp/port-status/ip interface oper status | IPhysical Layer         | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                               | Event Type             | Event Subtype                            | Expedited Polling                                                                                                                                                                                                                                              | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------|------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>SNMP Link up</b>                             | snmp link down         | snmp link up                             | ce-efp-status-telnet/mtop-mlppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/basetech-lldp-neighbors-snmpp/basetech-cdp-neighbors-snmpp/port-status/ip interface oper status | IPhysical Layer         | F             | T         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>IMA Group Remote Failure</b>                 | IMA Group Failure trap | IMA Group Remote Failure                 | mtop-ima-group-state,port-status                                                                                                                                                                                                                               | ImaGroupOid             | F             | F         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| <b>IMA Group Remote insufficient links trap</b> | IMA Group Failure trap | IMA Group Remote insufficient links trap | mtop-ima-group-state,port-status                                                                                                                                                                                                                               | ImaGroupOid             | F             | F         | F                      | 0      | F          | MAJOR    | T             | T           | T        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                              | Event Type             | Event Subtype                           | Expedites Polling                 | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|------------------------|-----------------------------------------|-----------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IMA Group Up Trap</b>                       | IMA Group Failure trap | IMA Group Up Trap                       | mtop-ima-group-state, port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | CLEARED  | F             | T           | T        |
| <b>IMA Group local Failure</b>                 | IMA Group Failure trap | IMA Group local Failure                 | mtop-ima-group-state, port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| <b>IMA Group local insufficient links trap</b> | IMA Group Failure trap | IMA Group local insufficient links trap | mtop-ima-group-state, port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | MAJOR    | T             | T           | T        |
| <b>Ima Link Loss of delay Frame Trap</b>       | IMA Link Failure trap  | Ima Link Loss of delay Frame Trap       | mtop-ima-group-state, port-status | ImaGroupOid             | F             | F         | F                      | 0      | T          | MINOR    | F             | T           | T        |
| <b>Ima Link Loss of ima Frame Trap</b>         | IMA Link Failure trap  | Ima Link Loss of ima Frame Trap         | mtop-ima-group-state, port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| <b>Ima Link Rcv Failure Trap</b>               | IMA Link Failure trap  | Ima Link Rcv Failure Trap               | mtop-ima-group-state, port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| <b>Ima Link Remote Failure Trap</b>            | IMA Link Failure trap  | Ima Link Remote Failure Trap            | mtop-ima-group-state, port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| <b>Ima Link Up Trap</b>                        | IMA Link Failure trap  | Ima Link Up Trap                        | mtop-ima-group-state, port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | CLEARED  | F             | T           | T        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                            | Event Type                        | Event Subtype                                | Expedited Polling                 | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| IMA Link Xmt Failure Trap                    | IMA Link Failure trap             | IMA Link Xmt Failure Trap                    | mtop-ima-group-state, port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | MINOR    | T             | T           | T        |
| Cisco UMT state Change trap                  | Cisco UMT state Change trap       | Cisco UMT state Change trap                  | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco GSM state Change trap                  | Cisco GSM state Change trap       | Cisco GSM state Change trap                  | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| IPRAN Backhaul Received Util Acceptable Trap | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Acceptable Trap | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPRAN Backhaul Received Util Warning Trap    | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Warning Trap    | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| IPRAN Backhaul Received Util Overloaded Trap | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Overloaded Trap | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| IPRAN Backhaul Sent Util Acceptable Trap     | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util Acceptable Trap     | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPRAN Backhaul Sent Util Overloaded Trap     | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util Overloaded Trap     | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| IPRAN Backhaul Sent Util Warning Trap        | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util WarningTrap         | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                                        | Event Type                        | Event Subtype                                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------|-----------------------------------|----------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                 | ipsla ip or lsp echo timeout trap | timeout detected by ipsla icmp echo trap                 | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla ip or lsp echo timeout trap | connection re-establish detected by ipsla icmp echo trap | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing under trap                            | ipsla threshold notification trap | threshold crossing under trap                            | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing over trap                             | ipsla threshold notification trap | threshold crossing over trap                             | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption in rtt operation trap                    | ipsla threshold notification trap | data corruption in rtt operation trap                    | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption cleared in rtt operation trap            | ipsla threshold notification trap | data corruption cleared in rtt operation trap            | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                                            | Event Type               | Event Subtype                                                | Expedited Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------------|--------------------------|--------------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Connection Loss detected by ipsla LSP icmp echo trap         | ipsla echo connloss trap | connection loss detected by ipsla lsp icmp echo trap         | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo connloss trap | connection re-establish detected by ipsla icmp echo trap     | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo connloss trap | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                     | ipsla echo timeout trap  | timeout detected by ipsla icmp echo trap                     | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Timeout detected by ipsla LSP icmp echo trap                 | ipsla echo timeout trap  | timeout detected by ipsla lsp icmp echo trap                 | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo timeout trap  | connection re-establish detected by ipsla icmp echo trap     | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo timeout trap  | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| RTT threshold crossing over trap                             | ipsla echo rtt trap      | rtt threshold crossing over trap                             | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| RTT threshold crossing under trap                            | ipsla echo rtt trap      | rtt threshold crossing under trap                            | N/A               | Managed Element         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |



Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                                   | Event Type                   | Event Subtype                           | Expedites Polling         | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------|------------------------------|-----------------------------------------|---------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IPSLA LSP path discovery failure trap</b>        | ipsla lpd discovery trap     | ipsla lsp path discovery failure trap   | N/A                       | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>IPSLA LSP path rediscovery trap</b>              | ipsla lpd discovery trap     | ipsla lsp path rediscovery trap         | N/A                       | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>IPSLA LDP group status failure trap</b>          | ipsla lpd group status trap  | ipsla ldp group status failure trap     | N/A                       | Managed Element         | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>IPSLA LDP group status restoration trap</b>      | ipsla lpd group status trap  | ipsla ldp group status restoration trap | N/A                       | Managed Element         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>FRR Protected Trap</b>                           | frr trigger trap             | frr protected trap                      | N/A                       | PortLayer 1             | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>FRR Unprotected Trap</b>                         | frr trigger trap             | frr unprotected trap                    | N/A                       | PortLayer 1             | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Pseudo wire tunnel up</b>                        | pseudo wire tunnel traps     | Pseudo wire tunnel up                   | ce-pw-tunnels-status-trap | IPTPLayer2MplsTunnel    | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Pseudo wire tunnel down</b>                      | pseudo wire tunnel traps     | Pseudo wire tunnel down                 | ce-pw-tunnels-status-trap | IPTPLayer2MplsTunnel    | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>vtp configuration revision number error trap</b> | vtp notification prefix trap | vtp Config Rev Number Error             | N                         | VtpKey                  | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>vtp configuration digest error trap</b>          | vtp notification prefix trap | vtp Config Digest Error                 | N                         | VtpKey                  | F             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>vtp VersionOne Device Detected trap</b>          | vtp notification prefix trap | vtp VersionOne Device Detected          | N                         | VtpKey                  | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                                             | Event Type                        | Event Subtype                    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------------------|-----------------------------------|----------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>vtp Local Mode Changed trap</b>                            | vtp notification prefix trap      | vtp Local Mode Changed           | N                 | VtpKey                  | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| <b>vtp VersionInUse Changed trap</b>                          | vtp notification prefix trap      | vtp VersionInUse Changed         | N                 | VtpKey                  | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Vlan trunk port dynamic status changed to trunking</b>     | vlan-trunk-port-dynamic-status    | trunking                         | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>Vlan trunk port dynamic status changed to not trunking</b> | vlan-trunk-port-dynamic-status    | not trunking                     | N                 | IPortLayer1             | F             | T         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>REP port state fully operational Trap</b>                  | REP port operational state change | REP port state fully operational | N/A               | IREPServ                | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>REP port state not operational Trap</b>                    | REP port operational state change | REP port state not operational   | N/A               | IREPServ                | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| <b>REP port role failed Trap</b>                              | REP port role change trap         | REP port role failed             | N/A               | IREPServ                | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>REP port role clear Trap</b>                               | REP port role change trap         | REP port role clear              | N/A               | IREPServ                | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco Sonet vt status changed to error</b>                 | sonet vt status changed           | sonet vt status changed to error | N                 | IPortLayer1             | F             | T         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Cisco Sonet vt status changed to clear</b>                 | sonet vt status changed           | sonet vt status changed to clear | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>CFM cc mep up trap</b>                                     | cisco cfm cc mep down trap        | mep up                           | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                                            | Event Subtype                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|-------------------------------------------------------|------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM cc mep down due to timeout trap</b>             | cisco cfm cc mep down trap                            | timeout                                  | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc mep down due to last gasp trap</b>           | cisco cfm cc mep down trap                            | lastgasp                                 | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc cross-connected service error trap</b>       | cisco cfm cc cross-connected service error trap       | cross-connected service error trap       | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc cross-connected service error trap clear</b> | cisco cfm cc cross-connected service error trap clear | cross-connected service error trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc loop trap</b>                                | cisco cfm cc loop trap                                | loop trap                                | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc loop trap clear</b>                          | cisco cfm cc loop trap clear                          | loop trap clear                          | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc config error trap</b>                        | cisco cfm cc config error trap                        | config error trap                        | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc config error trap clear</b>                  | cisco cfm cc config error trap clear                  | config error trap clear                  | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep missing trap</b>               | cisco cfm crossconnect mep missing trap               | mep missing trap                         | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap</b>               | cisco cfm crossconnect mep unknown trap               | mepunknown trap                          | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |

Table 36-9 Cisco IOS V1 Trap Registry Parameters (continued)

| Short Description                       | Event Type                                 | Event Subtype         | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------|--------------------------------------------|-----------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| CFM crossconnect mep unknown trap clear | cisco cfm crossconnect mep unknown trap    | mepunknown trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| CFM crossconnect mep service up trap    | cisco cfm crossconnect mep service up trap | mep service up trap   | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |

# Cisco IOS V2/V3 Trap Registry Parameters

Table 36-10 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOX SNMP V2/V3 traps shown in Table 36-3.

**Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters**

| Short Description                                        | Event Type                          | Event Subtype                       | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CBF File operation state indicator</b>                | cbf define file completion          | cbf define file completion          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco BGP backward transition trap</b>                | cisco bgp trap                      | cisco bgp backward transition trap  | N                 | IBgpNeighborEntry       | F             | T         | F                      | 0      | F          | info     | F             | T           | T        |
| <b>Cisco BGP down trap</b>                               | cisco bgp trap                      | cisco bgp down trap                 | N                 | IBgpNeighborEntry       | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| <b>Cisco BGP established trap</b>                        | cisco bgp trap                      | cisco bgp established trap          | N                 | IBgpNeighborEntry       | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco BGP prefix threshold exceeded</b>               | cisco bgp prefix threshold exceeded | cisco bgp prefix threshold exceeded | N                 | IProfileContainer (BGP) | F             | T         | F                      | 0      | F          | wrn      | T             | T           | T        |
| <b>Cisco BGP prefix threshold clear</b>                  | cisco bgp prefix threshold exceeded | cisco bgp prefix threshold clear    | N                 | IProfileContainer (BGP) | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Config-copy request completion</b>                    | cc copy completion                  | cc copy completion                  | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco Configuration management event notification</b> | cisco config man event              | cisco config man event              | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cefc fan-tray oper status down</b>                    | cefc fan tray status changed        | cefc fan status down                | physical-command  | IModule                 | F             | T         | T                      | 0      | F          | cri      | T             | T           | T        |
| <b>cefc fan-tray oper status up</b>                      | cefc fan tray status changed        | cefc fan status up                  | physical-command  | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc FRU inserted</b>                                 | cefc fru removed                    | cefc fru inserted                   | physical-command  | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc FRU removed</b>                                  | cefc fru removed                    | cefc fru removed                    | physical-command  | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                                | Event Type                           | Event Subtype                        | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------------------------|--------------------------------------|--------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>cefc module oper status down</b>                              | cefc module oper status changed      | cefc module oper down                | physical-c ommand | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |
| <b>cefc module oper status up</b>                                | cefc module oper status changed      | cefc module oper up                  | physical-c ommand | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc power status down</b>                                    | cefc power status changed            | cefc power status down               | physical-c ommand | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |
| <b>cefc power status up</b>                                      | cefc power status changed            | cefc power status up                 | physical-c ommand | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>sensor value crossed threshold in entSensorThresholdTable</b> | entity sensor threshold notification | entity sensor threshold notification | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Cisco flash copy failed</b>                                   | cisco flash copy completed           | cisco flash copy failed              | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco flash copy completion</b>                               | cisco flash copy completed           | cisco flash copy completed           | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco flash copy in progress</b>                              | cisco flash copy completed           | cisco flash copy in progress         | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco Flash device changed</b>                                | cisco flash device changed           | cisco flash device changed           | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>Cisco Flash device inserted</b>                               | cisco flash device removed           | cisco flash device inserted          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Flash device removed</b>                                | cisco flash device removed           | cisco flash device removed           | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | wrn      | F             | T           | T        |
| <b>Cisco Flash device inserted</b>                               | cisco flash device removed           | cisco flash device inserted          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Flash device removed</b>                                | cisco flash device removed           | cisco flash device removed           | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | wrn      | F             | T           | T        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                               | Event Type                      | Event Subtype                         | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------|---------------------------------|---------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Cisco Flash miscellaneous operation failed      | cisco flash operation completed | cisco flash operation failed          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco Flash miscellaneous operation completed   | cisco flash operation completed | cisco flash operation completed       | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco Flash miscellaneous operation in progress | cisco flash operation completed | cisco flash operation in progress     | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| chassis alarm off                               | chassis alarm trap              | chassis alarm off                     | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| chassis alarm on                                | chassis alarm trap              | chassis alarm on                      | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Cisco PIM neighbor lost                         | cisco pim neighbor lost         | cisco pim neighbor lost               | N                 | IRoutingEntry           | F             | T         | T                      | 0      | F          | info     | T             | T           | T        |
| Cisco ping completion                           | cisco ping completion           | cisco ping completion                 | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco Sonet section status changed to error     | sonet section status changed    | sonet section status changed to error | N                 | IPortLayer1             | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| Cisco Sonet section status changed to clear     | sonet section status changed    | sonet section status changed to clear | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Cisco Sonet line status changed to error        | sonet line status changed       | sonet line status changed to error    | N                 | IPortLayer1             | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| Cisco Sonet line status changed to clear        | sonet line status changed       | sonet line status changed to clear    | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Cisco Sonet path status changed to error        | sonet path status changed       | sonet path status changed to error    | N                 | IPortLayer1             | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                             | Event Type                              | Event Subtype                           | Expedites Polling                           | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------|-----------------------------------------|-----------------------------------------|---------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Cisco Sonet path status changed to clear      | sonet path status changed               | sonet path status changed to clear      | N                                           | IPortLayer 1            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| MPLS LDP init session threshold exceeded Trap | mpls ldp session down                   | mpls ldp init session thresh exceeded   | N                                           | IPortLayer 1            | F             | T         | F                      | 0      | F          | wrn      | F             | T           | T        |
| MPLS LDP session down Trap                    | mpls ldp session down                   | mpls ldp session down                   | mpls interfaces' and 'label switching table | IPortLayer 1            | T             | T         | T                      | 0      | F          | min      | T             | T           | T        |
| MPLS LDP session up Trap                      | mpls ldp session down                   | mpls ldp session up                     | mpls interfaces' and 'label switching table | IPortLayer 1            | F             | T         | F                      | 0      | F          | clr      | F             | T           | T        |
| MPLS TE tunnel up trap                        | mpls te tunnel down trap                | mpls te tunnel up trap                  | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| MPLS TE tunnel down trap                      | mpls te tunnel down trap                | mpls te tunnel down trap                | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| MPLS TE tunnel rerouted trap                  | mpls te tunnel rerouted trap            | mpls te tunnel rerouted trap            | N                                           | IMplsTETunnel           | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| Failed receive multicast router heartbeat     | cisco multicast router heartbeat failed | cisco multicast router heartbeat failed | N                                           | IManagedElement         | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco VSS Shelf 1 is Disabled                 | VSS RF State Change                     | Shelf 1 is Disabled                     | vss-shelfs-status-command                   | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |



Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                        | Event Type                  | Event Subtype             | Expedites Polling                                                  | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------|-----------------------------|---------------------------|--------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Cisco VSS Shelf 1 is Standby Cold</b> | VSS RF State Change         | Shelf 1 is Standby Cold   | vss-shelfs-status-command                                          | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>Cisco VSS Shelf 1 is Standby Hot</b>  | VSS RF State Change         | Shelf 1 is Standby Hot    | vss-shelfs-status-command                                          | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>Cisco VSS Shelf 2 is Disabled</b>     | VSS RF State Change         | Shelf 2 is Disabled       | vss-shelfs-status-command                                          | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>Cisco VSS Shelf 2 is Standby Cold</b> | VSS RF State Change         | Shelf 2 is Standby Cold   | vss-shelfs-status-command                                          | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>Cisco VSS Shelf 2 is Standby Hot</b>  | VSS RF State Change         | Shelf 2 is Standby Hot    | vss-shelfs-status-command                                          | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>VSL Connection Changed: Down</b>      | VSL Connection State Change | VSL Connection State Down | physical-entity-mib-snmp-cisco 6500vss + vss-shelfs-status-command | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>VSL Connection Change: Up</b>         | VSL Connection State Change | VSL Connection State Up   | physical-entity-mib-snmp-cisco 6500vss + vss-shelfs-status-command | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| <b>dot1qBridge trap</b>                  | dot1qBridge trap            | dot1qBridge trap          | N                                                                  | IManagedElement         | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Mep up trap</b>                       | mep trap                    | mep up                    | N                                                                  | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Mep down trap</b>                     | mep trap                    | mep down                  | N                                                                  | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>Cold start trap</b>                   | cold start trap             | cold start trap           | N                                                                  | IManagedElement         | F             | F         | T                      | 190000 | F          | info     | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                               | Event Type                                    | Event Subtype               | Expedites Polling                                        | Event Source (IMO Name)            | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------------|-----------------------------------------------|-----------------------------|----------------------------------------------------------|------------------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Cisco hsrp state standby                                        | cisco hsrp state change                       | cisco hsrp state standby    | hsrp information (command under forwarding investigator) | IIPInterface                       | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| Cisco hsrp state non active                                     | cisco hsrp state change                       | cisco hsrp state non active | hsrp information (command under forwarding investigator) | IIPInterface                       | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| Cisco hsrp state active                                         | cisco hsrp state change                       | cisco hsrp state active     | hsrp information (command under forwarding investigator) | IIPInterface                       | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| Cisco Environment Monitoring Fan Notification - Critical        | cisco-Environment-Monitoring-Fan-Notification | critical                    | N                                                        | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| Cisco Environment Monitoring Fan Notification - Normal          | cisco-Environment-Monitoring-Fan-Notification | normal                      | N                                                        | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| Cisco Environment Monitoring Fan Notification - Not Functioning | cisco-Environment-Monitoring-Fan-Notification | notFunctioning              | N                                                        | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                                  | Event Type                                      | Event Subtype  | Expedites Polling | Event Source (IMO Name)            | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------------------|-------------------------------------------------|----------------|-------------------|------------------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Cisco Environment Monitoring Fan Notification - Not Present</b> | cisco-Environment-Monitoring-Fan-Notification   | notPresent     | N                 | IManagedElement + identifier index | T             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Cisco Environment Monitoring Fan Notification - Shutdown</b>    | cisco-Environment-Monitoring-Fan-Notification   | shutdown       | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| <b>Cisco Environment Monitoring Fan Notification - Warning</b>     | cisco-Environment-Monitoring-Fan-Notification   | warning        | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>Redundant Supply State - Critical</b>                           | cisco-EnvMon-Redundant-Supply-Notification-Trap | critical       | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | F             | T           | F        |
| <b>Redundant Supply State - Normal</b>                             | cisco-EnvMon-Redundant-Supply-Notification-Trap | normal         | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| <b>Redundant Supply State - Not Functioning</b>                    | cisco-EnvMon-Redundant-Supply-Notification-Trap | notFunctioning | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Redundant Supply State - Not Present</b>                        | cisco-EnvMon-Redundant-Supply-Notification-Trap | notPresent     | N                 | IManagedElement + identifier index | T             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Redundant Supply State - Shutdown</b>                           | cisco-EnvMon-Redundant-Supply-Notification-Trap | shutdown       | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                      | Event Type                                            | Event Subtype                      | Expedites Polling | Event Source (IMO Name)            | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------|-------------------------------------------------------|------------------------------------|-------------------|------------------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Redundant Supply State - Warning       | cisco-EnvMon-Redundant-Supply-Notification-Trap       | warning                            | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| Critical Temperature                   | cisco-Environment-Monitoring-Temperature-Notification | critical                           | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| Normal Temperature                     | cisco-Environment-Monitoring-Temperature-Notification | normal                             | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| Not Functioning                        | cisco-Environment-Monitoring-Temperature-Notification | notFunctioning                     | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Not Present                            | cisco-Environment-Monitoring-Temperature-Notification | notPresent                         | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Critical Temperature - Device Shutdown | cisco-Environment-Monitoring-Temperature-Notification | shutdown                           | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| Temperature Rising                     | cisco-Environment-Monitoring-Temperature-Notification | warning                            | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| new root trap                          | new root trap                                         | new root trap                      | N                 | IStpService                        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| stpx port inconsistency discovered     | stpx port inconsistency update                        | stpx port inconsistency discovered | N                 | IStpService                        | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                            | Event Type                              | Event Subtype                           | Expedites Polling | Event Source (IMO Name)            | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------|-----------------------------------------|-----------------------------------------|-------------------|------------------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| stp port inconsistency resolved              | stp port inconsistency update           | stp port inconsistency resolved         | N                 | IStpService                        | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| stp loop inconsistency discovered            | stp loop inconsistency update           | stp loop inconsistency discovered       | N                 | IStpService                        | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| stp loop inconsistency resolved              | stp loop inconsistency update           | stp loop inconsistency resolved         | N                 | IStpService                        | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| stp root inconsistency discovered            | stp root inconsistency update           | stp root inconsistency discovered       | N                 | IStpService                        | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| stp root inconsistency resolved              | stp root inconsistency update           | stp root inconsistency resolved         | N                 | IStpService                        | F             | F         | F                      | 0      | F          | clr      | T             | T           | F        |
| vtp configuration revision number error trap | vtp notification prefix trap            | vtp Config Rev Number Error             | N                 | VtpKey                             | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| vtp configuration digest error trap          | vtp notification prefix trap            | vtp Config Digest Error                 | N                 | VtpKey                             | F             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| cisco EnvMon Shutdown Notification Trap      | cisco-EnvMon-Shutdown-Notification-Trap | cisco-EnvMon-Shutdown-Notification-Trap | N                 | IManagedElement                    | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| caem Temperature Notification Trap           | caem-MIB-Notification s-Trap            | caem Temperature Notification           | N                 | IManagedElement                    | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| caem Voltage Notification Trap               | caem-MIB-Notification s-Trap            | caem Voltage Notification               | N                 | IManagedElement                    | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| cmn Mac Changed Notification Trap            | cmn-Mac-Changed-Notification-Trap       | cmn-Mac-Changed-Notification-Trap       | N                 | IManagedElement                    | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| cmn Mac Move Notification Trap               | cmn-Mac-Move-Notification-Trap          | cmn-Mac-Move-Notification-Trap          | N                 | IManagedElement + identifier index | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                             | Event Type                                | Event Subtype                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------------------|-------------------------------------------|------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>vtp VersionOne Device Detected trap</b>                    | vtp notification prefix trap              | vtp VersionOne Device Detected           | N                 | VtpKey                  | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| <b>vtp Local Mode Changed trap</b>                            | vtp notification prefix trap              | vtp Local Mode Changed                   | N                 | VtpKey                  | F             | F         | F                      | 0      | F          | min      | F             | T           | F        |
| <b>vtp VersionInUse Changed trap</b>                          | vtp notification prefix trap              | vtp VersionInUse Changed                 | N                 | VtpKey                  | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Vlan trunk port dynamic status changed to trunking</b>     | vlan-trunk-port-dynamic-status            | trunking                                 | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>Vlan trunk port dynamic status changed to not trunking</b> | vlan-trunk-port-dynamic-status            | not trunking                             | N                 | IPortLayer1             | F             | T         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>cps Secure MacAddr Violation Trap</b>                      | cps-Secure-MacAddr-Violation-Trap         | cps-Secure-MacAddr-Violation-Trap        | N                 | IPortLayer1             | F             | F         | T                      | 0      | F          | maj      | T             | T           | F        |
| <b>cps IfVlan Secure MacAddr Violation Trap</b>               | cps-IfVlan-Secure-MacAddr-Violation-Trap  | cps-IfVlan-Secure-MacAddr-Violation-Trap | N                 | IPortLayer1             | F             | F         | T                      | 0      | F          | maj      | T             | T           | F        |
| <b>cisco L2 Control VlanMacLimit Notif Trap</b>               | cisco-L2-Control-VlanMacLimit-Notifs-Trap | clc VlanMacLimit Notif                   | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cisco L2 Control VlanMacLimit High Notif Trap</b>          | cisco-L2-Control-VlanMacLimit-Notifs-Trap | clc VlanMacLimit High Notif              | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cisco L2 Control IfMacLimit Low Notif Trap</b>             | cisco-L2-Control-IfMacLimit-Notifs-Trap   | clc IfMacLimit Low Notif                 | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cisco L2 Control IfMacLimit High Notif Trap</b>            | cisco-L2-Control-IfMacLimit-Notifs-Trap   | clc IfMacLimit High Notif                | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                                  | Event Subtype                    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|---------------------------------------------|----------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>cisco L2 Control IfVlanMacLimit Low Notif Trap</b>  | cisco-L2-Control-IfVlanMacLimit-Notifs-Trap | clc IfVlanMacLimit Low Notif     | N                 | IPortLayer 1            | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cisco L2 Control IfVlanMacLimit High Notif Trap</b> | cisco-L2-Control-IfVlanMacLimit-Notifs-Trap | clc IfVlanMacLimit High Notif    | N                 | IPortLayer 1            | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco SBC source alert off trap</b>                 | cisco sbc source alert trap                 | off                              | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco SBC source alert on trap</b>                  | cisco sbc source alert trap                 | on                               | N                 | ISbcService             | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>Cisco SBC source alert informational trap</b>       | cisco sbc source alert trap                 | informational                    | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco SBC dynamic blacklist trap</b>                | cisco sbc dynamic blacklist trap            | cisco sbc dynamic blacklist trap | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco SBC adjacency state up trap</b>               | cisco sbc adjacency state change trap       | up                               | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco SBC adjacency state down trap</b>             | cisco sbc adjacency state change trap       | down                             | N                 | ISbcService             | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Cisco SBC adjacency state informational trap</b>    | cisco sbc adjacency state change trap       | informational                    | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco SBC service state up trap</b>                 | cisco sbc service state change trap         | up                               | sbc               | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                              | Event Type                                    | Event Subtype | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|-----------------------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Cisco SBC service state down trap              | cisco sbc service state change trap           | down          | sbc               | ISbcService             | F             | F         | F                      | 0      | F          | cri      | T             | T           | F        |
| Cisco SBC service state informational trap     | cisco sbc service state change trap           | informational | sbc               | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco SBC system congestion cleared trap       | cisco sbc system congestion trap              | cleared       | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Cisco SBC system congestion raised trap        | cisco sbc system congestion trap              | raised        | N                 | ISbcService             | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| Cisco SBC system congestion informational trap | cisco sbc system congestion trap              | informational | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco SBC SLA violation off trap               | cisco sbc sla violation trap                  | off           | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Cisco SBC SLA violation on trap                | cisco sbc sla violation trap                  | on            | N                 | ISbcService             | F             | F         | F                      | 0      | F          | min      | T             | T           | F        |
| Cisco SBC SLA violation informational trap     | cisco sbc sla violation trap                  | informational | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco SBC radius connection state up trap      | cisco sbc radius connection state change trap | up            | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Cisco SBC radius connection state down trap    | cisco sbc radius connection state change trap | down          | N                 | ISbcService             | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |



Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                           | Event Type                                    | Event Subtype                        | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|-----------------------------------------------|--------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Cisco SBC radius connection state informational trap</b> | cisco sbc radius connection state change trap | informational                        | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco SBC H248 controller state up trap</b>              | cisco sbc h248 controller state change trap   | up                                   | N                 | ISbcService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco SBC H248 controller state down trap</b>            | cisco sbc h248 controller state change trap   | down                                 | N                 | ISbcService             | F             | F         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>Cisco SBC H248 controller state informational trap</b>   | cisco sbc h248 controller state change trap   | informational                        | N                 | ISbcService             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>RTT Connection Change</b>                                | RTT Connection Change                         | RTT Connection Change                | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Operation Timeout</b>                                | RTT Operation Timeout                         | RTT Operation Timeout                | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Operation Threshold Violation</b>                    | RTT Operation Threshold Violation             | RTT Operation Threshold Violation    | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Verify Error</b>                                     | RTT Verify Error                              | RTT Verify Error                     | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT threshold violation or clearance</b>                 | rttthreshold violation or clearance           | rtt threshold violation or clearance | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Lpd Discovery</b>                                    | RTT Lpd Discovery                             | RTT Lpd Discovery                    | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Lpd Grp Status</b>                                   | RTT Lpd Grp Status                            | RTT Lpd Grp Status                   | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                               | Event Type                  | Event Subtype                            | Expedites Polling                 | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------|-----------------------------|------------------------------------------|-----------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IMA Group Remote Failure</b>                 | IMA Group Failure trap      | IMA Group Remote Failure                 | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>IMA Group Remote insufficient links trap</b> | IMA Group Failure trap      | IMA Group Remote insufficient links trap | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>IMA Group Up Trap</b>                        | IMA Group Failure trap      | IMA Group Up Trap                        | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>IMA Group local Failure</b>                  | IMA Group Failure trap      | IMA Group local Failure                  | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>IMA Group local insufficient links trap</b>  | IMA Group Failure trap      | IMA Group local insufficient links trap  | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Ima Link Loss of delay Frame Trap</b>        | IMA Link Failure trap       | Ima Link Loss of delay Frame Trap        | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | T          | min      | F             | T           | T        |
| <b>Ima Link Loss of ima Frame Trap</b>          | IMA Link Failure trap       | Ima Link Loss of ima Frame Trap          | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>Ima Link Rcv Failure Trap</b>                | IMA Link Failure trap       | Ima Link Rcv Failure Trap                | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>Ima Link Remote Failure Trap</b>             | IMA Link Failure trap       | Ima Link Remote Failure Trap             | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>Ima Link Up Trap</b>                         | IMA Link Failure trap       | Ima Link Up Trap                         | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Ima Link Xmt Failure Trap</b>                | IMA Link Failure trap       | Ima Link Xmt Failure Trap                | mtop-ima-group-state ,port-status | ImaGroupOid             | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>Cisco UMT state Change trap</b>              | Cisco UMT state Change trap | Cisco UMT state Change trap              | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco GSM state Change trap</b>              | Cisco GSM state Change trap | Cisco GSM state Change trap              | N/A                               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                               | Event Type                        | Event Subtype                                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------------|-----------------------------------|----------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IPRAN Backhaul Received Util Acceptable Trap</b>             | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Acceptable Trap             | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>IPRAN Backhaul Received Util Warning Trap</b>                | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Warning Trap                | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| <b>IPRAN Backhaul Received Util Overloaded Trap</b>             | IPRAN Backhaul Received Util Trap | IPRAN Backhaul Received Util Overloaded Trap             | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>IPRAN Backhaul Sent Util Acceptable Trap</b>                 | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util Acceptable Trap                 | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>IPRAN Backhaul Sent Util Overloaded Trap</b>                 | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util Overloaded Trap                 | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| <b>IPRAN Backhaul Sent Util Warning Trap</b>                    | IPRAN Backhaul Sent Util Trap     | IPRAN Backhaul Sent Util Warning Trap                    | N/A               | PortLayer1Oid           | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>Connection Loss detected by ipsla icmp echo trap</b>         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>Connection re-establish detected by ipsla icmp echo trap</b> | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                        | Event Type                        | Event Subtype                                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------|-----------------------------------|----------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Timeout detected by ipsla icmp echo trap                 | ipsla ip or lsp echo timeout trap | timeout detected by ipsla icmp echo trap                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla ip or lsp echo timeout trap | connection re-establish detected by ipsla icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing under trap                            | ipsla threshold notification trap | threshold crossing under trap                            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing over trap                             | ipsla threshold notification trap | threshold crossing over trap                             | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption in rtt operation trap                    | ipsla threshold notification trap | data corruption in rtt operation trap                    | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption cleared in rtt operation trap            | ipsla threshold notification trap | data corruption cleared in rtt operation trap            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Connection Loss detected by ipsla LSP icmp echo trap     | ipsla echo connloss trap          | connection loss detected by ipsla lsp icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                            | Event Type                  | Event Subtype                                                | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------------|-----------------------------|--------------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo connloss trap    | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                     | ipsla echo timeout trap     | timeout detected by ipsla icmp echo trap                     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Timeout detected by ipsla LSP icmp echo trap                 | ipsla echo timeout trap     | timeout detected by ipsla lsp icmp echo trap                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo timeout trap     | connection re-establish detected by ipsla icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo timeout trap     | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| RTT threshold crossing over trap                             | ipsla echo rtt trap         | rtt threshold crossing over trap                             | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| RTT threshold crossing under trap                            | ipsla echo rtt trap         | rtt threshold crossing under trap                            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| IPSLA LSP path discovery failure trap                        | ipsla lpd discovery trap    | ipsla lsp path discovery failure trap                        | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| IPSLA LSP path rediscovery trap                              | ipsla lpd discovery trap    | ipsla lsp path rediscovery trap                              | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPSLA LDP group status failure trap                          | ipsla lpd group status trap | ipsla ldp group status failure trap                          | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                              | Event Type                        | Event Subtype                           | Expedites Polling                               | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IPSLA LDP group status restoration trap</b> | ipsla lpd group status trap       | ipsla ldp group status restoration trap | N/A                                             | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>FRR Protected Trap</b>                      | frr trigger trap                  | frr protected trap                      | N/A                                             | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>FRR Unprotected Trap</b>                    | frr trigger trap                  | frr unprotected trap                    | N/A                                             | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Pseudo wire tunnel up</b>                   | pseudo wire tunnel traps          | Pseudo wire tunnel up                   | ce-pw-tunnel-status-snmpp, ce-vfi-status-telnet | IPTPLayer2MplsTunnel    | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Pseudo wire tunnel down</b>                 | pseudo wire tunnel traps          | Pseudo wire tunnel down                 | ce-pw-tunnel-status-snmpp, ce-vfi-status-telnet | IPTPLayer2MplsTunnel    | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>REP port state fully operational Trap</b>   | REP port operational state change | REP port state fully operational        | N/A                                             | IREPService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>REP port state not operational Trap</b>     | REP port operational state change | REP port state not operational          | N/A                                             | IREPService             | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| <b>REP port role failed Trap</b>               | REP port role change trap         | REP port role failed                    | N/A                                             | IREPService             | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>REP port role clear Trap</b>                | REP port role change trap         | REP port role clear                     | N/A                                             | IREPService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco Sonet vt status changed to error</b>  | sonet vt status changed           | sonet vt status changed to error        | N                                               | IPortLayer1             | F             | T         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Cisco Sonet vt status changed to clear</b>  | sonet vt status changed           | sonet vt status changed to clear        | N                                               | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                                      | Event Subtype                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM cc mep up trap</b>                              | cisco cfm cc mep down trap                      | mep up                                   | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc mep down due to timeout trap</b>             | cisco cfm cc mep down trap                      | lastgap                                  | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc mep down due to last gasp trap</b>           | cisco cfm cc mep down trap                      | lastgap                                  | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc cross-connected service error trap</b>       | cisco cfm cc cross-connected service error trap | cross-connected service error trap       | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc cross-connected service error trap clear</b> | cisco cfm cc cross-connected service error trap | cross-connected service error trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc loop trap</b>                                | cisco cfm cc loop trap                          | loop trap                                | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc loop trap clear</b>                          | cisco cfm cc loop trap                          | loop trap clear                          | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc config error trap</b>                        | cisco cfm cc config error trap                  | config error trap                        | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc config error trap clear</b>                  | cisco cfm cc config error trap                  | config error trap clear                  | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep missing trap</b>               | cisco cfm crossconnect mep missing trap         | mep missing trap                         | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap</b>               | cisco cfm crossconnect mep unknown trap         | mep unknown trap                         | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |

Table 36-10 Cisco IOS V2/V3 Trap Registry Parameters (continued)

| Short Description                              | Event Type                                 | Event Subtype          | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|--------------------------------------------|------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM crossconnect mep unknown trap clear</b> | cisco cfm crossconnect mep unknown trap    | mep unknown trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep service up trap</b>    | cisco cfm crossconnect mep service up trap | mep service up trap    | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |



# Cisco IOX V1 Trap Registry Parameters

Table 36-11 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOX SNMP V1 traps shown in Table 36-4.

**Table 36-11 Cisco IOX V1 Trap Registry Parameters**

| Short Description                                        | Event Type                        | Event Subtype                                            | Expedites Polling         | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------|-----------------------------------|----------------------------------------------------------|---------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Pseudo wire tunnel up                                    | pseudo wire tunnel traps          | Pseudo wire tunnel up                                    | ce-pw-tunnels-status-trap | IP/MPLS Tunnel          | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Pseudo wire tunnel down                                  | pseudo wire tunnel traps          | Pseudo wire tunnel down                                  | ce-pw-tunnels-status-trap | IP/MPLS Tunnel          | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| SNMP Link down                                           | snmp link down                    | snmp link down                                           | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| SNMP Link up                                             | snmp link down                    | snmp link up                                             | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | clr      | F             | T           | T        |
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                 | ipsla ip or lsp echo timeout trap | timeout detected by ipsla icmp echo trap                 | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla ip or lsp echo timeout trap | connection re-establish detected by ipsla icmp echo trap | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing under trap                            | ipsla threshold notification trap | threshold crossing under trap                            | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                                                   | Event Type                        | Event Subtype                                                | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Threshold crossing over trap</b>                                 | ipsla threshold notification trap | threshold crossing over trap                                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Data corruption in rtt operation trap</b>                        | ipsla threshold notification trap | data corruption in rtt operation trap                        | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Data corruption cleared in rtt operation trap</b>                | ipsla threshold notification trap | data corruption cleared in rtt operation trap                | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Connection Loss detected by ipsla icmp echo trap</b>             | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap             | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Connection Loss detected by ipsla LSP icmp echo trap</b>         | ipsla echo connloss trap          | connection loss detected by ipsla lsp icmp echo trap         | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Connection re-establish detected by ipsla icmp echo trap</b>     | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Connection re-establish detected by ipsla LSP icmp echo trap</b> | ipsla echo connloss trap          | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Timeout detected by ipsla icmp echo trap</b>                     | ipsla echo timeout trap           | timeout detected by ipsla icmp echo trap                     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Timeout detected by ipsla LSP icmp echo trap</b>                 | ipsla echo timeout trap           | timeout detected by ipsla lsp icmp echo trap                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                                            | Event Type                  | Event Subtype                                                | Expedites Polling         | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------------|-----------------------------|--------------------------------------------------------------|---------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo timeout trap     | connection re-establish detected by ipsla icmp echo trap     | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo timeout trap     | connection re-establish detected by ipsla lsp icmp echo trap | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| RTT threshold crossing over trap                             | ipsla echo rtt trap         | rtt threshold crossing over trap                             | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| RTT threshold crossing under trap                            | ipsla echo rtt trap         | rtt threshold crossing under trap                            | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| IPSLA LSP path discovery failure trap                        | ipsla lpd discovery trap    | ipsla lsp path discovery failure trap                        | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| IPSLA LSP path rediscovery trap                              | ipsla lpd discovery trap    | ipsla lsp path rediscovery trap                              | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPSLA LDP group status failure trap                          | ipsla lpd group status trap | ipsla ldp group status failure trap                          | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| IPSLA LDP group status restoration trap                      | ipsla lpd group status trap | ipsla ldp group status restoration trap                      | N/A                       | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| FRR Protected Trap                                           | frr trigger trap            | frr protected trap                                           | N/A                       | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| FRR Unprotected Trap                                         | frr trigger trap            | frr unprotected trap                                         | N/A                       | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Pseudo wire tunnel up                                        | pseudo wire tunnel traps    | Pseudo wire tunnel up                                        | ce-pw-tunnels-status-trap | IPTPLayer2 MplsTunnel   | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                     | Event Type               | Event Subtype           | Expedites Polling         | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------|--------------------------|-------------------------|---------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Pseudo wire tunnel down               | pseudo wire tunnel traps | Pseudo wire tunnel down | ce-pw-tunnels-status-trap | IP/MPLS Tunnel          | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| DSX1 Far end LOF                      | dsx1 line status change  | RcvFarEndLOF            | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | T          | maj      | T             | T           | F        |
| DSX1 Near end sending LOF Indication  | dsx1 line status change  | XmtFarEndLOF            | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 Far end sending AIS              | dsx1 line status change  | RcvAIS                  | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| DSX1 Near end sending AIS             | dsx1 line status change  | XmtAIS                  | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| DSX1 Near end LOF                     | dsx1 line status change  | LossOfFrame             | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 Near end Loss of Signal          | dsx1 line status change  | LossOfSignal            | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 Near end is looped               | dsx1 line status change  | LoopbackState           | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 E1 TS16 AIS                      | dsx1 line status change  | T16AIS                  | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| DSX1 Far End Sending TS16 LOMF        | dsx1 line status change  | RcvFarEndLOMF           | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 Near End Sending TS16 LOMF       | dsx1 line status change  | XmtFarEndLOMF           | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 Near End detects a test code     | dsx1 line status change  | RcvTestCode             | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| DSX1 any line status not defined here | dsx1 line status change  | OtherFailure            | Y                         | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                                           | Event Type              | Event Subtype    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|-------------------------|------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 Near End in Unavailable Signal State</b>            | dsx1 line status change | UnavailSigState  | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Carrier Equipment Out of Service</b>                | dsx1 line status change | NetEquipOOS      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 DS2 Payload AIS</b>                                 | dsx1 line status change | RcvPayloadAIS    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 DS2 Performance Threshold Exceeded</b>              | dsx1 line status change | Ds2PerfThreshold | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 combination of bitmaps due to multiple failures</b> | dsx1 line status change | MultipleFailures | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 No alarm present</b>                                | dsx1 line status change | NoAlarm          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>DSX3 Receiving Yellow/Remote Alarm Indication</b>        | dsx3 line status change | RcvRAIFailure    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Transmitting Yellow/Remote Alarm Indication</b>     | dsx3 line status change | XmitRAIAlarm     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving AIS failure state</b>                     | dsx3 line status change | RcvAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Transmitting AIS</b>                                | dsx3 line status change | XmtAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Receiving LOF failure state</b>                     | dsx3 line status change | LossOfFrame      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving LOS failure state</b>                     | dsx3 line status change | LossOfSignal     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Looping the received signal</b>                     | dsx3 line status change | LoopbackState    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-11 Cisco I/OX V1 Trap Registry Parameters (continued)

| Short Description                                           | Event Type                         | Event Subtype                      | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|------------------------------------|------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX3 Receiving a Test Pattern</b>                        | dsx3 line status change            | RcvTestCode                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 any line status not defined here</b>                | dsx3 line status change            | OtherFailure                       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX3 Near End in Unavailable Signal State</b>            | dsx3 line status change            | UnavailSigState                    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Carrier Equipment Out of Service</b>                | dsx3 line status change            | NetEquipOOS                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 combination of bitmaps due to multiple failures</b> | dsx3 line status change            | MultipleFailures                   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 No alarm present</b>                                | dsx3 line status change            | NoAlarm                            | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Entity table configuration changed</b>                   | Entity table configuration changed | Entity table configuration changed | N                 | IManagedElement         | F             | F         | T                      | 0      | F          | info     | F             | T           | F        |
| <b>FR DLCI status invalid trap</b>                          | fr dlci status change trap         | fr dlci status invalid trap        | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status inactive trap</b>                         | fr dlci status change trap         | fr dlci status inactive trap       | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status active trap</b>                           | fr dlci status change trap         | fr dlci status active trap         | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco Sonet vt status changed to error</b>               | sonet vt status changed            | sonet vt status changed to error   | N                 | IPortLayer1             | F             | T         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Cisco Sonet vt status changed to clear</b>               | sonet vt status changed            | sonet vt status changed to clear   | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                                      | Event Subtype                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM cc mep up trap</b>                              | cisco cfm cc mep down trap                      | mep up                                   | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc mep down due to timeout trap</b>             | cisco cfm cc mep down trap                      | timeout                                  | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc mep down due to last gasp trap</b>           | cisco cfm cc mep down trap                      | lastgasp                                 | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc cross-connected service error trap</b>       | cisco cfm cc cross-connected service error trap | cross-connected service error trap       | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc cross-connected service error trap clear</b> | cisco cfm cc cross-connected service error trap | cross-connected service error trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc loop trap</b>                                | cisco cfm cc loop trap                          | loop trap                                | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc loop trap clear</b>                          | cisco cfm cc loop trap                          | loop trap clear                          | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc config error trap</b>                        | cisco cfm cc config error trap                  | config error trap                        | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc config error trap clear</b>                  | cisco cfm cc config error trap                  | config error trap clear                  | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 36-11 Cisco IOX V1 Trap Registry Parameters (continued)

| Short Description                              | Event Type                                    | Event Subtype          | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|-----------------------------------------------|------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM crossconnect mep missing trap</b>       | cisco cfm crossconnect mep missing trap       | mep missing trap       | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap</b>       | cisco cfm crossconnect mep unknown trap       | mep unknown trap       | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap clear</b> | cisco cfm crossconnect mep unknown trap clear | mep unknown trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep service up trap</b>    | cisco cfm crossconnect mep service up trap    | mep service up trap    | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |



# Cisco IOX V2/V3 Trap Registry Parameters

Table 36-12 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOX SNMP V2/V3 traps shown in Table 36-5.

**Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters**

| Short Description                          | Event Type                          | Event Subtype                       | Expedited Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------|-------------------------------------|-------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CBF File operation state indicator</b>  | cbf define file completion          | cbf define file completion          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco BGP backward transition trap</b>  | cisco bgp trap                      | cisco bgp backward transition trap  | N                 | IBgpNeighborEntry       | F             | T         | F                      | 0      | F          | info     | F             | T           | T        |
| <b>Cisco BGP down trap</b>                 | cisco bgp trap                      | cisco bgp down trap                 | N                 | IBgpNeighborEntry       | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| <b>Cisco BGP established trap</b>          | cisco bgp trap                      | cisco bgp established trap          | N                 | IBgpNeighborEntry       | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco BGP prefix threshold exceeded</b> | cisco bgp prefix threshold exceeded | cisco bgp prefix threshold exceeded | N                 | IProfileContainer (BGP) | F             | T         | F                      | 0      | F          | wrn      | T             | T           | T        |
| <b>Cisco BGP prefix threshold clear</b>    | cisco bgp prefix threshold exceeded | cisco bgp prefix threshold clear    | N                 | IProfileContainer (BGP) | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Config-copy request completion</b>      | cc copy completion                  | cc copy completion                  | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cefc fan-tray oper status down</b>      | cefc fan tray status changed        | cefc fan status down                | physical-command  | IModule                 | F             | T         | T                      | 0      | F          | cri      | T             | T           | T        |
| <b>cefc fan-tray oper status up</b>        | cefc fan tray status changed        | cefc fan status up                  | physical-command  | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc FRU inserted</b>                   | cefc fru removed                    | cefc fru inserted                   | physical-command  | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc FRU removed</b>                    | cefc fru removed                    | cefc fru removed                    | physical-command  | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |
| <b>cefc module oper status down</b>        | cefc module oper status changed     | cefc module oper down               | physical-command  | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                          | Event Type                          | Event Subtype                | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------------------|-------------------------------------|------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>cefc module oper status up</b>                          | cefc module oper status changed     | cefc module oper up          | physical -command | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cefc power status down</b>                              | cefc power status changed           | cefc power status down       | physical -command | IModule                 | F             | T         | T                      | 0      | F          | maj      | T             | T           | T        |
| <b>cefc power status up</b>                                | cefc power status changed           | cefc power status up         | physical -command | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cfh bundle link status down</b>                         | cfh bundle link status notification | cfh bundle link status down  | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | maj      | F             | T           | T        |
| <b>cfh bundle link status up</b>                           | cfh bundle link status notification | cfh bundle link status up    | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cfh Fabric bundle operational state changed to Down</b> | cfh bundle state notification       | cfh bundle state down        | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | maj      | F             | T           | T        |
| <b>cfh Fabric bundle operational state changed to Up</b>   | cfh bundle state notification       | cfh bundle state up          | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>cfh Fabric plane status down</b>                        | cfh plane state notification        | cfh plane status down        | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | maj      | F             | T           | T        |
| <b>cfh Fabric plane status up</b>                          | cfh plane state notification        | cfh plane status up          | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Configuration management event notification</b>   | cisco config man event              | cisco config man event       | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco flash copy failed</b>                             | cisco flash copy completed          | cisco flash copy failed      | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco flash copy completion</b>                         | cisco flash copy completed          | cisco flash copy completed   | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco flash copy in progress</b>                        | cisco flash copy completed          | cisco flash copy in progress | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                      | Event Subtype                         | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|---------------------------------|---------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Cisco Flash device changed</b>                      | cisco flash device changed      | cisco flash device changed            | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>Cisco Flash device inserted</b>                     | cisco flash device removed      | cisco flash device inserted           | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Flash device removed</b>                      | cisco flash device removed      | cisco flash device removed            | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | wrn      | F             | T           | T        |
| <b>Cisco Flash miscellaneous operation failed</b>      | cisco flash operation completed | cisco flash operation failed          | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco Flash miscellaneous operation completed</b>   | cisco flash operation completed | cisco flash operation completed       | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco Flash miscellaneous operation in progress</b> | cisco flash operation completed | cisco flash operation in progress     | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco ping completion</b>                           | cisco ping completion           | cisco ping completion                 | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco Sonet section status changed to error</b>     | sonet section status changed    | sonet section status changed to error | N                 | IPortLayer 1            | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| <b>Cisco Sonet section status changed to clear</b>     | sonet section status changed    | sonet section status changed to clear | N                 | IPortLayer 1            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Sonet line status changed to error</b>        | sonet line status changed       | sonet line status changed to error    | N                 | IPortLayer 1            | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| <b>Cisco Sonet line status changed to clear</b>        | sonet line status changed       | sonet line status changed to clear    | N                 | IPortLayer 1            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Cisco Sonet path status changed to error</b>        | sonet path status changed       | sonet path status changed to error    | N                 | IPortLayer 1            | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                         | Event Type                           | Event Subtype                        | Expedites Polling                               | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Cisco Sonet path status changed to clear                  | sonet path status changed            | sonet path status changed to clear   | N                                               | IPortLayer 1            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Cisco syslog message generated                            | cisco syslog message generated       | cisco syslog message generated       | N                                               | IManaged Element        | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco PIM neighbor lost                                   | cisco pim neighbor lost              | cisco pim neighbor lost              | N                                               | IRoutingEntry           | F             | T         | T                      | 0      | F          | info     | T             | T           | T        |
| sensor value crossed threshold in entSensorThresholdTable | entity sensor threshold notification | entity sensor threshold notification | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | maj      | T             | T           | T        |
| RTT threshold violation or clearance                      | rtt threshold violation or clearance | rtt threshold violation or clearance | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Pseudo wire tunnel up                                     | pseudo wire tunnel traps             | Pseudo wire tunnel up                | ce-pw-tunnel-status-snmpp, ce-vfi-status-telnet | IPTPLayer 2MplsTunnel   | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Pseudo wire tunnel down                                   | pseudo wire tunnel traps             | Pseudo wire tunnel down              | ce-pw-tunnel-status-snmpp, ce-vfi-status-telnet | IPTPLayer 2MplsTunnel   | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| Cisco RF Swap Status - Unsupported                        | cisco RF swap notification trap      | cisco RF status is unsupported       | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco RF Swap Status - None                               | cisco RF swap notification trap      | cisco RF status is none              | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco RF Swap Status - Not Known                          | cisco RF swap notification trap      | cisco RF status is notknown          | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Cisco RF Swap Status - UserInitiated                      | cisco RF swap notification trap      | cisco RF status is userInitiated     | N                                               | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                    | Event Type                           | Event Subtype                        | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------------|--------------------------------------|--------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Cisco RF Swap Status - UserForced</b>             | cisco RF swap notification trap      | cisco RF status is userForced        | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco RF Swap Status - ActiveUnitFailed</b>       | cisco RF swap notification trap      | cisco RF status is activeUnitFailed  | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Cisco RF Swap Status - ActiveUnitRemoved</b>      | cisco RF swap notification trap      | cisco RF status is activeUnitRemoved | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>cefc FRU inserted with unsupported product ID</b> | cefc unrecognized fru inserted       | cefc unrecognized fru inserted       | N                 | IModule                 | F             | T         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>cefc Power supply output capacity changed</b>     | cefc power supply output changed     | cefc power supply output changed     | N                 | IModule                 | F             | T         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Connection Change</b>                         | RTT Connection Change                | RTT Connection Change                | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Operation Timeout</b>                         | RTT Operation Timeout                | RTT Operation Timeout                | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Operation Threshold Violation</b>             | RTT Operation Threshold Violation    | RTT Operation Threshold Violation    | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Verify Error</b>                              | RTT Verify Error                     | RTT Verify Error                     | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT threshold violation or clearance</b>          | rtt threshold violation or clearance | rtt threshold violation or clearance | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Lpd Discovery</b>                             | RTT Lpd Discovery                    | RTT Lpd Discovery                    | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>RTT Lpd Grp Status</b>                            | RTT Lpd Grp Status                   | RTT Lpd Grp Status                   | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>IPv6 BGP down trap</b>                            | ipv6 bgp trap                        | ipv6 bgp down trap                   | N                 | IManaged Element        | F             | T         | F                      | 0      | F          | maj      | F             | T           | T        |
| <b>IPv6 BGP FSM state changed trap</b>               | ipv6 bgp trap                        | ipv6 bgp state changed trap          | N                 | IManaged Element        | F             | T         | F                      | 0      | F          | info     | F             | T           | T        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                        | Event Type                        | Event Subtype                                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------|-----------------------------------|----------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| IPv6 BGP established trap                                | ipv6 bgp trap                     | ipv6 bgp established trap                                | N                 | IManaged Element        | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla echo connloss trap          | connection re-establish detected by ipsla icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                 | ipsla ip or lsp echo timeout trap | timeout detected by ipsla icmp echo trap                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap | ipsla ip or lsp echo timeout trap | connection re-establish detected by ipsla icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing under trap                            | ipsla threshold notification trap | threshold crossing under trap                            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Threshold crossing over trap                             | ipsla threshold notification trap | threshold crossing over trap                             | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption in rtt operation trap                    | ipsla threshold notification trap | data corruption in rtt operation trap                    | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Data corruption cleared in rtt operation trap            | ipsla threshold notification trap | data corruption cleared in rtt operation trap            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Connection Loss detected by ipsla icmp echo trap         | ipsla echo connloss trap          | connection loss detected by ipsla icmp echo trap         | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Connection Loss detected by ipsla LSP icmp echo trap     | ipsla echo connloss trap          | connection loss detected by ipsla lsp icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                            | Event Type                  | Event Subtype                                                | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------------|-----------------------------|--------------------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo connloss trap    | connection re-establish detected by ipsla icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo connloss trap    | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Timeout detected by ipsla icmp echo trap                     | ipsla echo timeout trap     | timeout detected by ipsla icmp echo trap                     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Timeout detected by ipsla LSP icmp echo trap                 | ipsla echo timeout trap     | timeout detected by ipsla lsp icmp echo trap                 | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| Connection re-establish detected by ipsla icmp echo trap     | ipsla echo timeout trap     | connection re-establish detected by ipsla icmp echo trap     | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Connection re-establish detected by ipsla LSP icmp echo trap | ipsla echo timeout trap     | connection re-establish detected by ipsla lsp icmp echo trap | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| RTT threshold crossing over trap                             | ipsla echo rtt trap         | rtt threshold crossing over trap                             | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| RTT threshold crossing under trap                            | ipsla echo rtt trap         | rtt threshold crossing under trap                            | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| IPSLA LSP path discovery failure trap                        | ipsla lpd discovery trap    | ipsla lsp path discovery failure trap                        | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| IPSLA LSP path rediscovery trap                              | ipsla lpd discovery trap    | ipsla lsp path rediscovery trap                              | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPSLA LDP group status failure trap                          | ipsla lpd group status trap | ipsla ldp group status failure trap                          | N/A               | ManagedElement          | F             | F         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                              | Event Type                  | Event Subtype                           | Expedites Polling              | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------------------|-----------------------------|-----------------------------------------|--------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>IPSLA LDP group status restoration trap</b> | ipsla ldp group status trap | ipsla ldp group status restoration trap | N/A                            | ManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>FRR Protected Trap</b>                      | frr trigger trap            | frr protected trap                      | N/A                            | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>FRR Unprotected Trap</b>                    | frr trigger trap            | frr unprotected trap                    | N/A                            | PortLayer1              | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Pseudo wire tunnel up</b>                   | pseudo wire tunnel traps    | Pseudo wire tunnel up                   | ce-pw-tunnel-status-snmptelnet | IPTPLayer2MplsTunnel    | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>Pseudo wire tunnel down</b>                 | pseudo wire tunnel traps    | Pseudo wire tunnel down                 | ce-pw-tunnel-status-snmptelnet | IPTPLayer2MplsTunnel    | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| <b>DSX1 Far end LOF</b>                        | dsx1 line status change     | RcvFarEndLOF                            | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end sending LOF Indication</b>    | dsx1 line status change     | XmtFarEndLOF                            | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Far end sending AIS</b>                | dsx1 line status change     | RcvAIS                                  | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end sending AIS</b>               | dsx1 line status change     | XmtAIS                                  | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end LOF</b>                       | dsx1 line status change     | LossOfFrame                             | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end Loss of Signal</b>            | dsx1 line status change     | LossOfSignal                            | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end is looped</b>                 | dsx1 line status change     | LoopbackState                           | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 E1 TS16 AIS</b>                        | dsx1 line status change     | T16AIS                                  | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Far End Sending TS16 LOMF</b>          | dsx1 line status change     | RcvFarEndLOMF                           | Y                              | IPPhysicalLayer         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |



Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                           | Event Type              | Event Subtype    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|-------------------------|------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 Near End Sending TS16 LOMF</b>                      | dsx1 line status change | XmtFarEndLOMF    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near End detects a test code</b>                    | dsx1 line status change | RcvTestCode      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 any line status not defined here</b>                | dsx1 line status change | OtherFailure     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX1 Near End in Unavailable Signal State</b>            | dsx1 line status change | UnavailSigState  | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Carrier Equipment Out of Service</b>                | dsx1 line status change | NetEquipOOS      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 DS2 Payload AIS</b>                                 | dsx1 line status change | RcvPayloadAIS    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 DS2 Performance Threshold Exceeded</b>              | dsx1 line status change | Ds2PerfThreshold | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 combination of bitmaps due to multiple failures</b> | dsx1 line status change | MultipleFailures | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 No alarm present</b>                                | dsx1 line status change | NoAlarm          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>DSX3 Receiving Yellow/Remote Alarm Indication</b>        | dsx3 line status change | RcvRAIFailure    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Transmitting Yellow/Remote Alarm Indication</b>     | dsx3 line status change | XmitRAIAlarm     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving AIS failure state</b>                     | dsx3 line status change | RcvAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Transmitting AIS</b>                                | dsx3 line status change | XmtAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |

Table 36-12 Cisco I/OX V2/V3 Trap Registry Parameters (continued)

| Short Description                                           | Event Type                         | Event Subtype                      | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|------------------------------------|------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX3 Receiving LOF failure state</b>                     | dsx3 line status change            | LossOfFrame                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving LOS failure state</b>                     | dsx3 line status change            | LossOfSignal                       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Looping the received signal</b>                     | dsx3 line status change            | LoopbackState                      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving a Test Pattern</b>                        | dsx3 line status change            | RcvTestCode                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 any line status not defined here</b>                | dsx3 line status change            | OtherFailure                       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX3 Near End in Unavailable Signal State</b>            | dsx3 line status change            | UnavailSigState                    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Carrier Equipment Out of Service</b>                | dsx3 line status change            | NetEquipOOS                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 combination of bitmaps due to multiple failures</b> | dsx3 line status change            | MultipleFailures                   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 No alarm present</b>                                | dsx3 line status change            | NoAlarm                            | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Entity table configuration changed</b>                   | Entity table configuration changed | Entity table configuration changed | N                 | IManagedElement         | F             | F         | T                      | 0      | F          | info     | F             | T           | F        |
| <b>FR DLCI status invalid trap</b>                          | fr dlci status change trap         | fr dlci status invalid trap        | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status inactive trap</b>                         | fr dlci status change trap         | fr dlci status inactive trap       | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status active trap</b>                           | fr dlci status change trap         | fr dlci status active trap         | N                 | IPortLayer1             | T             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Cisco Sonet vt status changed to error</b>               | sonet vt status changed            | sonet vt status changed to error   | N                 | IPortLayer1             | F             | T         | F                      | 0      | F          | maj      | T             | T           | T        |
| <b>Cisco Sonet vt status changed to clear</b>               | sonet vt status changed            | sonet vt status changed to clear   | N                 | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |

Table 36-12 Cisco IOX V2/V3 Trap Registry Parameters (continued)

| Short Description                                      | Event Type                                      | Event Subtype                            | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM cc mep up trap</b>                              | cisco cfm cc mep down trap                      | mep up                                   | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc mep down due to timeout trap</b>             | cisco cfm cc mep down trap                      | timeout                                  | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc mep down due to last gasp trap</b>           | cisco cfm cc mep down trap                      | lastgasp                                 | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM cc cross-connected service error trap</b>       | cisco cfm cc cross-connected service error trap | cross-connected service error trap       | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc cross-connected service error trap clear</b> | cisco cfm cc cross-connected service error trap | cross-connected service error trap clear | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc loop trap</b>                                | cisco cfm cc loop trap                          | loop trap                                | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc loop trap clear</b>                          | cisco cfm cc loop trap                          | loop trap clear                          | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM cc config error trap</b>                        | cisco cfm cc config error trap                  | config error trap                        | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM cc config error trap clear</b>                  | cisco cfm cc config error trap                  | config error trap clear                  | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep missing trap</b>               | cisco cfm crossconnectmep missing trap          | mep missing trap                         | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap</b>               | cisco cfm crossconnectmep unknown trap          | mep unknown trap                         | N/A               | ICfmServiceOid          | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM crossconnect mep unknown trap clear</b>         | cisco cfm crossconnectmep unknown trap          | mep unknown trap clear                   | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM crossconnect mep service up trap</b>            | cisco cfm crossconnectmep service up trap       | mep service up trap                      | N/A               | ICfmServiceOid          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

# Cisco MIB2 V1 Trap Registry Parameters

Table 36-13 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco MIB2 SNMP V1 traps shown in Table 36-5.

**Table 36-13** Cisco MIB2 V1 Trap Registry Parameter

| Short Description | Event Type              | Event Subtype     | Expedites Polling                                                                                                                                                                                                                | Event Source (IMO Name)  | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------|-------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| dummy ticket trap | dummy ticket trap       | dummy ticket trap | N                                                                                                                                                                                                                                | IManagedElement          | F             | F         | F                      | 0      | F          | clr      | F             |             |          |
| SNMP Link down    | snmp link down          | snmp link down    | ce-efp-status-telnet/mtop-mlppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/basetech-lldp-neighbors-snmp/port-status/ip interface oper status | IPhysicalLayer / Efp Oid | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| SNMP Link up      | snmp link down          | snmp link up      | ce-efp-status-telnet/mtop-mlppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/basetech-lldp-neighbors-snmp/port-status/ip interface oper status | IPhysicalLayer / Efp Oid | F             | T         | F                      | 0      | F          | clr      | F             | T           | T        |
| DSX1 Far end LOF  | dsx1 line status change | RcvFarEndLOF      | Y                                                                                                                                                                                                                                | IPhysicalLayer           | F             | T         | F                      | 0      | T          | maj      | T             | T           | F        |

Table 36-13 Cisco MIB2 V1 Trap Registry Parameter (continued)

| Short Description                                | Event Type              | Event Subtype   | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------|-------------------------|-----------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 Near end sending LOF Indication</b>      | dsx1 line status change | XmtFarEndLOF    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Far end sending AIS</b>                  | dsx1 line status change | RcvAIS          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end sending AIS</b>                 | dsx1 line status change | XmtAIS          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end LOF</b>                         | dsx1 line status change | LossOfFrame     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end Loss of Signal</b>              | dsx1 line status change | LossOfSignal    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end is looped</b>                   | dsx1 line status change | LoopbackState   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 E1 TS16 AIS</b>                          | dsx1 line status change | T16AIS          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Far End Sending TS16 LOMF</b>            | dsx1 line status change | RcvFarEndLOMF   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near End Sending TS16 LOMF</b>           | dsx1 line status change | XmtFarEndLOMF   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near End detects a test code</b>         | dsx1 line status change | RcvTestCode     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 any line status not defined here</b>     | dsx1 line status change | OtherFailure    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX1 Near End in Unavailable Signal State</b> | dsx1 line status change | UnavailSigState | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Carrier Equipment Out of Service</b>     | dsx1 line status change | NetEquipOOS     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-13 Cisco MIB2 V1 Trap Registry Parameter (continued)

| Short Description                                           | Event Type              | Event Subtype     | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|-------------------------|-------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 DS2 Payload AIS</b>                                 | dsx1 line status change | RcvPayloadAIS     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 DS2 Performance Threshold Exceeded</b>              | dsx1 line status change | Ds2PerfThresh old | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 combination of bitmaps due to multiple failures</b> | dsx1 line status change | MultipleFailures  | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 No alarm present</b>                                | dsx1 line status change | NoAlarm           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>DSX3 Receiving Yellow/Remote Alarm Indication</b>        | dsx3 line status change | RcvRAIFailure     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Transmitting Yellow/Remote Alarm Indication</b>     | dsx3 line status change | XmitRAIAlarm      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving AIS failure state</b>                     | dsx3 line status change | RcvAIS            | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Transmitting AIS</b>                                | dsx3 line status change | XmtAIS            | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Receiving LOF failure state</b>                     | dsx3 line status change | LossOfFrame       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving LOS failure state</b>                     | dsx3 line status change | LossOfSignal      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Looping the received signal</b>                     | dsx3 line status change | LoopbackState     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving a Test Pattern</b>                        | dsx3 line status change | RcvTestCode       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-13 Cisco MIB2 V1 Trap Registry Parameter (continued)

| Short Description                                           | Event Type                         | Event Subtype                      | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|------------------------------------|------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX3 any line status not defined here</b>                | dsx3 line status change            | OtherFailure                       | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX3 Near End in Unavailable Signal State</b>            | dsx3 line status change            | UnavailSigState                    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Carrier Equipment Out of Service</b>                | dsx3 line status change            | NetEquipOOS                        | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 combination of bitmaps due to multiple failures</b> | dsx3 line status change            | MultipleFailures                   | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 No alarm present</b>                                | dsx3 line status change            | NoAlarm                            | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Entity table configuration changed</b>                   | Entity table configuration changed | Entity table configuration changed | N                 | IManagedElement         | F             | F         | T                      | 0      | F          | info     | F             | T           | F        |
| <b>FR DLCI status invalid trap</b>                          | fr dlci status change trap         | fr dlci status invalid trap        | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status inactive trap</b>                         | fr dlci status change trap         | fr dlci status inactive trap       | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status active trap</b>                           | fr dlci status change trap         | fr dlci status active trap         | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

# Cisco MIB2 V2/V3 Trap Registry Parameters

Table 36-14 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco MIB2 SNMP V2/V3 traps shown in Table 36-7.

**Table 36-14** Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                         | Event Type                         | Event Subtype                      | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------|------------------------------------|------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>BGP down trap</b>                      | bgp trap                           | bgp down trap                      | N                 | IBgpNeighborEntry       | F             | T         | T                      | 0      | F          | maj      | F             | T           | T        |
| <b>BGP established trap</b>               | bgp trap                           | bgp established trap               | N                 | IBgpNeighborEntry       | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>mte event set failure</b>              | cisco mte event set failure        | cisco mte event set failure        | N                 | IManagedElement         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | T        |
| <b>Cisco mte trigger falling</b>          | cisco mte trigger rising           | cisco mte trigger falling          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | T             | T           | T        |
| <b>mte trigger fired</b>                  | cisco mte trigger fired            | cisco mte trigger fired            | N                 | IManagedElement         | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| <b>Cisco mte trigger rising</b>           | cisco mte trigger rising           | cisco mte trigger rising           | N                 | IManagedElement         | F             | T         | F                      | 0      | F          | wrn      | T             | T           | T        |
| <b>Entity table configuration changed</b> | Entity table configuration changed | Entity table configuration changed | N                 | IManagedElement         | F             | F         | T                      | 0      | F          | info     | F             | T           | F        |
| <b>Cold start trap</b>                    | cold start trap                    | cold start trap                    | N                 | IManagedElement         | F             | F         | T                      | 190000 | F          | info     | T             | T           | F        |
| <b>Warm start trap</b>                    | warm start trap                    | warm start trap                    | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>SNMP authentication failure</b>        | snmp authentication failure        | snmp authentication failure        | N                 | IManagedElement         | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |



Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description | Event Type     | Event Subtype  | Expedites Polling                                                                                                                                                                                                                                                                                                                                                | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| SNMP Link down    | snmp link down | snmp link down | ce-efp-stat<br>us-telnet/<br>mtop-mlp<br>ppbundle-<br>status-teln<br>et/mtop-i<br>ma-group-<br>state-telne<br>t/mtop-ce<br>m-group-s<br>tatus/bund<br>le-status/<br>mpls<br>traffic<br>engineerin<br>g tunnel<br>informatio<br>n/basetech<br>-lldp-neig<br>hbors-snm<br>p/basetech<br>-cdp-neig<br>hbors-snm<br>p/port-stat<br>us/ip<br>interface<br>oper status | IPhysicalL<br>ayer      | F             | T         | T                      | 0      | T          | maj      | F             | T           | T        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                            | Event Type                 | Event Subtype              | Expedited Polling                                                                                                                                                                                                                                                                                                                | Event Source (IMO Name)  | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------|----------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| SNMP Link up                                 | snmp link down             | snmp link up               | ce-efp-status-telnet/<br>mtop-mlp<br>ppbundle-status-telnet/<br>mtop-ima-group-state-telnet/<br>mtop-ce-m-group-status/<br>bundle-status/<br>mpls<br>traffic<br>engineering<br>tunnel<br>information/<br>basetech-<br>lldp-neighbors-snm<br>p/basetech-<br>cdp-neighbors-snm<br>p/port-status/<br>ip<br>interface<br>oper status | IPPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| ipv6 interface state changed                 | ipv6-if-state-changed      | ipv6-if-state-changed      | N                                                                                                                                                                                                                                                                                                                                | IManagedElement          | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF interface state changed to Down         | ospf if state down         | ospf if state down         | N                                                                                                                                                                                                                                                                                                                                | IIPInterface             | F             | T         | T                      | 0      | F          | info     | F             | T           | T        |
| OSPF interface state changed to Up           | ospf if state down         | ospf if state up           | N                                                                                                                                                                                                                                                                                                                                | IIPInterface             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| OSPF virtual interface state changed to Down | ospf virtual if state down | ospf virtual if state down | N                                                                                                                                                                                                                                                                                                                                | IProfileContainer (OSPF) | F             | T         | T                      | 0      | F          | min      | F             | T           | T        |
| OSPF neighbor state down                     | ospf neighbor state down   | ospf neighbor state down   | N                                                                                                                                                                                                                                                                                                                                | IIPInterface             | T             | T         | T                      | 0      | F          | maj      | T             | T           | T        |
| OSPF neighbor state up                       | ospf neighbor state down   | ospf neighbor state up     | N                                                                                                                                                                                                                                                                                                                                | IIPInterface             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                               | Event Type                               | Event Subtype                              | Expedites Polling | Event Source (IMO Name)  | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------|------------------------------------------|--------------------------------------------|-------------------|--------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| OSPF virtual neighbor state down                | ospf-virtual-neighbor-state-changed      | ospf-virtual-neighbor-state-down           | N                 | IOspfEntry               | T             | T         | T                      | 0      | F          | min      | T             | T           | T        |
| OSPF virtual neighbor state up                  | ospf-virtual-neighbor-state-changed      | ospf-virtual-neighbor-state-up             | N                 | IOspfEntry               | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| OSPF interface configuration error              | ospf-if-config-err                       | ospf-if-config-err                         | N                 | IIPInterface             | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| OSPF virtual interface configuration error      | ospf-virtual-if-config-err               | ospf-virtual-if-config-err                 | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | F          | min      | F             | T           | F        |
| OSPF interface authentication failure           | ospf-if-authentic-fail                   | ospf-if-authentic-fail                     | N                 | IIPInterface             | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| OSPF virtual interface authentication failure   | ospf-virtual-if-authentic-fail           | ospf-virtual-if-authentic-fail             | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| OSPF bad packet received                        | ospf-if-bad-packet                       | ospf-if-bad-packet                         | N                 | IIPInterface             | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF bad packet received on virtual interface   | ospf-virtual-if-bad-packet               | ospf-virtual-if-bad-packet                 | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF packet retransmitted                       | ospf-if-packet-retransmit                | ospf-if-packet-retransmit                  | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF packet retransmitted on virtual interface  | ospf-virtual-if-packet-retransmit        | ospf-virtual-if-packet-retransmit          | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF new LSA originated                         | ospf-new-lsa-originated                  | ospf-new-lsa-originated                    | N                 | IProfileContainer (OSPF) | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF LSA aged to MaxAge                         | ospf-lsa-reached-maxage                  | ospf-lsa-reached-maxage                    | N                 | IManagedElement          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| mpls l3 vpn numvrf routemax thresh cleared Trap | mpls l3 vpn vrf routemid thresh exceeded | mpls l3 vpn numvrf routemax thresh cleared | N                 | IVrf                     | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                                           | Event Type                               | Event Subtype                                   | Expedites Polling                       | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|------------------------------------------|-------------------------------------------------|-----------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>mpls l3 vpn vrf Down Trap</b>                            | mpls l3 vpn vrf Down                     | mpls l3 vpn vrf Down                            | N                                       | IVrf                    | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>mpls l3 vpn vrf numvrf routemax thresh exceeded Trap</b> | mpls l3 vpn vrf routemid thresh exceeded | mpls l3 vpn vrf numvrf routemax thresh exceeded | N                                       | IVrf                    | F             | T         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>mpls l3 vpn vrf routemid thresh exceeded Trap</b>        | mpls l3 vpn vrf routemid thresh exceeded | mpls l3 vpn vrf routemid thresh exceeded        | N                                       | IVrf                    | F             | T         | F                      | 0      | F          | wrn      | F             | T           | F        |
| <b>mpls l3 vpn vrf Up Trap</b>                              | mpls l3 vpn vrf Down                     | mpls l3 vpn vrf Up                              | N                                       | IVrf                    | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>MPLS LDP init session threshold exceeded Trap</b>        | mpls ldp session down                    | mpls ldp init session thresh exceeded           | mpls interfaces + label switching table | IPortLayer 1            | F             | T         | F                      | 0      | F          | wrn      | F             | T           | T        |
| <b>MPLS LDP session down Trap</b>                           | mpls ldp session down                    | mpls ldp session down                           | mpls interfaces + label switching table | IPortLayer 1            | T             | T         | T                      | 0      | F          | min      | T             | T           | T        |
| <b>MPLS LDP session up Trap</b>                             | mpls ldp session down                    | mpls ldp session up                             | mpls interfaces + label switching table | IPortLayer 1            | F             | T         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>MPLS TE tunnel rerouted trap</b>                         | mpls te tunnel rerouted trap             | mpls te tunnel rerouted trap                    | N                                       | IMplsTETunnel           | F             | T         | F                      | 0      | F          | info     | T             | T           | T        |
| <b>MPLS TE tunnel reoptimized trap</b>                      | mpls te tunnel reoptimized trap          | mpls te tunnel reoptimized trap                 | N                                       | IMplsTETunnel           | F             | T         | F                      | 0      | F          | info     | F             | T           | T        |
| <b>MPLS TE tunnel down</b>                                  | mpls te tunnel down                      | mpls te tunnel down                             | Y                                       | IMplsTETunnel           | T             | T         | T                      | 800    | F          | maj      | T             | T           | T        |
| <b>MPLS TE tunnel up</b>                                    | mpls te tunnel down                      | mpls te tunnel up                               | Y                                       | IMplsTETunnel           | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>DSX1 Far end LOF</b>                                     | dsx1 line status change                  | RcvFarEndLOF                                    | Y                                       | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                                | Event Type              | Event Subtype    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------|-------------------------|------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 Near end sending LOF Indication</b>      | dsx1 line status change | XmtFarEndLOF     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Far end sending AIS</b>                  | dsx1 line status change | RcvAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end sending AIS</b>                 | dsx1 line status change | XmtAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Near end LOF</b>                         | dsx1 line status change | LossOfFrame      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end Loss of Signal</b>              | dsx1 line status change | LossOfSignal     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near end is looped</b>                   | dsx1 line status change | LoopbackState    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 E1 TS16 AIS</b>                          | dsx1 line status change | T16AIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 Far End Sending TS16 LOMF</b>            | dsx1 line status change | RcvFarEndLOMF    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near End Sending TS16 LOMF</b>           | dsx1 line status change | XmtFarEndLOMF    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Near End detects a test code</b>         | dsx1 line status change | RcvTestCode      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 any line status not defined here</b>     | dsx1 line status change | OtherFailure     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX1 Near End in Unavailable Signal State</b> | dsx1 line status change | UnavailSigState  | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 Carrier Equipment Out of Service</b>     | dsx1 line status change | NetEquipOSS      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 DS2 Payload AIS</b>                      | dsx1 line status change | RcvPayloadAIS    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX1 DS2 Performance Threshold Exceeded</b>   | dsx1 line status change | Ds2PerfThreshold | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                                           | Event Type              | Event Subtype    | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|-------------------------|------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>DSX1 combination of bitmaps due to multiple failures</b> | dsx1 line status change | MultipleFailures | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX1 No alarm present</b>                                | dsx1 line status change | NoAlarm          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>DSX3 Receiving Yellow/Remote Alarm Indication</b>        | dsx3 line status change | RcvRAIFailure    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Transmitting Yellow/Remote Alarm Indication</b>     | dsx3 line status change | XmitRAIAlarm     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving AIS failure state</b>                     | dsx3 line status change | RcvAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Transmitting AIS</b>                                | dsx3 line status change | XmtAIS           | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | wrn      | T             | T           | F        |
| <b>DSX3 Receiving LOF failure state</b>                     | dsx3 line status change | LossOfFrame      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving LOS failure state</b>                     | dsx3 line status change | LossOfSignal     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Looping the received signal</b>                     | dsx3 line status change | LoopbackState    | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Receiving a Test Pattern</b>                        | dsx3 line status change | RcvTestCode      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 any line status not defined here</b>                | dsx3 line status change | OtherFailure     | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | min      | T             | T           | F        |
| <b>DSX3 Near End in Unavailable Signal State</b>            | dsx3 line status change | UnavailSigState  | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 Carrier Equipment Out of Service</b>                | dsx3 line status change | NetEquipOOS      | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 combination of bitmaps due to multiple failures</b> | dsx3 line status change | MultipleFailures | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>DSX3 No alarm present</b>                                | dsx3 line status change | NoAlarm          | Y                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 36-14 Cisco MIB2 V2/V3 Trap Registry Parameters

| Short Description                   | Event Type                 | Event Subtype                | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------|----------------------------|------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>FR DLCI status invalid trap</b>  | fr dlci status change trap | fr dlci status invalid trap  | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status inactive trap</b> | fr dlci status change trap | fr dlci status inactive trap | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>FR DLCI status active trap</b>   | fr dlci status change trap | fr dlci status active trap   | N                 | FREncapKey              | T             | F         | F                      | 0      | F          | clr      | F             | T           | F        |







## CHAPTER 37

# Support Information for Cisco Syslogs

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This chapter provides detailed information about the syslogs supported in Cisco ANA. It presents this information in two forms:

- **Syslog Tables:** A section devoted to the supported syslogs for each NOS platform (e.g., [Cisco ASR 9000 Syslogs](#)). Each of these sections contains a table listing the name of each supported syslog, along with a description, the raw format of the syslog string, and a short description. In the syslog tables in this Reference, each syslog's short description is also a link to its corresponding registry parameters.
- **Registry Parameter Tables:** A section devoted to the event types, event subtypes and Cisco ANA registry parameters for the supported syslogs. There is one parameter table for every syslog table (e.g., [Cisco ASR 9000 Syslog Registry Parameters](#)). Each syslog can have multiple event subtypes, or states. The parameter tables indicate when each state is generated, and how Cisco ANA processes them (such as their severity, whether they are ticketable, can be correlated, are autocleared, and so on).

This chapter includes the following sections:

- [Cisco ASR 9000 Syslogs, page 37-2](#)
- [Cisco IOS Syslogs, page 37-3](#)
- [Cisco IOX Syslogs, page 37-16](#)
- [Cisco ASR 9000 Syslog Registry Parameters, page 37-28](#)
- [Cisco IOS Syslog Registry Parameters, page 37-30](#)
- [Cisco IOX Syslog Registry Parameters, page 37-48](#)

# Cisco ASR 9000 Syslogs

Table 37-1 lists the Cisco ASR 9000 Syslogs supported in Cisco ANA.

**Table 37-1** Cisco ASR Syslogs

| Syslog Name                                    | Description                            | Raw Format                                                                                                                                        | Short Description                  |
|------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| PLATFORM-PWRMON-4-OIR                          | handle power supply syslog             | %PLATFORM-PWRMON-4-OIR : Power-module 0/PM0/SP inserted                                                                                           | Power supply inserted syslog       |
| PLATFORM-PWRMON-4-OIR                          | handle power supply syslog             | %PLATFORM-PWRMON-4-OIR : Power-module 0/PM0/SP removed                                                                                            | Power supply removed syslog        |
| IP-VRRP-6-INFO_STATECHANGE                     | handle VRRP state change syslog        | %IP-VRRP-6-INFO_STATECHANGE: GigabitEthernet0_5_0_1 vrid 10: state Backup -> Master                                                               | Backup to Master change syslog     |
| IP-VRRP-6-INFO_STATECHANGE                     | handle VRRP state change syslog        | %IP-VRRP-6-INFO_STATECHANGE: GigabitEthernet0_5_0_1 vrid 10: state Master -> Backup                                                               | Master to Backup change syslog     |
| L2-BFD-4-RATE_LIMIT_WARNIN<br>G_HIGH_WATERMARK | BFD rate limit high warning syslog     | %L2-BFD-4-RATE_LIMIT_WARNIN G_HIGH_WATERMARK BFD PPS allocation exceeds 90 percent of maximum.                                                    | BFD rate limit high warning syslog |
| ROUTING-RIP-3-ERR_PAK_AUTH                     | RIP Authentication Failure syslog      | %ROUTING-RIP-3-ERR_PAK_AUTH Authentication failure for RIP [chars] packet in context [chars]: instance [chars]: error equals [chars]              | RIP authentication failed syslog   |
| ROUTING-RIP-3-ERR_CFG                          | RIP configuration error syslog         | %ROUTING-RIP-3-ERR_CFG Error during configuration in context [chars]: error equals [chars]                                                        | RIP configuration error syslog     |
| ROUTING-RIP-6-INFO_OOM                         | RIP out of memory event syslog         | %ROUTING-RIP-6-INFO_OOM RIP out-of-memory event [chars]: new/current state equals [chars]: old state equals [chars]                               | RIP out of memory event syslog     |
| ROUTING-ISIS-5-ADJCHANGE                       | handle ROUTING-ISIS-5-ADJCHANGE syslog | RP/0/RSP1/CPU0:Oct 19 19:48:32.212 : isis[240]:<br>%ROUTING-ISIS-5-ADJCHANGE : Adjacency to AGS2a (Bundle-Ether1) (L1) Down, Interface state down | routing ISIS neighbor down syslog  |
| ROUTING-ISIS-5-ADJCHANGE                       | handle ROUTING-ISIS-5-ADJCHANGE syslog | RP/0/RSP1/CPU0:Oct 19 19:48:32.212 : isis[240]:<br>%ROUTING-ISIS-5-ADJCHANGE : Adjacency to AGS2a (Bundle-Ether1) (L1) Up, Interface state up     | routing ISIS neighbor up syslog    |

# Cisco IOS Syslogs

Table 37-2 lists the Cisco IOS syslogs supported in Cisco ANA.

**Table 37-2** Cisco IOS Syslogs

| Syslog Name           | Description                                                                                                                                                                                                             | Raw Format                                                                                                  | Short Description                                           |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| LINK-5-CHANGED        | handle link down syslog                                                                                                                                                                                                 | %LINK-5-CHANGED: Interface Ethernet5/1, changed state to administratively up                                | <a href="#">Link down syslog</a>                            |
| LINK-5-CHANGED        | handle link down syslog                                                                                                                                                                                                 | %LINK-5-CHANGED: Interface Ethernet5/1, changed state to administratively down                              | <a href="#">Link up syslog</a>                              |
| FR-5-DLCICCHANGE      | handle dlcid change syslog                                                                                                                                                                                              | %FR-5-DLCICCHANGE: Interface Serial3/0/0:1 - DLCI 105 state changed to INACTIVE                             | <a href="#">FR DLCI down syslog</a>                         |
| FR-5-DLCICCHANGE      | handle dlcid change syslog                                                                                                                                                                                              | %FR-5-DLCICCHANGE: Interface Serial3/0/0:1 - DLCI 105 state changed to ACTIVE                               | <a href="#">FR DLCI up syslog</a>                           |
| STANDBY-6-STATECHANGE | handle hsrp syslog                                                                                                                                                                                                      | %STANDBY-6-STATECHANGE: Standby: 1: Ethernet1 state Active -> Standby                                       | <a href="#">HSRP group change syslog</a>                    |
| STANDBY-6-STATECHANGE | handle hsrp syslog                                                                                                                                                                                                      | %STANDBY-6-STATECHANGE: Standby: 1: Ethernet1 state Active -> Speak                                         | <a href="#">HSRP group restored syslog</a>                  |
| SNMP-5-SNMPAUTHFAIL   | This message indicates that the switch has received an SNMP message that was not properly authenticated                                                                                                                 | %SNMP-5-SNMPAUTHFAIL: Authentication failed for message from 192.168.1.2                                    | <a href="#">SNMP message has not properly authenticated</a> |
| SYS-2-MALLOCFAIL      | The requested memory allocation is not available from the specified memory pool                                                                                                                                         | %SYS-2-MALLOCFAIL: Memory allocation of 1028 bytes failed from 0x6015EC84, Pool Processor, alignment 0      | <a href="#">Memory allocation is not available</a>          |
| SYS-3-CPUHOG          | The indicated process ran too long without relinquishing the processor                                                                                                                                                  | %SYS-3-CPUHOG: Task ran for 2148 msec (20/13), Process = IP Input, PC = 3199482 -Traceback= 314B5E6 319948A | <a href="#">process ran too long</a>                        |
| SCHED-3-STUCKMTMR     | A process can register to be notified when various events occur in the router. This message indicates that a registered timer is expired and its value is unchanged after the process has executed two successive times | %SCHED-3-STUCKMTMR: Sleep with expired managed timer 1C7410, time 0x1063F9C52 (00:00:00 ago).               | <a href="#">registered timer is expired</a>                 |

**Table 37-2** Cisco IOS Syslogs (continued)

| Syslog Name          | Description                                                                                                                                                  | Raw Format                                                                                                                 | Short Description                                 |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| DUAL-3-SIA           | The EIGRP router hasn't received a reply to a query from one or more neighbors within the time allotted, so it clears the neighbors that didn't send a reply | %DUAL-3-SIA: Route 10.1.2.0/24 stuck-in-active state in IP-EIGRP 1. Cleaning up                                            | EIGRP router query to neighbors timed out syslog  |
| LANCE-3-BADCABLE     | The Ethernet cable is not connected                                                                                                                          | %LANCE-3-BADCABLE: msgtxt_badcable                                                                                         | Ethernet cable is not connected                   |
| LAPB-4-CTRLBAD       | A received FRMR has reported a frame with an invalid control code                                                                                            | %LAPB-4-CTRLBAD: Interface Ethernet0, Invalid control field                                                                | frame with an invalid control code                |
| DTP-5-NONTRUNKPORTON | The interface changed to non trunk                                                                                                                           | %DTP-5- ONTRUNKPORTON:Port 8/1 has become trunk                                                                            | Interface changed to non trunk                    |
| DTP-5-NONTRUNKPORTON | The interface changed to non trunk                                                                                                                           | %DTP-5- ONTRUNKPORTON:Port 8/1 has become non trunk                                                                        | Interface changed to trunk                        |
| LINEPROTO-5-UPDOWN   | handle line syslog                                                                                                                                           | %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, changed state to down                                | Line down syslog                                  |
| LINEPROTO-5-UPDOWN   | handle line syslog                                                                                                                                           | %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, changed state to up                                  | Line up syslog                                    |
| IPX-3-BADIGRPSAP     | A hardware or software error occurred                                                                                                                        | %IPX-3-BADIGRPSAP: Cannot send incremental SAP update to peer on interface Ethernet0. Increasing output-sap-delay may help | Cannot send incremental SAP update to peer        |
| LANCE-5-COLL         | An Ethernet cable is broken or unterminated, or the transceiver is unplugged                                                                                 | %LANCE-5-COLL: Unit 1, excessive collisions. TDR=10                                                                        | An Ethernet cable is broken or unterminated       |
| LANCE-5-LATECOLL     | An Ethernet transceiver is unplugged or defective                                                                                                            | %LANCE-5-LATECOLL: Unit 1, late collision error                                                                            | An Ethernet transceiver is unplugged or defective |
| SYS-5-CONFIG_I       | The router's configuration was changed                                                                                                                       | %SYS-5-CONFIG_I: Configured from console by console                                                                        | Device configuration changed                      |
| AT-6-NODEWRONG       | An AppleTalk node sent a GetNet Info request to this router specifying an invalid network number for the source of the GetNet Info request                   | %AT-6-NODEWRONG: XX: AppleTalk node 192.168.2.0 misconfigured; reply has been broadcast                                    | AppleTalk invalid network number                  |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name               | Description                                                                                                                                                                  | Raw Format                                                                                                 | Short Description                                           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| SECURITY-1-PORTSHUTDOWN   | This message indicates that a port has been shut down due to an insecure host sourcing a packet into that port                                                               | %Security-1-PORTSHUTDOWN: Port 0/1 shutdown due to security violation                                      | security port shut down                                     |
| SPANTREE-2-RX_PORTFAST    | A BPDU that has spanning-tree portfast enabled was received on the specified interface                                                                                       | %SPANTREE-2-RX_PORTFAST:Received BPDU on PortFast enabled port. Disabling 2/1                              | BPDU spanning-tree portfast enabled                         |
| UDLD-3-DISABLE            | This message indicates that a fault has been detected in a fiber Ethernet port connection and that the port has been disabled to prevent other protocols from malfunctioning | %UDLD-3-DISABLE: Unidirectional link detected on port 1/2. Port disabled                                   | Fault has been detected in a fiber Ethernet port connection |
| UDLD-3-DISABLEFAIL        | This message indicates that a fault was detected in the wiring on a fiber Ethernet port, but UDLD could not disable the port                                                 | %UDLD-3-DISABLEFAIL: Unidirectional link detected on port 1/2, failed to disable port                      | Unidirectional link detected                                |
| UDLD-4-ONEWAYPATH         | This message indicates that a fault has been detected in a fiber Ethernet connection in a shared media environment and that the connection may cause a possible malfunction  | %UDLD-4-ONEWAYPATH: A unidirectional link from port 1/2 to port 1/2 of device abc was detected             | Fault has been detected in a fiber Ethernet connection      |
| OSPF-5-ADJCHG             | handle ospf syslog                                                                                                                                                           | %OSPF-5-ADJCHG: Process 1, Nbr 10.100.12.6 on FastEthernet1/0 from Up to DOWN, Loading Done                | OSPF neighbor down syslog                                   |
| OSPF-5-ADJCHG             | handle ospf syslog                                                                                                                                                           | %OSPF-5-ADJCHG: Process 1, Nbr 10.100.12.6 on FastEthernet1/0 from LOADING to FULL, Loading Done           | OSPF neighbor up syslog                                     |
| SPANTREE-2-LOOPGUARDBLOCK | When the loop guard blocks an inconsistent port, the following message is logged                                                                                             | %SPANTREE-2-LOOPGUARDBLOCK: No BPDUs were received on port 3/2 in vlan 3. Moved to loop-inconsistent state | No BPDUs were received on port                              |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name                 | Description                                                                                                 | Raw Format                                                                    | Short Description                                       |
|-----------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|
| SPANTREE-2-LOOPGUARDUNBLOCK | After the recovery, the following message is logged                                                         | %SPANTREE-2-LOOPGUARDUNBLOCK: port 3/2 restored in vlan 3                     | BPDUs were received on port                             |
| AMDP2_FE-5-COLL             | Ethernet or Fast Ethernet is seeing multiple collisions. This problem may occur under heavy loads           | %AMDP2_FE-5-COLL: AMDP2/FE Ethernet1/1, Excessive collisions, TDR=1, TRC=1    | Ethernet is seeing multiple collisions                  |
| DEC21140-5-COLL             | A Fast Ethernet packet has been dropped because too many attempts to transmit it were stopped by collisions | %DEC21140-5-COLL: unit 0, excessive collisions                                | Fast Ethernet packet has been dropped                   |
| ILACC-5-COLL                | An Ethernet cable is broken or is not terminated, or the transceiver is unplugged                           | %ILACC-5-COLL: Unit 0, excessive collisions. TDR=0.12                         | An Ethernet cable is broken                             |
| PQUICC-5-COLL               | PQUICC-5-COLL: An Ethernet cable is broken or is not terminated                                             | %PQUICC-5-COLL: Unit 1, excessive collisions. Retry limit 12 exceeded         | pquicc 5 coll syslog: An Ethernet cable is broken       |
| PQUICC_ETHER-5-COLL         | PQUICC_ETHER-5-COLL: An Ethernet cable is broken or is not terminated                                       | %PQUICC_ETHER-5-COLL: Unit 1, excessive collisions. Retry limit 2 exceeded    | pquicc ether 5 coll syslog: An Ethernet cable is broken |
| PQUICC_FE-5-COLL            | Ethernet or Fast Ethernet is detecting multiple collisions                                                  | %PQUICC_FE-5-COLL: PQUICC/FE(0/1), Excessive collisions, TDR=10, TRC=10.      | Ethernet is detecting multiple collisions               |
| QUICC_ETHER-5-COLL          | An Ethernet cable is broken or unterminated                                                                 | %PQUICC_ETHER-5-COLL: Unit 1, excessive collisions. Retry limit 2 exceeded    | quicc ether 5 coll syslog: An Ethernet cable is broken  |
| AMDP2_FE-5-LATECOLL         | Late collisions have occurred on the Ethernet or Fast Ethernet                                              | %AMDP2_FE-5-LATECOLL: Ethernet1/1 transmit error                              | Late collisions have occurred                           |
| CLNS-5-ADJCHANGE            | handle isis syslog                                                                                          | %CLNS-5-ADJCHANGE: ISIS: Adjacency to edge-02(POS0/0) Down, hold time expired | IS-IS neighbor down syslog                              |
| CLNS-5-ADJCHANGE            | handle isis syslog                                                                                          | %CLNS-5-ADJCHANGE: ISIS: Adjacency to edge-02(POS0/0) Up, hold time expired   | IS-IS neighbor up syslog                                |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name             | Description                                                                                                                                                              | Raw Format                                                                          | Short Description                                             |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------|
| DEC21140-5-LATECOLL     | Late collisions are collisions that occur after transmitting the preamble                                                                                                | %DEC21140-5-LATECOLL: FastEthernet0/0 transmit error                                | Late collisions have occurred                                 |
| ILACC-5-LATECOLL        | An Ethernet transceiver is malfunctioning, the Ethernet is overloaded, or the Ethernet cable is too long                                                                 | %ILACC-5-LATECOLL: Unit 0, late collision error                                     | ilacc 5 late coll syslog: Late collisions have occurred       |
| PQUICC-5-LATECOLL       | pquicc 5 late coll syslog                                                                                                                                                | %PQUICC-5-LATECOLL: Unit 1, late collision error                                    | pquicc 5 late coll syslog: Late collisions have occurred      |
| PQUICC_ETHER-5-LATECOLL | PQUICC_ETHER-5-LATECOLL : A new network may not have been engineered properly or adding a regenerator to an existing network may have changed the network specifications | %PQUICC_ETHER-5-LATECOLL: Unit 0, late collision error                              | A new network may not have been engineered properly           |
| PQUICC_FE-5-LATECOLL    | Late collisions have occurred on the Ethernet or Fast Ethernet interface                                                                                                 | %PQUICC_FE-5-LATECOLL: PQUICC/FE(0/1), Late collision                               | pquicc fe 5 late coll syslog: Late collisions have occurred   |
| QUICC_ETHER-5-LATECOLL  | QUICC_ETHER-5-LATECOLL : A software or hardware error occurred                                                                                                           | %QUICC_ETHER-5-LATECOLL: Unit 0, late collision error                               | quicc ether 5 late coll syslog: Late collisions have occurred |
| SNMP-5-LINKTRAP         | This message indicates the type of Link Trap                                                                                                                             | %SNMP-5-LINKTRAP: Link down Trap -- ifName=sc0                                      | Link trap down has occurred                                   |
| SNMP-5-LINKTRAP         | This message indicates the type of Link Trap                                                                                                                             | %SNMP-5-LINKTRAP: Link up Trap -- ifName=sc0                                        | Link trap up has occurred                                     |
| SNMP-5-TOPOTRAP         | This message indicates that a configured port changed from the learning state to the forwarding state, or from the forwarding state to the blocking state                | %SNMP-5-TOPOTRAP: Topology Change Trap for VLAN 1                                   | configured port changed state from learning to forwarding     |
| DUAL-5-NBRCHANGE        | handle eigrp syslog                                                                                                                                                      | %DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.1.4.3 (Serial0) is down: stuck in active | DUAL 5 neighbor down syslog                                   |



**Table 37-2** Cisco IOS Syslogs (continued)

| Syslog Name         | Description                                                                        | Raw Format                                                                                                    | Short Description              |
|---------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------|
| DUAL-5-NBRCHANGE    | handle eigrp syslog                                                                | %DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.1.4.3 (Serial0) is up: stuck in active                             | DUAL 5 neighbor up syslog      |
| LINK-3-UPDOWN       | handle link down syslog                                                            | %LINK-3-UPDOWN: Interface ATM2/0, changed state to down                                                       | Link down syslog               |
| LINK-3-UPDOWN       | handle link down syslog                                                            | %LINK-3-UPDOWN: Interface ATM2/0, changed state to up                                                         | Link up syslog                 |
| BGP-5-ADJCHANGE-vrf | handle BGP 5 syslog from vrf. make sure it is before the "BGP-5-ADJCHANGE" pattern | %BGP-5-ADJCHANGE: neighbor 10.1.2.3 vpn vrf inet Down                                                         | BGP neighbor down syslog       |
| BGP-5-ADJCHANGE-vrf | handle BGP 5 syslog from vrf. make sure it is before the "BGP-5-ADJCHANGE" pattern | %BGP-5-ADJCHANGE: neighbor 10.1.2.3 vpn vrf inet Up                                                           | BGP neighbor up syslog         |
| BGP-5-ADJCHANGE     | handle BGP 5 syslog                                                                | %BGP-5-ADJCHANGE: neighbor 161.10.11.1 Down                                                                   | BGP neighbor down syslog       |
| BGP-5-ADJCHANGE     | handle BGP 5 syslog                                                                | %BGP-5-ADJCHANGE: neighbor 161.10.11.1 Up                                                                     | BGP neighbor up syslog         |
| OIR-6-(REMIINS)CARD | handle module out syslog                                                           | %OIR-6-INSCARD: Card inserted from slot 4, interfaces disabled                                                | card in syslog                 |
| OIR-6-(REMIINS)CARD | handle module out syslog                                                           | %OIR-6-REMCARD: Card removed from slot 4, interfaces disabled                                                 | card out syslog                |
| OIR-SP-3-PWRCYCLE   | card being power cycled                                                            | %OIR-SP-3-PWRCYCLE: Card in module x, is being power-cycled off (Module not responding to Keep Alive polling) | oir sp 3 power cycle syslog    |
| SYS-5-RELOAD        | syslog for reloading the device                                                    | %SYS-5-RELOAD: Reload requested                                                                               | Reloading device syslog        |
| SYS-5-RESTART       | syslog for restarting the device                                                   | %SYS-5-RESTART: System restarted --                                                                           | System restart                 |
| DTP-5-TRUNKPORTON   | The interface returned to be a trunk                                               | %DTP-5-TRUNKPORTON:Port 7/2 has become interface trunk                                                        | Interface changed to non trunk |
| DTP-5-TRUNKPORTON   | The interface returned to be a trunk                                               | %DTP-5-TRUNKPORTON:Port 7/2 has become dot1q trunk                                                            | Interface changed to trunk     |
| ISDN-6-CONNECT      | handle ISDN connect syslog                                                         | %ISDN-6-CONNECT: Interface BRI0/0:1 is now connected to 5772223                                               | ISDN connect syslog            |
| ISDN-6-CONNECT      | handle ISDN connect syslog                                                         | %ISDN-6-CONNECT: Interface BRI0/0:1 is now connected to 5772223                                               | ISDN disconnect syslog         |
| ISDN-6-DISCONNECT   | handle ISDN connect syslog                                                         | %ISDN-6-DISCONNECT: Interface BRI0:1? disconnected from 8130 traxbol, call lasted 60 seconds                  | ISDN connect syslog            |



Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name              | Description                                             | Raw Format                                                                                                                  | Short Description                          |
|--------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| ISDN-6-DISCONNECT        | handle ISDN connect syslog                              | %ISDN-6-DISCONNECT: Interface BRI0:1? disconnected from 8130 traxbol, call lasted 60 seconds                                | ISDN disconnect syslog                     |
| CDP-4-DUPLEX_MISMATCH    | This messages indicates a duplex mismatch problem (IOS) | %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on FastEthernet6/2 (not half duplex), with TBA04251336 3/2 (half duplex) | Duplex mismatch discovered                 |
| ISDN-6-CONNECT-2         | handle ISDN connect syslog2                             | %ISDN-6-LAYER2UP: Layer 2 for Interface FastEthernet2/1, TEI 0 changed to up                                                | ISDN connect syslog                        |
| ISDN-6-CONNECT-2         | handle ISDN connect syslog2                             | %ISDN-6-DISCONNECT: Interface FastEthernet0/1 disconnected from 71017, call lasted 22 seconds                               | ISDN disconnect syslog                     |
| ISDN-6-DISCONNECT-2      | handle ISDN disconnect syslog2                          | %ISDN-6-LAYER2UP: Layer 2 for Interface FastEthernet2/1, TEI 0 changed to up                                                | ISDN connect syslog                        |
| ISDN-6-DISCONNECT-2      | handle ISDN disconnect syslog2                          | %ISDN-6-LAYER2DOWN: Layer 2 for Interface FastEthernet0/1, TEI 0 changed to down                                            | ISDN disconnect syslog                     |
| LDP-5-NBRCHG-TDP         | handle LDP Neighbor change syslog                       | %LDP-5-NBRCHG: TDP Neighbor 10.12.12.12:0 is DOWN (TCP connection closed by peer)                                           | TDP neighbor down syslog                   |
| LDP-5-NBRCHG-TDP         | handle LDP Neighbor change syslog                       | %LDP-5-NBRCHG: TDP Neighbor 10.12.12.12:0 is UP (TCP connection closed by peer)                                             | TDP neighbor up syslog                     |
| LDP-5-NBRCHG-LDP         | handle LDP Neighbor change syslog                       | %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is DOWN                                                                           | LDP neighbor down syslog                   |
| LDP-5-NBRCHG-LDP         | handle LDP Neighbor change syslog                       | %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is UP                                                                             | LDP neighbor up syslog                     |
| MPLS_TE-5-TUN_reoptimize | handle tunnel reoptimization syslog                     | %MPLS_TE-5-TUN: Tun1002: installed LSP 1002_33 (popt 10) for 1002_32 (popt 20), reopt. LSP is up                            | MPSL-TE tunnel reoptimized/rerouted syslog |
| MPLS_TE-5-TUN_up         | handle tunnel up syslog                                 | %MPLS_TE-5-TUN: Tun0: installed LSP 0_26 (popt 5) for nil, got 1st feasible path opt                                        | MPLS TE tunnel down syslog                 |
| MPLS_TE-5-TUN_up         | handle tunnel up syslog                                 | %MPLS_TE-5-TUN: Tun0: installed LSP 0_26 (popt 5) for nil, got 1st feasible path opt                                        | MPLS TE tunnel up syslog                   |
| MPLS_TE-5-TUN_down       | handle tunnel down syslog                               | %MPLS_TE-5-TUN: Tun1001: installed LSP nil for 1001_92 (popt 1), path verification failed                                   | MPLS TE tunnel down syslog                 |
| MPLS_TE-5-TUN_down       | handle tunnel down syslog                               | %MPLS_TE-5-TUN: Tun1001: installed LSP nil for 1001_92 (popt 1), path verification failed                                   | MPLS TE tunnel up syslog                   |

**Table 37-2** Cisco IOS Syslogs (continued)

| Syslog Name                      | Description                                                                       | Raw Format                                                                                                                                                                                       | Short Description                                                       |
|----------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| ENV_MON-2-SUPPLY                 | Power supply is not working or has not been turned on                             | %ENV_MON-2-SUPPLY : [chars] Power Supply is Operation or Non-Operational                                                                                                                         | <a href="#">A power supply is not working or has not been turned on</a> |
| SYS-SP-STDBY-5-RESTART           | restarting the device                                                             | %SYS-SP-STDBY-5-RESTART: System restarted -- Cisco IOS Software (c7600s72033-ADVENTERPRISEK9_WAN_MZ), Version 12.2 Copyright (c) 1986-2006 by Cisco Systems, Inc.Compiled Thu 26-Oct-06 03:49 by | <a href="#">System restart</a>                                          |
| UDLD-SP-4-UDLD_PORT_DISABLED     | aggressive mode failure detected                                                  | %UDLD-SP-4-UDLD_PORT_DISABLE D: UDLD disabled interface FastEthernet2/1, FastEthernet2/1                                                                                                         | <a href="#">Aggressive Mode Failure Detected</a>                        |
| FABRIC-SP-5-FABRIC_MODULE_BACKUP | clear block option                                                                | %FABRIC-SP-5-FABRIC_MODULE_BACKUP: The Switch Fabric Module in slot 6 became standby                                                                                                             | <a href="#">fabric sp 5 clear block down syslog</a>                     |
| FABRIC-SP-5-FABRIC_MODULE_BACKUP | clear block option                                                                | %FABRIC-SP-5-FABRIC_MODULE_BACKUP: The Switch Fabric Module in slot 6 became standby                                                                                                             | <a href="#">fabric sp 5 clear block up syslog</a>                       |
| C6KENV-SP-4-FANTRAYFAILED        | fan tray failed                                                                   | %C6KENV-SP-4-FANTRAYFAILED: fan tray 2 failed                                                                                                                                                    | <a href="#">c6kenv sp 4 fan tray fail syslog</a>                        |
| PFREDUN-SP-4-BOOTSTRING_INVALID  | bootstring invalid                                                                | PFREDUN-SP-4-BOOTSTRING_INVALID: The bootfile slavebootflash:image_name is not present in standby                                                                                                | <a href="#">pfredun sp 4 bootstring invalid syslog</a>                  |
| SYS-5-POWER-SUPPLY               | Power supply failure notification                                                 | Power supply [dec] failed                                                                                                                                                                        | <a href="#">Power supply failed syslog</a>                              |
| SYS-5-POWER-SUPPLY               | Power supply failure notification                                                 | Power supply [dec] okay                                                                                                                                                                          | <a href="#">Power supply okay syslog</a>                                |
| PM-SP-STDBY-4-ERR_DISABLE        | err disable state                                                                 | %PM-SP-STDBY-4-ERR_DISABLE: bpduguard error detected on Gi2/5, putting Gi2/5 in err-disable state                                                                                                | <a href="#">pm sp stdby 4 err disable syslog</a>                        |
| HSRP-6-STATECHANGE               | handle hsrp syslog                                                                | %HSRP-6-STATECHANGE:FastEthernet 0/0 Grp 1 state Init                                                                                                                                            | <a href="#">HSRP group change syslog</a>                                |
| HSRP-6-STATECHANGE               | handle hsrp syslog                                                                | %HSRP-6-STATECHANGE:FastEthernet 0/0 Grp 1 state Standby                                                                                                                                         | <a href="#">HSRP group restored syslog</a>                              |
| BGP-3-NOTIFICATION               | handle BGP 3 syslog                                                               | %BGP-3-NOTIFICATION: sent to neighbor 10.10.10.254 4/0 (hold time expired) 0 bytes                                                                                                               | <a href="#">BGP notification syslog</a>                                 |
| NEW-INTERFACE-FOR-VSL-CONNECTION | new interface for the VSL connection syslog (one of the ether channel interfaces) | %VSL-5-VSL_CNTRL_LINK: New VSL Control Link 8/4                                                                                                                                                  | <a href="#">new ethernet channel interface for VSL connection</a>       |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name                  | Description                                                                               | Raw Format                                                                                       | Short Description                                         |
|------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| VSL-LINK-UP                  | VSL link up syslog                                                                        | %VSLP-5-VSL_UP: Ready for Role Resolution with Switch=1, MAC=0014.1bc6.1c00 over 8/4             | VSL link up syslog                                        |
| VSL-LINK-DOWN                | VSL link down syslog                                                                      | %VSLP-SW1_SP-2-VSL_DOWN: Last VSL interface Te1/6/4 went down                                    | VSL link down syslog                                      |
| VSL-LINK-UP                  | VSL link up syslog and active switch is #1                                                | %VSLP-SW1_SP-5-VSL_UP: Ready for Role Resolution with Switch=2, MAC=0013a.30e1.6800 over Te1/5/5 | VSL link up syslog: active switch is #1                   |
| VSL-LINK-UP                  | VSL link up syslog and active switch is #2                                                | %VSLP-SW2_SP-5-VSL_UP: Ready for Role Resolution with Switch=2, MAC=0013a.30e1.6800 over Te1/5/5 | VSL link up syslog: active switch is #2                   |
| VSL-ROLE-MISMATCH-RESOLVED   | role mismatch resolved syslog, sent from active switch #1                                 | %VSLP-SW1_SP-5-RRP_ROLE_RESOLUTION: Role resolved as ACTIVE by VSLP                              | role mismatch resolved syslog, sent from active switch #1 |
| VSL-ROLE-MISMATCH-RESOLVED   | role mismatch resolved syslog, sent from active switch #2                                 | %VSLP-SW2_SP-5-RRP_ROLE_RESOLUTION: Role resolved as ACTIVE by VSLP                              | role mismatch resolved syslog, sent from active switch #2 |
| ENV-SP-4-FANTRAYFAILED       | fan tray failed                                                                           | %C7600_ENV-SP-4-FANTRAYFAILED: fan tray 2 failed                                                 | env sp 4 fan tray fail syslog                             |
| PWR-SP-2-PSFAIL              | power supply failed                                                                       | %C7600_PWR-SP-2-PSFAIL: power supply 1 output failed.                                            | pwr sp 2 power supply fail syslog                         |
| BGP-5-ADJCHANGE-bfd          | handle BGP 5 syslogs for BFD                                                              | %BGP-5-ADJCHANGE: neighbor 192.168.20.1 Down BFD adjacency down                                  | BGP neighbor down syslog                                  |
| BGP-5-ADJCHANGE-bfd          | handle BGP 5 syslogs for BFD                                                              | %BGP-5-ADJCHANGE: neighbor 192.168.20.1 UP BFD adjacency up                                      | BGP neighbor up syslog                                    |
| VRRP-6-STATECHANGE           | Virtual Router Redundancy Protocol (VRRP) message: The VRRP router has changed state.     | %VRRP-6-STATECHANGE: Fa0/1 Grp 1 state Backup -> Master                                          | VRRP State Changed syslog                                 |
| ATM_AIM-5-ACTIVE_LINK_DOWN   | The specified link in the specified IMA group has become inactive/active                  | %ATM_AIM-5-ACTIVE_LINK_DOWN: Interface ATM1/0 of IMA Group ATM0/IMA2 is now inactive             | Ima Link Status Change Down Syslog                        |
| ATM_AIM-5-ACTIVE_LINK_UP     | The specified link in the specified IMA group has become inactive/active                  | %ATM_AIM-5-ACTIVE_LINK_UP: Interface ATM1/0 of IMA Group ATM0/IMA2 is now active                 | Ima Link Status Change Up Syslog                          |
| ATM_AIM-5-ACTIVE_LINK_CHANGE | Active links were added to or removed from the group, changing the bandwidth of the group | %ATM_AIM-5-ACTIVE_LINK_CHANGE: IMA Group ATM3/1/ima0 now has 2 active links                      | IMA Active Link Change Syslog                             |

**Table 37-2** Cisco IOS Syslogs (continued)

| Syslog Name                    | Description                                                                                                                                                                                      | Raw Format                                                                                                                              | Short Description                 |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| CDP-4-NATIVE_VLAN_MISMATCH     | Native VLAN mismatch discovered                                                                                                                                                                  | %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on GigabitEthernet1/1 (12), with 3750E-24TD-AGG3 FastEthernet0/2 (1)       | Native VLAN mismatch discovered   |
| TOP_MODULE-6-CLK_STATUS_CHANGE | Clock status change                                                                                                                                                                              | Mar 19 15:26:54.371: %TOP_MODULE-6-CLK_STATUS_CHANGE: PLL clock changed to LOCKED                                                       | Clock status change syslog        |
| TOP_MODULE-6-CLK_SOURCE_CHANGE | Clock source change                                                                                                                                                                              | Mar 19 15:15:40.523: %TOP_MODULE-6-CLK_SOURCE_CHANGE: Changing clock reference source to Secondary TDM 8KHZ                             | Clock source change syslog        |
| L2-L2VPN_PW-3-UPDOWN           | The L2VPN Pseudowire went down                                                                                                                                                                   | %L2-L2VPN_PW-3-UPDOWN : Pseudowire with address 2.2.2.2, id 140, state is Down                                                          | pseudo wire tunnel down syslog    |
| L2-L2VPN_PW-3-UPDOWN           | The L2VPN Pseudowire went up                                                                                                                                                                     | %L2-L2VPN_PW-3-UPDOWN : Pseudowire with address 2.2.2.2, id 140, state is Up                                                            | pseudo wire tunnel up syslog      |
| ETHER_SERVICE-6-ERR_DISABLED   | Service instance shutdown due to errdisable.                                                                                                                                                     | %ETHER_SERVICE-6-ERR_DISABLED : Mac security violation - shutdown service instance 900 on interface GigabitEthernet10/0/12              | EFP service error disabled syslog |
| ETHER_SERVICE-6-UPDOWN         | Service instance shutdown Syslog                                                                                                                                                                 | %ETHER_SERVICE-6-UPDOWN: Service instance 111 on interface GigabitEthernet10/0/3 changed to down                                        | EFP down syslog                   |
| ETHER_SERVICE-6-UPDOWN         | Service instance up Syslog                                                                                                                                                                       | %ETHER_SERVICE-6-UPDOWN: Service instance 111 on interface GigabitEthernet10/0/3 changed to up                                          | EFP up syslog                     |
| REP-SP-4-LINKSTATUS            | The Resilient Ethernet Protocol (REP) link status has changed.                                                                                                                                   | <188>950: *Aug 28 05:07:26.987: %REP-SP-4-LINKSTATUS: GigabitEthernet5/11 (segment 1) is non-operational due to neighbor not responding | REP link not operational syslog   |
| REP-SP-4-LINKSTATUS            | The Resilient Ethernet Protocol (REP) link status has changed.                                                                                                                                   | <188>949:*Aug 28 05:04:40.690: %REP-SP-4-LINKSTATUS: GigabitEthernet5/11 (segment 1) is operational                                     | REP link operational syslog       |
| OSPFv3-5-ADJCHG                | An OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from FULL to DOWN, Neighbor Down: Interface down or detached              | OSPFv3 neighbor down syslog       |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name               | Description                                                                                                                                                                                      | Raw Format                                                                                                                    | Short Description                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| OSPFv3-5-ADJCHG           | An OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from LOADING to FULL, Neighbor Down: Interface down or detached | <a href="#">OSPFv3 neighbor up syslog</a>             |
| ETHER_CFM-6-ENTER_AIS     | handle CFM AIS defect syslog                                                                                                                                                                     | %ETHER_CFM-6-ENTER_AIS: local mep with mpid 101 level 4 id 7 dir I Interface Ethernet0/0 enters AIS defect condition          | <a href="#">CFM enter AIS defect syslog</a>           |
| ETHER_CFM-6-EXIT_AIS      | handle CFM AIS defect syslog                                                                                                                                                                     | %ETHER_CFM-6-EXIT_AIS: local mep with mpid 101 level 4 id 7 dir I Interface Ethernet0/0 enters AIS defect condition           | <a href="#">CFM exit AIS defect syslog</a>            |
| E_CFM-6-ENTER_AIS         | handle CFM AIS defect syslog                                                                                                                                                                     | %E_CFM-6-ENTER_AIS: local mep with mpid 7606 level 4 BD/VLAN 22 dir D Interface Gi5/1 enters AIS defect condition             | <a href="#">CFM enter AIS defect syslog</a>           |
| E_CFM-6-EXIT_AIS          | handle CFM AIS defect syslog                                                                                                                                                                     | %E_CFM-6-EXIT_AIS: local mep with mpid 7606 level 4 BD/VLAN 22 dir D Interface Gi5/1 enters AIS defect condition              | <a href="#">CFM exit AIS defect syslog</a>            |
| ETHER_CFM-6-ENTER_AIS_INT | handle CFM interface AIS defect syslog                                                                                                                                                           | %ETHER_CFM-6-ENTER_AIS_INT: Interface Ethernet0/0 enters AIS defect condition for outward direction                           | <a href="#">CFM interface enter AIS defect syslog</a> |
| ETHER_CFM-6-EXIT_AIS_INT  | handle CFM interface AIS defect syslog                                                                                                                                                           | %ETHER_CFM-6-EXIT_AIS_INT: Interface Ethernet0/0 enters AIS defect condition for outward direction                            | <a href="#">CFM interface exit AIS defect syslog</a>  |
| E_CFM-6-ENTER_AIS_INT     | handle CFM interface AIS defect syslog                                                                                                                                                           | %E_CFM-6-ENTER_AIS_INT: Interface GigabitEthernet5/1 enters AIS defect condition for Down direction                           | <a href="#">CFM interface enter AIS defect syslog</a> |
| E_CFM-6-EXIT_AIS_INT      | handle CFM interface AIS defect syslog                                                                                                                                                           | %E_CFM-6-EXIT_AIS_INT: Interface GigabitEthernet5/1 enters AIS defect condition for Down direction                            | <a href="#">CFM interface exit AIS defect syslog</a>  |
| E_CFM-6-ENTER_LCK         | handle CFM AIS defect syslog                                                                                                                                                                     | %E_CFM-6-ENTER_LCK: local mep with mpid 7606 level 4 BD/VLAN 22 dir D Interface Gi5/1 enters LCK defect condition             | <a href="#">CFM enter LCK defect syslog</a>           |
| E_CFM-6-EXIT_LCK          | handle CFM AIS defect syslog                                                                                                                                                                     | %E_CFM-6-EXIT_LCK: local mep with mpid 7606 level 4 BD/VLAN 22 dir D Interface Gi5/1 exited LCK defect condition              | <a href="#">CFM exit LCK defect syslog</a>            |

**Table 37-2** Cisco IOS Syslogs (continued)

| Syslog Name                 | Description                           | Raw Format                                                                                                                                                                               | Short Description              |
|-----------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| E_CFM-6-ENTER_LCK_INT       | CFM interface enter LCK defect syslog | %E_CFM-6-ENTER_LCK_INT: Interface GigabitEthernet5/1 enters LCK defect condition for Down direction                                                                                      | CFM interface enter LCK syslog |
| E_CFM-6-EXIT_LCK_INT        | CFM interface exit LCK defect syslog  | %E_CFM-6-EXIT_LCK_INT: Interface GigabitEthernet5/1 exited LCK defect condition for Down direction                                                                                       | CFM interface exit LCK syslog  |
| E_CFM-3-REMOTE_MEP_DOWN     | handle Remote MEP syslog              | %E_CFM-3-REMOTE_MEP_DOWN: Remote MEP mpid 1911 evc DemoAugEVC vlan 911 MA name DemoAugMA in domain DemoAugDA changed state to down with event code TimeOut.                              | CFM Mep Down syslog            |
| E_CFM-3-REMOTE_MEP_UP       | handle Remote MEP syslog              | %E_CFM-6-REMOTE_MEP_UP: Continuity Check message is received from a remote MEP with mpid 755 evc EVC_S4_22 vlan 22 MA name S4_22 domain L4 interface status Up event code Returning.     | CFM Mep Up syslog              |
| ETHER_CFM-3-REMOTE_MEP_DOWN | handle Remote MEP syslog              | %ETHER_CFM-3-REMOTE_MEP_DOWN: Remote MEP mpid 537 vlan 555 CSIID S4_sw in domain D4_sw changed state to down with event code lastGasp.                                                   | CFM Mep Down syslog            |
| ETHER_CFM-3-REMOTE_MEP_UP   | handle Remote MEP syslog              | %ETHER_CFM-3-REMOTE_MEP_UP: Remote MEP mpid 537 vlan 555 CSIID S4_sw in domain D4_sw changed state to up with event code lastGasp.                                                       | CFM Mep Up syslog              |
| E_CFM-6-REMOTE_MEP_DOWN     | handle Remote MEP syslog              | %E_CFM-6-REMOTE_MEP_DOWN: Continuity Check message is received from a remote MEP with mpid 755 evc EVC_S4_22 vlan 22 MA name S4_22 domain L4 interface status Down event code Returning. | CFM Mep Down syslog            |
| E_CFM-6-REMOTE_MEP_UP       | handle Remote MEP syslog              | %E_CFM-6-REMOTE_MEP_UP: Continuity Check message is received from a remote MEP with mpid 755 evc EVC_S4_22 vlan 22 MA name S4_22 domain L4 interface status Up event code Returning.     | CFM Mep Up syslog              |

Table 37-2 Cisco IOS Syslogs (continued)

| Syslog Name              | Description                                                                                                                                                                                      | Raw Format                                                                                                                    | Short Description                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| OSPFv3-5-ADJCHG          | An OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from FULL to DOWN, Neighbor Down: Interface down or detached    | <a href="#">OSPFv3 neighbor down syslog</a>                |
| OSPFv3-5-ADJCHG          | An OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from LOADING to FULL, Neighbor Down: Interface down or detached | <a href="#">OSPFv3 neighbor up syslog</a>                  |
| TOP_MODULE-5-APPL_UPDOWN | Timing over packet application syslog                                                                                                                                                            | %TOP_MODULE-5-APPL_UPDOWN: Timing over packet application is down                                                             | <a href="#">Timing over packet application down syslog</a> |
| TOP_MODULE-5-APPL_UPDOWN | Timing over packet application syslog                                                                                                                                                            | %TOP_MODULE-5-APPL_UPDOWN: Timing over packet application is up                                                               | <a href="#">Timing over packet application up syslog</a>   |
| HSRP-5-STATECHANGE       | handle hsrp 5 syslog                                                                                                                                                                             | %HSRP-5-STATECHANGE: GigabitEthernet0/1.555 Grp 55 state Active -> Init                                                       | <a href="#">HSRP group change syslog</a>                   |
| HSRP-5-STATECHANGE       | handle hsrp 5 syslog                                                                                                                                                                             | %HSRP-5-STATECHANGE: GigabitEthernet0/1.555 Grp 55 state Active -> Standby                                                    | <a href="#">HSRP group restored syslog</a>                 |
| DWDM-4-G709ALARM         | The specified G709 Alarm has been declared                                                                                                                                                       | %DWDM-4-G709ALARM : DWDM 2/0/0 : LOS declared                                                                                 | <a href="#">Layer2 G709 alarm syslog</a>                   |
| DWDM-4-G709ALARM         | The specified G709 Alarm has been cleared                                                                                                                                                        | %DWDM-4-G709ALARM : DWDM 2/0/0 : LOS cleared                                                                                  | <a href="#">Layer2 G709 clear syslog</a>                   |



# Cisco IOX Syslogs

Table 37-3 lists the Cisco IOX Syslogs supported in Cisco ANA.

**Table 37-3** Cisco IOX Syslogs

| Syslog Name        | Description                                                                                                                                                                                    | Raw Format                                                                                                            | Short Description                         |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| LINK-3-UPDOWN      | The interface hardware has gone either down or up.                                                                                                                                             | %LINK-3-UPDOWN: Interface ATM2/0, changed state to down                                                               | <a href="#">Link down syslog</a>          |
| LINK-3-UPDOWN      | The interface hardware has gone either down or up.                                                                                                                                             | %LINK-3-UPDOWN: Interface ATM2/0, changed state to up                                                                 | <a href="#">Link up syslog</a>            |
| LINK-5-CHANGED     | The interface has changed state.                                                                                                                                                               | %LINK-5-CHANGE D: Interface Ethernet5/1, changed state to administratively up                                         | <a href="#">Link down syslog</a>          |
| LINK-5-CHANGED     | The interface has changed state.                                                                                                                                                               | %LINK-5-CHANGE D: Interface Ethernet5/1, changed state to administratively down                                       | <a href="#">Link up syslog</a>            |
| LINEPROTO-5-UPDOWN | The data link level line protocol changed state.                                                                                                                                               | %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, changed state to up                             | <a href="#">Line down syslog</a>          |
| LINEPROTO-5-UPDOWN | The data link level line protocol changed state.                                                                                                                                               | %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/1, changed state to up                             | <a href="#">Line up syslog</a>            |
| OSPF-5-ADJCHG      | An OSPF neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPF-5-ADJCHG: Process 1, Nbr 192.168.100.100 on POS1/0 from FULL to DOWN, Neighbor Down: Interface down or detached | <a href="#">OSPF neighbor down syslog</a> |
| OSPF-5-ADJCHG      | An OSPF neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %OSPF-5-ADJCHG: Process 1, Nbr 192.168.100.100 on POS1/0 from FULL to DOWN, Neighbor Down: Interface down or detached | <a href="#">OSPF neighbor up syslog</a>   |



Table 37-3 Cisco IOX Syslogs (continued)

| Syslog Name                      | Description                                                                                                                                                                        | Raw Format                                                                                              | Short Description                               |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| ENVMON-ADDITIVE-POWER-OVERBUDGET | The power calculated in use by the chassis exceeds that available by the powershell.<br>This condition could result in an outage of the chassis if action is not immediately taken | PLATFORM-ENVMON-2-POWERSUPPLY_CURRENT : 1<br>current has reached high level at 1 A                      | <a href="#">envmon powersupply syslog</a>       |
| ENVMON-ENV-CONDITION             | One or more environmental conditions exist on the specified slot. If left untended, they could result in loss of service or even hardware damage                                   | PLATFORM-ENVMON-2-ENV_CONDITION : An environmental condition exists on slot 1                           | <a href="#">envmon condition syslog</a>         |
| ENVMON-ENV-CONDITION             | One or more environmental conditions exist on the specified slot. If left untended, they could result in loss of service or even hardware damage                                   | PLATFORM-ENVMON-2-ENV_CONDITION_CLEAR : The environmental condition on slot 1 has cleared               | <a href="#">envmon condition clear syslog</a>   |
| ENVMON-FAN                       | The fan array specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range                                  | PLATFORM-ENVMON-2-FAN : The fan array 1 has reached high level.                                         | <a href="#">envmon fan syslog</a>               |
| ENVMON-FAN                       | The fan array specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range                                  | PLATFORM-ENVMON-2-FAN_CLEAR : The fan array 1 has reached high level.                                   | <a href="#">envmon fan clear syslog</a>         |
| ENVMON-LOW-FAN-SPEED-WARNING     | Indicates that the fan is spinning very slow                                                                                                                                       | PLATFORM-ENVMON-5-LOW_FAN_SPEED_WARNING : 1<br>is spinning slow - speed is dRPM (register value = 0x x) | <a href="#">envmon fan syslog</a>               |
| ENVMON-OVERTEMP                  | The temperature sensor specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range                         | PLATFORM-ENVMON-2-OVERTEMP : 1<br>temperature has reached high level                                    | <a href="#">envmon tempreature syslog</a>       |
| ENVMON-OVERTEMP                  | The temperature sensor specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range                         | PLATFORM-ENVMON-2-OVERTEMP_CLEAR : 1<br>temperature has returned to a normal level                      | <a href="#">envmon tempreature clear syslog</a> |
| ENVMON-PEM-REMOVE                | The power entry module specified was detected as removed                                                                                                                           | PLATFORM-ENVMON-5-PEM_REMOVE : 2 removed from slot 2                                                    | <a href="#">card out syslog</a>                 |

Table 37-3 Cisco I/O Syslogs (continued)

| Syslog Name                | Description                                                                                                                                                | Raw Format                                                                                               | Short Description               |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------|
| ENVMON-PEM-REMOVE          | The power entry module specified was detected as removed                                                                                                   | PLATFORM-ENVMON-5-PEM_INSERT : 2 inserted into slot 2                                                    | card in syslog                  |
| ENVMON-POWERSUPPLY-CURRENT | handle envmon powersupply current syslog                                                                                                                   | PLATFORM-ENVMON-2-POWERSUPPLY_CURRENT : 1 current has reached high level at 1 A                          | envmon powersupply syslog       |
| ENVMON-POWERSUPPLY-CURRENT | The current supply specified has reached a critical level and is now out of specification                                                                  | PLATFORM-ENVMON-2-POWERSUPPLY_CURRENT_CLEAR : 1 current has returned to a normal level at d              | envmon powersupply clear syslog |
| ENVMON-POWERSUPPLY-NONOP   | The power supply specified has become non operational                                                                                                      | PLATFORM-ENVMON-2-POWERSUPPLY_NONOP : Powersupply1 is Non-Operational                                    | envmon powersupply syslog       |
| ENVMON-POWERSUPPLY-NONOP   | The power supply specified has become non operational                                                                                                      | PLATFORM-ENVMON-2-POWERSUPPLY_NONOP_CLEAR : Powersupply1 has become operational                          | envmon powersupply clear syslog |
| ENVMON-POWERSUPPLY-VOLTAGE | The voltage supply specified has reached a critical level and is now out of specification                                                                  | PLATFORM-ENVMON-2-POWERSUPPLY_VOLTAGE : Powersupply1 voltage has reached high level at 11 V              | envmon powersupply syslog       |
| ENVMON-POWERSUPPLY-VOLTAGE | The voltage supply specified has reached a critical level and is now out of specification                                                                  | PLATFORM-ENVMON-2-POWERSUPPLY_VOLTAGE_CLEAR : Powersupply1 voltage has returned to a normal level at d V | envmon powersupply clear syslog |
| ENVMON-TEMP                | The temperature sensor specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range | PLATFORM-ENVMON-2-OVERTEMP : 1 temperature has reached high level                                        | envmon tempreature syslog       |
| ENVMON-TEMP                | The temperature sensor specified has reached a warning or critical level and is approaching or approached a condition that is outside the acceptable range | PLATFORM-ENVMON-2-OVERTEMP_CLEAR : 1 temperature has returned to a normal level                          | envmon tempreature clear syslog |

Table 37-3 Cisco IOX Syslogs (continued)

| Syslog Name           | Description                                                                                                                                                                                                                  | Raw Format                                                                                               | Short Description                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| ENVMON-VOLTAGE        | The voltage supply specified has reached a critical level and is now out of specification                                                                                                                                    | PLATFORM-ENVMON-2-POWERSUPPLY_VOLTAGE : Powersupply1 voltage has reached high level at 11 V              | <a href="#">envmon powersupply syslog</a>          |
| ENVMON-VOLTAGE        | The voltage supply specified has reached a critical level and is now out of specification                                                                                                                                    | PLATFORM-ENVMON-2-POWERSUPPLY_VOLTAGE_CLEAR : Powersupply1 voltage has returned to a normal level at d V | <a href="#">envmon powersupply clear syslog</a>    |
| FIA-FIAHW-LOS         | This error indicates a problem (Loss of Sync) in the interface between the card reporting error and the switch fabric card in the indicated slot. This error is traffic affecting. Error recovery is triggered by this error | ENVMON-3-FIAHW_LOS : Persistent LOS on serial link (from slot 2)                                         | <a href="#">fabric hardware syslog</a>             |
| FIA-FIAHW-LOS         | This error indicates a problem (Loss of Sync) in the interface between the card reporting error and the switch fabric card in the indicated slot. This error is traffic affecting. Error recovery is triggered by this error | ENVMON-3-FIAHW_LOS_CLEAR LOS : cleared on serial link (from slot 2)                                      | <a href="#">fabric hardware clear syslog</a>       |
| FLASH-CARD-REMOVAL    | handle flash card insertion or removal syslog                                                                                                                                                                                | libpcmcia_ide-1-CARD_UNAVAILABLE : flash1: Can not access flash device                                   | <a href="#">flash card removed syslog</a>          |
| FLASH-CARD-REMOVAL    | handle flash card insertion or removal syslog                                                                                                                                                                                | libpcmcia_ide-1-CARD_SWAPPED : flash1: The flash card has been swapped (OIR)                             | <a href="#">flash card inserted syslog</a>         |
| LIBPARSER-ERR-MEMALOC | handle memory allocation in syslog                                                                                                                                                                                           | MGBL-LIBPARSER-3-ERR_MEM_ALLO C : s: memory allocation routine failed.                                   | <a href="#">Memory allocation is not available</a> |
| NODE-RELOAD           | handle node reload syslog by sysldr                                                                                                                                                                                          | PLATFORM-SHELF MGR-3-SHUTDOWN_RESET : Node 0/SM2/* is reset due to admin shut shut request               | <a href="#">Module reset syslog</a>                |

Table 37-3 Cisco IOX Syslogs (continued)

| Syslog Name       | Description                                | Raw Format                                                                            | Short Description                         |
|-------------------|--------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------|
| NODE-STATE-CHANGE | Indicates a change in the card oper status | PLATFORM-INVMG<br>R-6-NODE_STATE_<br>CHANGE : Node:<br>0/RP0/*, state:<br>BRINGDOWN   | <a href="#">Card oper status changed</a>  |
| NODE-STATE-CHANGE | Indicates a change in the card oper status | PLATFORM-INVMG<br>R-6-NODE_STATE_<br>CHANGE : Node:<br>0/0/CPU0, state: IOS<br>XR RUN | <a href="#">Card oper status changed</a>  |
| OIROUT            | handle module out syslog                   | %PLATFORM-INV-6<br>-OIROUT : OIR: Node<br>0/0/CPU0 removed                            | <a href="#">card out syslog</a>           |
| OIROUT            | handle module out syslog                   | %PLATFORM-INV-6<br>-OIRIN : OIR: Node<br>0/0/CPU0 inserted                            | <a href="#">card in syslog</a>            |
| OIROUT-on-CPU0    | handle module out syslog                   | %PLATFORM-INV-6<br>-OIROUT : OIR: Node<br>0/0/CPU0 removed                            | <a href="#">card out syslog</a>           |
| OIROUT-on-CPU0    | handle module out syslog                   | %PLATFORM-INV-6<br>-OIRIN : OIR: Node<br>0/0/CPU0 inserted                            | <a href="#">card in syslog</a>            |
| PIM-5-NBRCHG      | handle pim neighbor syslog                 | PIM-5-NBRCHG:<br>neighbor 172.72.73.1<br>DOWN on<br>MgmtEth0/RSP0/CPU<br>0/1          | <a href="#">pim neighbor loss syslog</a>  |
| PIM-5-NBRCHG      | handle pim neighbor syslog                 | PIM-5-NBRCHG:<br>neighbor 192.168.2.1<br>UP on<br>MgmtEth0/RSP0/CPU<br>0/1            | <a href="#">pim neighbor up syslog</a>    |
| PIM-5-UPDOWN      | handle pim interface syslog                | ROUTING-IPV4_PI<br>M-5-INTCHG : PIM<br>interface<br>GigabitEthernet0/3/0/<br>0 DOWN   | <a href="#">pim interface down syslog</a> |
| PIM-5-UPDOWN      | handle pim interface syslog                | ROUTING-IPV4_PI<br>M-5-INTCHG : PIM<br>interface<br>GigabitEthernet0/3/0/<br>0 UP     | <a href="#">pim interface up syslog</a>   |

Table 37-3 Cisco IOX Syslogs (continued)

| Syslog Name              | Description                                                                                                                                                                                                             | Raw Format                                                                                                 | Short Description                        |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------|
| PIM-INVALID-JOIN         | handle pim invlid join in syslog                                                                                                                                                                                        | ROUTING-IPV4_PIM-5-INVALID_JP : PIM invalid POS0/2/0/0 J/P message from POS0/2/0/0 with RP address 1.1.1.1 | <a href="#">pim invalid join syslog</a>  |
| POWERDOWN-RESET          | Indicates that the node will be reset because the user has administratively 'power disable' or 'no power disable' the node                                                                                              | PLATFORM-SHELF MGR-3-POWERDOWN_RESET : Node 0/0/CPU0 is powered off due to admin power off request         | <a href="#">Card oper status changed</a> |
| POWERDOWN-RESET          | Indicates that the node will be reset because the user has administratively 'power disable' or 'no power disable' the node                                                                                              | PLATFORM-SHELF MGR-3-POWERDOWN_RESET : Node 0/0/CPU0 is powered on due to admin power on request           | <a href="#">Card oper status changed</a> |
| SONET-LOCAL-4-ALARM      | The specified SONET Alarm has been declared or released                                                                                                                                                                 | SONET_LOCAL-4-ALARM : Interface SONET/2/0/0: changed SLOS                                                  | <a href="#">Line down syslog</a>         |
| SONET-LOCAL-4-ALARM      | The specified SONET Alarm has been declared or released                                                                                                                                                                 | SONET_LOCAL-4-ALARM : Interface SONET/2/0/0: changed SLOS cleared                                          | <a href="#">Line up syslog</a>           |
| SPA-OIROUT               | handle invmgr node state change syslog                                                                                                                                                                                  | <SourceID>LC/0/0/CPU0</SourceID> L2-SPA-5-OIR_REMOVED : SPA removed from bay 0                             | <a href="#">card out syslog</a>          |
| SPA-OIROUT               | handle invmgr node state change syslog                                                                                                                                                                                  | <SourceID>LC/0/0/CPU0</SourceID> L2-SPA-5-OIR_INSERTED : SPA discovered in bay 0                           | <a href="#">card in syslog</a>           |
| ROUTING-LDP-5-NBR_CHANGE | A LDP neighbor has changed state (up/down). If neighbor has went down, then a reason for session going down is also displayed. This message appears only if the log neighbor command is configured for the LDP process. | ROUTING-LDP-5-NBR_CHANGE : Neighbor 7.7.7.7:0, DOWN                                                        | <a href="#">LDP neighbor down syslog</a> |

**Table 37-3** Cisco IOX Syslogs (continued)

| Syslog Name                 | Description                                                                                                                                                                                                                                                                                         | Raw Format                                                                                                                                      | Short Description                                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| ROUTING-LDP-5-NBR_CHANGE    | A LDP neighbor has changed state (up/down). If neighbor has went down, then a reason for session going down is also displayed. This message appears only if the log neighbor command is configured for the LDP process.                                                                             | gRP/0/RP0/CPU0:Sep 25 14:22:35.329 : mpls_ldp[274]: ROUTING-LDP-5-NBR_CHANGE : Neighbor 7.7.7.7:0, UP                                           | <a href="#">LDP neighbor up syslog</a>             |
| BGP-5-ADJCHANGE             | The adjacent BGP neighbor was lost                                                                                                                                                                                                                                                                  | BGP-5-ADJCHANGE : neighbor 172.23.95.15 Down - BGP Notification received: configuration change                                                  | <a href="#">BGP neighbor down syslog</a>           |
| BGP-5-ADJCHANGE             | The adjacent BGP neighbor was lost                                                                                                                                                                                                                                                                  | BGP-5-ADJCHANGE : neighbor 172.23.95.15 Up - BGP Notification received: configuration change                                                    | <a href="#">BGP neighbor up syslog</a>             |
| SECURITY-4-AUTHEN_FAILED    | The user login authentication failed                                                                                                                                                                                                                                                                | SECURITY-login-4-AUTHEN_FAILED. : Failed authentication attempt by user 'user_A' from '161.44.192.231'                                          | <a href="#">Login authentication failed syslog</a> |
| MGBL-INVENTORY-6-PORTS      | Sent by the XR device after a card-in event has occurred and the If and Entity tables are in sync. Once Cisco ANA receives the syslog, it will expedite the physical command instead of the card-in syslogs doing the expedite, so that the polling is done only after the tables are synchronized. | %MGBL-INVENTORY-6-PORTS : ifTable INSYNC for card:0/PL7/* entPhysicalIndex:239                                                                  | <a href="#">If-Table in sync syslog</a>            |
| L2-BFD-6-SESSION_STATE_DOWN | The bfd session is down                                                                                                                                                                                                                                                                             | %L2-BFD-6-SESSION_STATE_DOWN : BFD session to neighbor 23.1.1.1 on interface GigabitEthernet0/2/0/0 has gone down. Reason: Echo function failed | <a href="#">bfd session down syslog</a>            |

**Table 37-3** Cisco IOX Syslogs (continued)

| Syslog Name               | Description                                                       | Raw Format                                                                                                                                                                                 | Short Description                          |
|---------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| L2-BFD-6-SESSION_REMOVED  | The bfd session has been removed                                  | %L2-BFD-6-SESSION_REMOVED : BFD session to neighbor 23.1.1.1 on interface GigabitEthernet0/2/0/0 has gone down.<br>Reason: Echo function failed                                            | <a href="#">bfd session removed syslog</a> |
| L2-BFD-6-SESSION_STATE_UP | The bfd session is up                                             | %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 23.1.1.1 on interface GigabitEthernet0/2/0/0 has gone down.<br>Reason: Echo function failed                                           | <a href="#">bfd session up syslog</a>      |
| L2-G709-4-ALARM           | The specified G709 Alarm has been declared or released            | LC/0/0/CPU0:Feb 16 05:36:25.553 :<br>plim_4p_10ge_dwdm [204]:<br>%L2-G709-4-ALARM : DWDM0/0/0/0: LOS                                                                                       | <a href="#">Layer2 G709 alarm syslog</a>   |
| L2-G709-4-ALARM-CLEARED   | The specified G709 Alarm has been declared or released            | LC/0/0/CPU0:Feb 16 05:36:25.553 :<br>plim_4p_10ge_dwdm [204]:<br>%L2-G709-4-ALARM : DWDM0/0/0/0: LOS cleared                                                                               | <a href="#">Layer2 G709 clear syslog</a>   |
| L2-DWDM-3-INFO            | The DWDM encountered an error that would lead to degraded service | LC/0/0/CPU0:Feb 16 05:36:25.553 :<br>plim_4p_10ge_dwdm [204]:<br>%L2-DWDM-3-INFO<br>dwdm: service degrading error, reason equals ERROR                                                     | <a href="#">Layer2 dwdm info syslog</a>    |
| L1-PMENGINE-4-TCA         | The specified PM TCA has been declared                            | %L1-PMENGINE-4-TCA Port [chars] reports [chars] [chars]([chars]) PM TCA with current value [unsigned long long int], threshold [unsigned long long int] in current [chars] interval window | <a href="#">Layer1 PM TCA syslog</a>       |

**Table 37-3** Cisco IOX Syslogs (continued)

| Syslog Name             | Description                                                                                                                                                                                                                                    | Raw Format                                                                                                                                     | Short Description                                   |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| L2-SPA-3-POWER_FAILURE  | SPA_OK and PWR_OK signals are asserted after the SPA is powered on by LC. These signals are deasserted when there is a power failure on the SPA and this failure indicates that it is an SPA hardware issue. The SPA is put into FAILED state. | %L2-SPA-3-POWER_FAILURE SPA_OK and PWR_OK signal is deasserted on subslot [unsigned int]                                                       | <a href="#">Layer2 SPA failure syslog</a>           |
| ROUTING-OSPF-5-ADJCHG   | An OSPF routing neighbor has changed state. The message describes the change and the reason for it.                                                                                                                                            | %ROUTING-OSPF-5-ADJCHG : Process 1, Nbr 2.2.2.2 on MgmtEth0/7/CPU0/2 in area 0 from FULL to DOWN, Loading Done,vrf default vrfid 0x60000000    | <a href="#">OSPF routing neighbor down syslog</a>   |
| ROUTING-OSPF-5-ADJCHG   | An OSPF routing neighbor has changed state. The message describes the change and the reason for it.                                                                                                                                            | %ROUTING-OSPF-5-ADJCHG : Process 1, Nbr 2.2.2.2 on MgmtEth0/7/CPU0/2 in area 0 from LOADING to FULL, Loading Done,vrf default vrfid 0x60000000 | <a href="#">OSPF routing neighbor up syslog</a>     |
| OSPFv3-5-ADJCHG-IPv6    | An IPv6 OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process.                                          | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from FULL to DOWN, Neighbor Down: Interface down or detached                     | <a href="#">OSPFv3 neighbor down syslog</a>         |
| OSPFv3-5-ADJCHG-IPv6    | An IPv6 OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process.                                          | %OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from LOADING to FULL, Neighbor Down: Interface down or detached                  | <a href="#">OSPFv3 neighbor up syslog</a>           |
| ROUTING-OSPFv3-5-ADJCHG | An IPv6 OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process.                                          | %ROUTING-OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from FULL to DOWN, Neighbor Down: Interface down or detached             | <a href="#">OSPFv3 routing neighbor down syslog</a> |



**Table 37-3** Cisco IOX Syslogs (continued)

| Syslog Name             | Description                                                                                                                                                                                           | Raw Format                                                                                                                                          | Short Description                     |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| ROUTING-OSPFv3-5-ADJCHG | An IPv6 OSPFv3 neighbor has changed state. The message describes the change and the reason for it. This message appears only if the log-adjacency-changes command is configured for the OSPF process. | %ROUTING-OSPFv3-5-ADJCHG : Process 1, Nbr 192.168.1.1 on Mg0/5/CPU0/1 from LOADING to FULL, Neighbor Down: Interface down or detached               | OSPFv3 routing neighbor up syslog     |
| BGP-5-ADJCHANGE-IPv6    | The IPv6 adjacent BGP neighbor was lost                                                                                                                                                               | %ROUTING-BGP-5-ADJCHANGE : neighbor 3.3.3.3 down (VRF: default)<br>%ROUTING-BGP-5-ADJCHANGE : neighbor 2001:210:10:1::1 Down - User clear requested | Routing BGP neighbor down syslog      |
| BGP-5-ADJCHANGE-IPv6    | The IPv6 adjacent BGP neighbor was lost                                                                                                                                                               | %ROUTING-BGP-5-ADJCHANGE : neighbor 3.3.3.3 Up (VRF: default)<br>%ROUTING-BGP-5-ADJCHANGE : neighbor 2001:210:10:1::1 Up                            | Routing BGP neighbor up syslog        |
| ROUTING-BGP-5-ADJCHANGE | The IPv6 adjacent BGP neighbor was lost                                                                                                                                                               | %ROUTING-BGP-5-ADJCHANGE : neighbor 3.3.3.3 down (VRF: default)<br>%ROUTING-BGP-5-ADJCHANGE : neighbor 2001:210:10:1::1 Down - User clear requested | IPv6 Routing BGP neighbor down syslog |
| ROUTING-BGP-5-ADJCHANGE | The IPv6 adjacent BGP neighbor was lost                                                                                                                                                               | %ROUTING-BGP-5-ADJCHANGE : neighbor 3.3.3.3 Up (VRF: default)<br>%ROUTING-BGP-5-ADJCHANGE : neighbor 2001:210:10:1::1 Up                            | IPv6 Routing BGP neighbor up syslog   |

**Table 37-3** Cisco IOX Syslogs (continued)

| Syslog Name                   | Description                                  | Raw Format                                                                                                                   | Short Description                                             |
|-------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| L2-L2VPN_PW-3-UPDOWN          | The L2VPN Pseudowire went down               | %L2-L2VPN_PW-3-UPDOWN :<br>Pseudowire with address 2.2.2.2, id 140, state is Down                                            | <a href="#">pseudo wire tunnel down syslog</a>                |
| L2-L2VPN_PW-3-UPDOWN          | The L2VPN Pseudowire went up                 | %L2-L2VPN_PW-3-UPDOWN :<br>Pseudowire with address 2.2.2.2, id 140, state is Up                                              | <a href="#">pseudo wire tunnel up syslog</a>                  |
| ETHER_SERVICE-6-ERR_DISABLED  | Service instance shutdown due to errdisable. | %ETHER_SERVICE-6-ERR_DISABLED:<br>Mac security violation - shutdown service instance 900 on interface GigabitEthernet10/0/12 | <a href="#">EFP service error disabled syslog</a>             |
| L2-DWDM-3-NOT_YET_IMPLEMENTED | handle L2-DWDM-3-NOT_YET_IMPLEMENTED syslog  | %L2-DWDM-3-NOT_YET_IMPLEMENTED dwdm: this function [chars] is not yet implemented                                            | <a href="#">DWDM feature not implemented yet</a>              |
| L2-DWDM-3-FATAL_2             | handle L2-DWDM-3-FATAL_2 syslog              | %L2-DWDM-3-FATAL_2 dwdm: fatal error encountered, reason equals [chars], errno equals 1                                      | <a href="#">DWDM fatal error with reason and error number</a> |
| L2-DWDM-3-FATAL               | handle L2-DWDM-3-FATAL syslog                | %L2-DWDM-3-FATAL dwdm: fatal error encountered, reason equals 1                                                              | <a href="#">DWDM fatal error with reason</a>                  |
| L2-PLIM-2-EIO_TRAIN           | handle L2-PLIM-2-EIO_TRAIN syslog            | %L2-PLIM-2-EIO_TRAIN PLA: [chars], [chars]                                                                                   | <a href="#">PLIM EIO training errors syslog</a>               |
| L2-PLIM-3-CHK_ERR             | handle L2-PLIM-3-CHK_ERR syslog              | %L2-PLIM-3-CHK_ERR PLA: [chars], [chars]                                                                                     | <a href="#">PLIM Checkpoint Initialization Failure syslog</a> |
| L2-PLIM-3-HW_ERR              | handle L2-PLIM-3-HW_ERR syslog               | %L2-PLIM-3-HW_ERR asic error: [chars]                                                                                        | <a href="#">PLIM ASIC error syslog</a>                        |
| L2-PLIM-3-MEM_ERR             | handle L2-PLIM-3-MEM_ERR syslog              | %L2-PLIM-3-MEM_ERR [chars]                                                                                                   | <a href="#">PLIM memory error syslog</a>                      |
| L2-PLIM-3-SQUID_ERR           | handle L2-PLIM-3-SQUID_ERR syslog            | %L2-PLIM-3-SQUID_ERR [chars]                                                                                                 | <a href="#">PLIM squid error syslog</a>                       |

**Table 37-3** *Cisco IOX Syslogs (continued)*

| Syslog Name                    | Description                                     | Raw Format                                                                                  | Short Description                                    |
|--------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------|
| L2-PLIM-7-ERR                  | handle L2-PLIM-7-ERR syslog                     | %L2-PLIM-7-ERR<br>[chars]                                                                   | <a href="#">PLIM 7 error syslog</a>                  |
| L2-PLIM_OC768-3-CRITICAL_ERROR | handle<br>L2-PLIM_OC768-3-CRITICAL_ERROR syslog | %L2-PLIM_OC768-3-<br>-CRITICAL_ERROR<br>[chars]: [chars]: [hex]                             | <a href="#">PLIM OC768 critical error<br/>syslog</a> |
| L2-PLIM_OC768-6-INFO           | handle L2-PLIM_OC768-6-INFO<br>syslog           | %L2-PLIM_OC768-6-<br>-INFO [chars]: [chars]                                                 | <a href="#">PLIM OC768 INFO syslog</a>               |
| L2-PLIM_OC768-7-DEBUG_MSG      | handle<br>L2-PLIM_OC768-7-DEBUG_MSG<br>syslog   | %L2-PLIM_OC768-7-<br>-DEBUG_MSG<br>Debug: [chars]:<br>[chars] errno 1                       | <a href="#">PLIM OC768 debug<br/>syslog</a>          |
| BGP-3-NOTIFICATION             | handle BGP 3 syslog                             | %BGP-3-NOTIFICATION:<br>sent to neighbor<br>10.10.10.254 4/0 (hold<br>time expired) 0 bytes | <a href="#">BGP notification syslog</a>              |
| BGP-3-NOTIFICATION             | handle BGP 3 syslog                             | %BGP-3-NOTIFICATION:<br>sent to neighbor<br>10.10.10.254 4/0 (hold<br>time expired) 0 bytes | <a href="#">BGP notification syslog</a>              |

# Cisco ASR 9000 Syslog Registry Parameters

Table 37-4 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco ASR syslogs shown in Table 37-1.

**Table 37-4 Cisco ASR Syslog Registry Parameters**

| Short Description                         | Event Type                         | Event Subtype                      | Subtype Value | Expedited Polling | Event Source (IMO Name) | Activate | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------|------------------------------------|------------------------------------|---------------|-------------------|-------------------------|----------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Power supply inserted syslog</b>       | power supply removed syslog        | power supply inserted syslog       | inserted      | N                 | IModule                 | F        | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>Power supply removed syslog</b>        | power supply removed syslog        | power supply removed syslog        | removed       | N                 | IModule                 | F        | F         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>Backup to Master change syslog</b>     | Backup to Master syslog            | Backup to Master syslog            | Backup        | N                 | IIPInterface            | F        | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>Master to Backup change syslog</b>     | Backup to Master syslog            | Master to Backup syslog            | Master        | N                 | IIPInterface            | F        | F         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>BFD rate limit high warning syslog</b> | bfd rate limit high warning syslog | bfd rate limit high warning syslog | N/A           | N                 | IBfdService             | F        | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| <b>RIP authentication failed syslog</b>   | rip authentication failed syslog   | rip authentication failed syslog   | N/A           | N                 | IIPInterface            | F        | F         | F                      | 0      | T          | min      | F             | T           | F        |
| <b>RIP configuration error syslog</b>     | rip configuration error syslog     | rip configuration error syslog     | N/A           | N                 | IManagedElement         | F        | F         | F                      | 0      | T          | min      | F             | T           | F        |
| <b>RIP out of memory event syslog</b>     | rip out of memory event syslog     | rip out of memory event syslog     | N/A           | N                 | IManagedElement         | F        | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 37-4 Cisco ASR Syslog Registry Parameters (continued)

| Short Description                 | Event Type                        | Event Subtype                     | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------|-----------------------------------|-----------------------------------|---------------|-------------------|-------------------------|----------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| routing ISIS neighbor down syslog | routing isis neighbor down syslog | routing isis neighbor down syslog | down          | N                 | IPhysicalLayer          | F        | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| routing ISIS neighbor up syslog   | routing isis neighbor down syslog | routing isis neighbor up syslog   | up            | N                 | IPhysicalLayer          | F        | F         | F                      | 0      | F          | clr      | F             | T           | F        |

# Cisco IOS Syslog Registry Parameters

Table 37-5 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOS syslogs shown in Table 37-2.

**Table 37-5** Cisco IOS Registry Parameters

| Short Description   | Event Type         | Event Subtype    | Subtype Value | Expedites Polling                                                                                                                                                                                                                    | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------|--------------------|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Link down syslog    | link down syslog   | link down syslog |               | mtop-mlpp<br>pbundle-st<br>atus-telnet/<br>mtop-ima-<br>group-state<br>-telnet/mto<br>p-cem-gro<br>up-status/b<br>un<br>\\dle-status/<br>mpls<br>traffic<br>engineerin<br>g tunnel<br>informatio<br>n/ip<br>interface<br>oper status | IIPInterface            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| Link up syslog      | link down syslog   | link up syslog   |               | mtop-mlpp<br>pbundle-st<br>atus-telnet/<br>mtop-ima-<br>group-state<br>-telnet/mto<br>p-cem-gro<br>up-status/b<br>un<br>\\dle-status/<br>mpls<br>traffic<br>engineerin<br>g tunnel<br>informatio<br>n/ip<br>interface<br>oper status | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| FR DLCI down syslog | dlci change syslog | dlci down        |               | N                                                                                                                                                                                                                                    | IPPhysicalLayer         | T             | T         | F                      | 0      | T          | maj      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                | Event Type                                       | Event Subtype                                    | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| FR DLCI up syslog                                | dlci change syslog                               | dlci up                                          |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| HSRP group change syslog                         | hsrp syslog                                      | hsrp group change syslog                         |               | hsrp              | IIPInterface            | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| HSRP group restored syslog                       | hsrp syslog                                      | hsrp group restored syslog                       |               | hsrp              | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| SNMP message has not properly authenticated      | snmp 5 snmp auth fail syslog                     | snmp 5 snmp auth fail syslog                     |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Memory allocation is not available               | memory allocation syslog                         | memory allocation syslog                         |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| process ran too long                             | process ran too long syslog                      | process ran too long syslog                      |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| registered timer is expired                      | registered timer expired syslog                  | registered timer expired syslog                  |               | N                 | IManagedElement         | F             | T         | F                      | 0      | F          | min      | F             | T           | F        |
| EIGRP router query to neighbors timed out syslog | EIGRP router query to neighbors timed out syslog | EIGRP router query to neighbors timed out syslog |               | N                 | IManagedElement         | T             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Ethernet cable is not connected                  | ethernet cable is not connected syslog           | ethernet cable is not connected syslog           |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| frame with an invalid control code               | frmr report syslog                               | frmr report syslog                               |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description              | Event Type                  | Event Subtype               | Subtype Value | Expedites Polling                                                                                                                                                                                                                                                                                                             | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------|-----------------------------|-----------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Interface changed to non trunk | dtp 5 non port trunk syslog | dtp 5 non port trunk syslog |               | N                                                                                                                                                                                                                                                                                                                             | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Interface changed to trunk     | dtp 5 non port trunk syslog | dtp 5 port trunk syslog     |               | N                                                                                                                                                                                                                                                                                                                             | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Line down syslog               | line down syslog            | line down syslog            |               | basetech-ll<br>dp-neighb<br>ors-snmp/b<br>asetech-cd<br>p-neighbor<br>s-snmp/mt<br>op-mlpppb<br>undle-stat<br>s-telnet/mt<br>op-ima-gro<br>up-state-te<br>lnet/mtop-<br>cem-group<br>-status/bun<br>dle-status/<br>mpls<br>trafficengi<br>neering<br>tunnel<br>informatio<br>n/port-stat<br>us/ip<br>interface<br>oper status | IIPInterface            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |



Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                 | Event Type                | Event Subtype             | Subtype Value | Expedites Polling                                                                                                                                                                                                                                                                                        | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------|---------------------------|---------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Line up syslog                                    | line down syslog          | line up syslog            |               | basetech-ll<br>dp-neighbors-snm<br>p-neighbor<br>s-snm/mt<br>op-mlpppb<br>undle-statu<br>s-telnet/mt<br>op-ima-gro<br>up-state-te<br>lnet/mtop-<br>cem-group<br>-status/bun<br>dle-status/<br>mpls<br>trafficengi<br>neering<br>tunnel<br>informatio<br>n/port-stat<br>us/ip<br>interface<br>oper status | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Cannot send incremental SAP update to peer        | ipx 3 bad igrp sap syslog | ipx 3 bad igrp sap syslog |               | N                                                                                                                                                                                                                                                                                                        | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| An Ethernet cable is broken or unterminated       | lance 5 coll syslog       | lance 5 coll syslog       |               | N                                                                                                                                                                                                                                                                                                        | IManagedElement         | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| An Ethernet transceiver is unplugged or defective | lance 5 late coll syslog  | lance 5 late coll syslog  |               | N                                                                                                                                                                                                                                                                                                        | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Device configuration changed                      | sys 5 config i syslog     | sys 5 config i syslog     |               | N                                                                                                                                                                                                                                                                                                        | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| AppleTalk invalid network number                  | at 6 node wrong syslog    | at 6 node wrong syslog    |               | N                                                                                                                                                                                                                                                                                                        | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                           | Event Type                            | Event Subtype                         | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------------------------------|---------------------------------------|---------------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| security port shut down                                     | security 1 port shut down syslog      | security 1 port shut down syslog      |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| BPDUs spanning-tree portfast enabled                        | span tree 2 rx port fast syslog       | span tree 2 rx port fast syslog       |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Fault has been detected in a fiber Ethernet port connection | udld 3 disable syslog                 | udld 3 disable syslog                 |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Unidirectional link detected                                | udld 3 disable fail syslog            | udld 3 disable fail syslog            |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Fault has been detected in a fiber Ethernet connection      | udld 4 one way path syslog            | udld 4 one way path syslog            |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF neighbor down syslog                                   | ospf neighbor down syslog             | ospf neighbor down syslog             |               | N                 | IIPInterface            | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| OSPF neighbor up syslog                                     | ospf neighbor up syslog               | ospf neighbor up syslog               |               | N                 | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| No BPDUs were received on port                              | span tree 2 loop guard block syslog   | span tree 2 loop guard block syslog   |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| BPDUs were received on port                                 | span tree 2 loop guard unblock syslog | span tree 2 loop guard unblock syslog |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                       | Event Type                 | Event Subtype              | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------------|----------------------------|----------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Ethernet is seeing multiple collisions                  | amdp2 fe 5 coll syslog     | amdp2 fe 5 coll syslog     |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Fast Ethernet packet has been dropped                   | dec 21140-5 coll syslog    | dec 21140-5 coll syslog    |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| An Ethernet cable is broken                             | ilacc 5 coll syslog        | ilacc 5 coll syslog        |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| pquicc 5 coll syslog: An Ethernet cable is broken       | pquicc 5 coll syslog       | pquicc 5 coll syslog       |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| pquicc ether 5 coll syslog: An Ethernet cable is broken | pquicc ether 5 coll syslog | pquicc ether 5 coll syslog |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| Ethernet is detecting multiple collisions               | pquicc fe 5 coll syslog    | pquicc fe 5 coll syslog    |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| quicc ether 5 coll syslog: An Ethernet cable is broken  | quicc ether 5 coll syslog  | quicc ether 5 coll syslog  |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Late collisions have occurred                           | amdp2 fe 5 latecoll syslog | amdp2 fe 5 latecoll syslog |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| IS-IS neighbor down syslog                              | is is neighbor down syslog | is is neighbor down syslog |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| IS-IS neighbor up syslog                                | is is neighbor down syslog | is is neighbor up syslog   |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                             | Event Type                      | Event Subtype                   | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------------------|---------------------------------|---------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Late collisions have occurred                                 | dec 21140-5 late coll syslog    | dec 21140-5 late coll syslog    |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| ilacc 5 late coll syslog: Late collisions have occurred       | ilacc 5 late coll syslog        | ilacc 5 late coll syslog        |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| pquicc 5 late coll syslog: Late collisions have occurred      | pquicc 5 late coll syslog       | pquicc 5 late coll syslog       |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| A new network may not have been engineered properly           | pquicc ether 5 late coll syslog | pquicc ether 5 late coll syslog |               | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| pquicc fe 5 late coll syslog: Late collisions have occurred   | pquicc fe 5 late coll syslog    | pquicc fe 5 late coll syslog    |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| quicc ether 5 late coll syslog: Late collisions have occurred | quicc ether 5 late coll syslog  | quicc ether 5 late coll syslog  |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| Link trap down has occurred                                   | snmp 5 link trap syslog         | snmp 5 link trap down syslog    |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Link trap up has occurred                                     | snmp 5 link trap syslog         | snmp 5 link trap up syslog      |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                         | Event Type             | Event Subtype          | Subtype Value | Expedites Polling                                                                                                                                                                                                                     | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------|------------------------|------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| configured port changed state from learning to forwarding | snmp 5 top trap syslog | snmp 5 top trap syslog |               | N                                                                                                                                                                                                                                     | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| DUAL 5 neighbor down syslog                               | dual5 neighbor change  | dual5 neighbor down    |               | N                                                                                                                                                                                                                                     | IPhysicalLayer          | T             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| DUAL 5 neighbor up syslog                                 | dual5 neighbor change  | dual5 neighbor up      |               | N                                                                                                                                                                                                                                     | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Link down syslog                                          | link down syslog       | link down syslog       |               | ce-qinq-status-telnet/<br>mtop-mlppbundle-status-telnet/<br>mtop-ima-group-state-telnet/<br>mto<br>p-cem-group-status/<br>bundle-status/<br>mpls<br>traffic<br>engineering<br>tunnel<br>information/<br>ipinterface<br>oper<br>status | IIPInterface            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description           | Event Type               | Event Subtype            | Subtype Value | Expedited Polling                                                                                                                                                                                                                    | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------|--------------------------|--------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Link up syslog              | link down syslog         | link up syslog           |               | ce-qinq-status-telnet/<br>mtop-mlppbundle-status-telnet/<br>mtop-imagroup-state-telnet/<br>mto<br>p-cem-group-status/<br>bundle-status/<br>mpls<br>traffic<br>engineering<br>tunnel<br>information/<br>ipinterface<br>oper<br>status | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| BGP neighbor down syslog    | bgp neighbor down syslog | bgp neighbor down syslog |               | bgp neighbours                                                                                                                                                                                                                       | IMpBgpOid               | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| BGP neighbor up syslog      | bgp neighbor down syslog | bgp neighbor up syslog   |               | bgp neighbours                                                                                                                                                                                                                       | IMpBgpOid               | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| BGP neighbor down syslog    | bgp neighbor down syslog | bgp neighbor down syslog |               | bgp neighbours                                                                                                                                                                                                                       | IMpBgpOid               | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| BGP neighbor up syslog      | bgp neighbor down syslog | bgp neighbor up syslog   |               | bgp neighbours                                                                                                                                                                                                                       | IMpBgpOid               | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| card in syslog              | card out syslog          | card in syslog           |               | physical-command                                                                                                                                                                                                                     | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| card out syslog             | card out syslog          | card out syslog          |               | physical-command                                                                                                                                                                                                                     | IModule                 | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| oir sp 3 power cycle syslog | oir sp 3 power cycle     | oir sp 3 power cycle     |               | N                                                                                                                                                                                                                                    | IModule                 | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description              | Event Type                  | Event Subtype               | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------|-----------------------------|-----------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Reloading device syslog        | reloading device syslog     | reloading device syslog     |               | N                 | IManagedElement         | F             | F         | T                      | 200000 | F          | info     | T             | T           | T        |
| System restart                 | system restart syslog       | system restart syslog       |               | physical-command  | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | T        |
| Interface changed to non trunk | ntp 5 non port trunk syslog | ntp 5 non port trunk syslog |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Interface changed to trunk     | ntp 5 non port trunk syslog | ntp 5 port trunk syslog     |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| ISDN connect syslog            | isdn 6 connect syslog       | isdn 6 connect syslog       |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| ISDN disconnect syslog         | isdn 6 connect syslog       | isdn 6 disconnect syslog    |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| ISDN connect syslog            | isdn 6 connect syslog       | isdn 6 connect syslog       |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| ISDN disconnect syslog         | isdn 6 connect syslog       | isdn 6 disconnect syslog    |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Duplex mismatch discovered     | duplex mismatch             | duplex mismatch             |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| ISDN connect syslog            | isdn 6 connect syslog       | isdn 6 connect syslog       |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| ISDN disconnect syslog         | isdn 6 connect syslog       | isdn 6 disconnect syslog    |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| ISDN connect syslog            | isdn 6 connect syslog       | isdn 6 connect syslog       |               | N                 | IPhysicalLayer          | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| ISDN disconnect syslog         | isdn 6 connect syslog       | isdn 6 disconnect syslog    |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                 | Event Type                        | Event Subtype                     | Subtype Value | Expedites Polling                           | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------------------|-----------------------------------|-----------------------------------|---------------|---------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>TDP neighbor down syslog</b>                   | tdp neighbor down syslog          | tdp neighbor down syslog          |               | label switching table                       | ILseOid                 | F             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| <b>TDP neighbor up syslog</b>                     | tdp neighbor down syslog          | tdp neighbor up syslog            |               | label switching table                       | ILseOid                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>LDP neighbor down syslog</b>                   | ldp neighbor down syslog          | ldp neighbor down syslog          |               | mpls interfaces                             | ILseOid                 | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>LDP neighbor up syslog</b>                     | ldp neighbor down syslog          | ldp neighbor up syslog            |               | mpls interfaces                             | ILseOid                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>MPSL-TE tunnel reoptimized/rerouted syslog</b> | mpls te tunnel reoptimized syslog | mpls te tunnel reoptimized syslog |               | N                                           | IMplsTETunnel           | T             | T         | F                      | 0      | F          | info     | T             | T           | F        |
| <b>MPLS TE tunnel down syslog</b>                 | mpls te tunnel down syslog        | mpls te tunnel down syslog        |               | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>MPLS TE tunnel up syslog</b>                   | mpls te tunnel down syslog        | mpls te tunnel up syslog          |               | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>MPLS TE tunnel down syslog</b>                 | mpls te tunnel down syslog        | mpls te tunnel down syslog        |               | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |



Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                              | Event Type                             | Event Subtype                      | Subtype Value | Expedites Polling                           | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|----------------------------------------------------------------|----------------------------------------|------------------------------------|---------------|---------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>MPLS TE tunnel up syslog</b>                                | mpls te tunnel down syslog             | mpls te tunnel up syslog           |               | mpls traffic engineering tunnel information | IMplsTETunnel           | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>A power supply is not working or has not been turned on</b> | environment monitoring 2 supply syslog | environment monitoring 2 supply    |               | N                                           | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>System restart</b>                                          | system sp restart syslog               | system sp restart syslog           |               | N                                           | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Aggressive Mode Failure Detected</b>                        | udld sp 4 disable syslog               | udld sp 4 disable syslog           |               | N                                           | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>fabric sp 5 clear block down syslog</b>                     | fabric sp 5 clear block off syslog     | fabric sp 5 clear block off syslog |               | N                                           | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>fabric sp 5 clear block up syslog</b>                       | fabric sp 5 clear block off syslog     | fabric sp 5 clear block on syslog  |               | N                                           | IPhysicalLayer          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>c6kenv sp 4 fan tray fail syslog</b>                        | c6kenv sp 4 fan tray fail              | c6kenv sp 4 fan tray fail          |               | N                                           | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>pfredun sp 4 bootstring invalid syslog</b>                  | pfredun sp 4 bootstring invalid        | pfredun sp 4 bootstring invalid    |               | N                                           | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>Power supply failed syslog</b>                              | power supply failure syslog            | power supply failed syslog         |               | N                                           | IPhysicalLayer          | F             | F         | F                      | 0      | T          | maj      | F             | T           | F        |
| <b>Power supply okay syslog</b>                                | power supply failure syslog            | power supply okay syslog           |               | N                                           | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                         | Event Type                          | Event Subtype                                        | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------|-------------------------------------|------------------------------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| pm sp stdby 4 err disable syslog                          | pm sp stdby 4 err disable           | pm sp stdby 4 err disable                            |               | N                 | IPhysicalLayer          | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| HSRP group change syslog                                  | hsrp syslog                         | hsrp group change syslog                             |               | hsrp              | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| HSRP group restored syslog                                | hsrp syslog                         | hsrp group restored syslog                           |               | hsrp              | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| BGP notification syslog                                   | bgp notification syslog             | bgp notification syslog                              |               | N                 | IPhysicalLayer          | T             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| new ethernet channel interface for VSL connection         | VSL-connection-new-interface-syslog | VSL connection new interface                         |               | N                 | IManagedElement         | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| VSL link up syslog                                        | VSL-link-state-change-syslog        | VSL link up syslog                                   |               | N                 | IManagedElement         | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| VSL link down syslog                                      | VSL-link-state-change-syslog        | VSL link down syslog                                 |               | N                 | IManagedElement         | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| VSL link up syslog: active switch is #1                   | VSL-link-state-change-syslog        | VSL link up and switch 1 is active                   |               | N                 | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| VSL link up syslog: active switch is #2                   | VSL-link-state-change-syslog        | VSL link up and switch 2 is active                   |               | N                 | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| role mismatch resolved syslog, sent from active switch #1 | VSL-role-mismatch-resolved-syslog   | VSL role mismatch resolved sent from active switch 1 |               | N                 | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                                         | Event Type                         | Event Subtype                                        | Subtype Value | Expedites Polling                 | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------------------|------------------------------------|------------------------------------------------------|---------------|-----------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| role mismatch resolved syslog, sent from active switch #2 | VSL-role-mismatch-resolved-syslog  | VSL role mismatch resolved sent from active switch 2 |               | N                                 | IShelf                  | F             | F         | F                      | 110000 | F          | info     | T             | T           | F        |
| env sp 4 fan tray fail syslog                             | env sp 4 fan tray fail             | env sp 4 fan tray fail                               |               | N                                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| pwr sp 2 powersupply fail syslog                          | pwr sp 2 power supply fail         | pwr sp 2 power supply fail                           |               | N                                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| BGP neighbor down syslog                                  | bgp neighbor down syslog           | bgp neighbor down syslog                             |               | bgp neighbours , BFD              | IMpBgpOid               | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| BGP neighbor up syslog                                    | bgp neighbor down syslog           | bgp neighbor up syslog                               |               | bgp neighbours , BFD              | IMpBgpOid               | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| VRRP State Changed syslog                                 | vrrp state changed syslog          | vrrp state changed syslog                            |               | N                                 | IManagedElement         | F             | F         | F                      | 0      | F          | info     | T             | T           | F        |
| Ima Link Status Change Down Syslog                        | Ima Link Status Change Down Syslog | Ima Link Status Change Down Syslog                   |               |                                   | IPhysicalLayer          | F             | T         | F                      | 0      | F          | maj      | T             | T           | T        |
| Ima Link Status Change Up Syslog                          | Ima Link Status Change Down Syslog | Ima Link Status Change Up Syslog                     |               |                                   | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| IMA Active Link Change Syslog                             | IMA Active Link Change Syslog      | IMA Active Link Change Syslog                        |               | mtop-ima-group-state ,port-status | IMAGroupOid             | F             | F         | F                      | 0      | F          | info     | F             | T           | F        |
| Native VLAN mismatch discovered                           | native VLAN mismatch               | native VLAN mismatch                                 |               | N                                 | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                 | Event Type                         | Event Subtype                     | Subtype Value | Expedites Polling          | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------|------------------------------------|-----------------------------------|---------------|----------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Clock status change syslog        | clock status change syslog         | clock status change syslog        |               | N                          | defaultClockDC          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| Clock source change syslog        | clock source change syslog         | clock source change syslog        |               | N                          | defaultClockDC          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| pseudo wire tunnel down syslog    | pseudo wire tunnel syslog          | pseudo wire tunnel down syslog    |               | ce-pw-tunnel-status-telnet | PTPLayer2MplsTunnel     | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| pseudo wire tunnel up syslog      | pseudo wire tunnel syslog          | pseudo wire tunnel up syslog      |               | ce-pw-tunnel-status-telnet | PTPLayer2MplsTunnel     | F             | F         | F                      | 0      | F          | clr      | T             | T           | T        |
| EFP service error disabled syslog | efp service error disabled syslog  | efp service error disabled syslog |               | EFP status                 | IEFP                    | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| EFP down syslog                   | efp down syslog                    | efp down syslog                   |               | EFP status                 | IEFP                    | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| EFP up syslog                     | efp down syslog                    | efp up syslog                     |               | EFP status                 | IEFP                    | F             | T         | F                      | 0      | F          | clr      | F             | T           | F        |
| REP link not operational syslog   | REP link operational status change | REP link not operational          |               | Rep status                 | IREPService             | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| REP link operational syslog       | REP link operational status change | REP link operational              |               | Rep status                 | IREPService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| OSPFv3 neighbor down syslog       | ospfv3 neighbor syslog             | ospfv3 neighbor down syslog       | Down / DOWN   | N                          | IManagedElement         | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| OSPFv3 neighbor up syslog         | ospfv3 neighbor syslog             | ospfv3 neighbor up syslog         | Up / FULL     | N                          | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                     | Event Type                     | Event Subtype                  | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------|--------------------------------|--------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| CFM enter AIS defect syslog           | CFM enter AIS defect syslog    | CFM enter AIS defect syslog    | ENTER         | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM exit AIS defect syslog            | CFM enter AIS defect syslog    | CFM exit AIS defect syslog     | EXIT          | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM enter AIS defect syslog           | CFM enter AIS defect syslog    | CFM enter AIS defect syslog    | ENTER         | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM exit AIS defect syslog            | CFM enter AIS defect syslog    | CFM exit AIS defect syslog     | EXIT          | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM interface enter AIS defect syslog | CFM interface enter AIS syslog | CFM interface enter AIS syslog | ENTER         | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM interface exit AIS defect syslog  | CFM interface exit AIS syslog  | CFM interface exit AIS syslog  | EXIT          | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM interface enter AIS defect syslog | CFM interface enter AIS syslog | CFM interface enter AIS syslog | ENTER         | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM interface exit AIS defect syslog  | CFM interface exit AIS syslog  | CFM interface exit AIS syslog  | EXIT          | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM enter LCK defect syslog           | CFM enter LCK defect syslog    | CFM enter LCK defect syslog    | ENTER         | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| CFM exit LCK defect syslog            | CFM enter LCK defect syslog    | CFM exit LCK defect syslog     | EXIT          | N                 | ICfmServiceOid          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                     | Event Type                            | Event Subtype                         | Subtype Value | Expedites Polling | Event Source (IMO Name)        | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------|-------------------|--------------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>CFM interface enter LCK syslog</b> | CFM interface enter LCK defect syslog | CFM interface enter LCK defect syslog | ENTER         | N                 | ICfmServiceOid                 | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM interface exit LCK syslog</b>  | CFM interface enter LCK defect syslog | CFM interface exit LCK defect syslog  | EXIT          | N                 | ICfmServiceOid                 | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>CFM Mep Down syslog</b>            | Mep Down syslog                       | Mep Down syslog                       | DOWN          | N                 | ICfmMaintenance AssociationOid | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM Mep Up syslog</b>              | Mep Down syslog                       | Mep Up syslog                         | UP            | N                 | ICfmMaintenance AssociationOid | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM Mep Down syslog</b>            | Mep Down syslog                       | Mep Down syslog                       | DOWN          | N                 | ICfmMaintenance AssociationOid | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM Mep Up syslog</b>              | Mep Down syslog                       | Mep Up syslog                         | UP            | N                 | ICfmMaintenance AssociationOid | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>CFM Mep Down syslog</b>            | Mep Down syslog                       | Mep Down syslog                       | DOWN          | N                 | ICfmMaintenance AssociationOid | F             | T         | F                      | 0      | T          | minor    | F             | T           | F        |
| <b>CFM Mep Up syslog</b>              | Mep Down syslog                       | Mep Up syslog                         | UP            | N                 | ICfmMaintenance AssociationOid | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>OSPFv3 neighbor down syslog</b>    | ospfv3 neighbor syslog                | ospfv3 neighbor down syslog           | Down / DOWN   | N                 | IManagedElement                | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>OSPFv3 neighbor up syslog</b>      | ospfv3 neighbor syslog                | ospfv3 neighbor up syslog             | Up / FULL     | N                 | IManagedElement                | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-5 Cisco IOS Registry Parameters (continued)

| Short Description                          | Event Type                                 | Event Subtype                              | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------------|--------------------------------------------|--------------------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Timing over packet application down syslog | timing over packet application down syslog | timing over packet application down syslog | down          | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | min      | T             | T           | T        |
| Timing over packet application up syslog   | timing over packet application down syslog | timing over packet application up syslog   | up            | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| HSRP group change syslog                   | hsrp syslog                                | hsrp group change syslog                   |               | hsrp              | IPhysicalLayer          | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| HSRP group restored syslog                 | hsrp syslog                                | hsrp group restored syslog                 |               | hsrp              | IPhysicalLayer          | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Layer2 G709 alarm syslog                   | layer2 G709 alarm syslog                   | layer2 G709 alarm syslog                   | declared      | N                 | DWDM Oid                | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| Layer2 G709 clear syslog                   | layer2 G709 alarm syslog                   | layer2 G709 clear syslog                   | cleared       | N                 | DWDM Oid                | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

# Cisco IOX Syslog Registry Parameters

Table 37-1 lists the associated event types, event subtypes, and Cisco ANA registry parameters for the Cisco IOX syslogs shown in Table 37-1.

**Table 37-6** Cisco IOX Registry Parameters

| Short Description | Event Type       | Event Subtype    | Subtype Value | Expedites Polling                                                                                                                                                                        | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------|------------------|------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Link down syslog  | link down syslog | link down syslog | down / Down   | ce-qinq-status-telnet/mtop-mlpppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/ipinterface oper status | IIPInterface            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| Link up syslog    | link down syslog | link up syslog   | up / Up       | ce-qinq-status-telnet/mtop-mlpppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/ipinterface oper status | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Link down syslog  | link down syslog | link down syslog | down / Down   | ip interface oper status                                                                                                                                                                 | IIPInterface            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| Link up syslog    | link down syslog | link up syslog   | up / Up       | mtop-mlpppbundle-status-telnet/mtop-ima-group-state-telnet/mtop-cem-group-status/bundle-status/mpls traffic engineering tunnel information/ipinterface oper status                       | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |



Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                    | Event Type                 | Event Subtype                 | Subtype Value          | Expedites Polling                                                                                                                             | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|--------------------------------------|----------------------------|-------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>Line down syslog</b>              | line down syslog           | line down syslog              | down / Down            | mtop-mlpppbundle -status-telnet/mtop-ima-group-state-telnet/mps traffic engineering tunnel information / port-status/ip interface oper status | IPortLayer 1            | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| <b>Line up syslog</b>                | line down syslog           | line up syslog                | up / Up                | mtop-mlpppbundle -status-telnet/mtop-ima-group-state-telnet/mps traffic engineering tunnel information / port-status/ip interface oper status | IPortLayer 1            | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| <b>OSPF neighbor down syslog</b>     | ospf neighbor syslog       | ospf neighbor down syslog     | Down                   | N                                                                                                                                             | IIPInterface            | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| <b>OSPF neighbor up syslog</b>       | ospf neighbor syslog       | ospf neighbor up syslog       | Up / LOADIN G to FULL  | N                                                                                                                                             | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>envmon powersup ply syslog</b>    | envmon powersup ply syslog | envmon powersup ply syslog    | N/A                    | N                                                                                                                                             | IManagedE lement        | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| <b>envmon condition syslog</b>       | envmon condition syslog    | envmon condition syslog       | ENV_C ONDITI ON        | N                                                                                                                                             | IManagedE lement        | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| <b>envmon condition clear syslog</b> | envmon condition syslog    | envmon condition clear syslog | ENV_C ONDITI ON_CL EAR | N                                                                                                                                             | IManagedE lement        | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| <b>envmon fan syslog</b>             | envmon fan syslog          | envmon fan syslog             | FAN                    | N                                                                                                                                             | IManagedE lement        | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description               | Event Type                      | Event Subtype                   | Subtype Value              | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------|---------------------------------|---------------------------------|----------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| envmon fan clear syslog         | envmon fan syslog               | envmon fan clear syslog         | FAN_CLEAR                  | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| envmon fan syslog               | envmon fan syslog               | envmon fan syslog               | N/A                        | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon tempreature syslog       | envmon tempreature syslog       | envmon tempreature syslog       | OVERTEMP                   | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon tempreature clear syslog | envmon tempreature clear syslog | envmon tempreature clear syslog | OVERTEMP_CLEAR             | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| card out syslog                 | card out syslog                 | card out syslog                 | REMOVE                     | physical-command  | IManagedElement         | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| card in syslog                  | card out syslog                 | card in syslog                  | INSERT                     | physical-command  | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| envmon powersupply syslog       | envmon powersupply syslog       | envmon powersupply syslog       | POWER_SUPPLY_CURRENT       | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon powersupply clear syslog | envmon powersupply clear syslog | envmon powersupply clear syslog | POWER_SUPPLY_CURRENT_CLEAR | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| envmon powersupply syslog       | envmon powersupply syslog       | envmon powersupply syslog       | POWER_SUPPLY_NONOP         | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon powersupply clear syslog | envmon powersupply clear syslog | envmon powersupply clear syslog | POWER_SUPPLY_NONOP_CLEAR   | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| envmon powersupply syslog       | envmon powersupply syslog       | envmon powersupply syslog       | POWER_SUPPLY_VOLTAGE       | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                   | Event Type                          | Event Subtype                       | Subtype Value              | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| envmon powersupply clear syslog     | envmon powersupply syslog           | envmon powersupply clear syslog     | POWER_SUPPLY_VOLTAGE_CLEAR | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| envmon temptemperature syslog       | envmon temptemperature syslog       | envmon temptemperature syslog       | TEMP                       | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon temptemperature clear syslog | envmon temptemperature clear syslog | envmon temptemperature clear syslog | TEMP_CLEAR                 | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| envmon powersupply syslog           | envmon powersupply syslog           | envmon powersupply syslog           | VOLTA GE                   | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| envmon powersupply clear syslog     | envmon powersupply clear syslog     | envmon powersupply clear syslog     | VOLTA GE_CLEAR-            | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| fabric hardware syslog              | fabric hardware syslog              | fabric hardware syslog              | FIAHW_LOS                  | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| fabric hardware clear syslog        | fabric hardware clear syslog        | fabric hardware clear syslog        | FIAHW_LOS_CLEAR            | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| flash card removed syslog           | flash card removed syslog           | flash card removed syslog           | UNAVAILABLE                | N                 | IManagedElement         | F             | T         | T                      | 0      | T          | maj      | F             | T           | F        |
| flash card inserted syslog          | flash card removed syslog           | flash card inserted syslog          | SWAPPED                    | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Memory allocation is not available  | memory allocation syslog            | memory allocation syslog            | N/A                        | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| Module reset syslog                 | reset module syslog                 | reset module syslog                 | N/A                        | N                 | IManagedElement         | F             | T         | T                      | 0      | F          | info     | T             | T           | T        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description         | Event Type                | Event Subtype             | Subtype Value                                  | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------|---------------------------|---------------------------|------------------------------------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Card oper status changed  | card down syslog          | card down syslog          | UNPOWERED / DOWN / BRING DOWN / NOT / DISABLED | card status       | IModule                 | F             | T         | F                      | 0      | T          | min      | F             | T           | T        |
| Card oper status changed  | card down syslog          | card up syslog            | IOS XR RUN / OK                                | card status       | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| card out syslog           | card out syslog           | card out syslog           | OIROUT                                         | physical-command  | IModule                 | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| card in syslog            | card out syslog           | card in syslog            | OIRIN                                          | N                 | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| card out syslog           | card out syslog           | card out syslog           | OIROUT                                         | physical-command  | IModule                 | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| card in syslog            | card out syslog           | card in syslog            | OIRIN                                          | N                 | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| pim neighbor loss syslog  | pim neighbor loss syslog  | pim neighbor loss syslog  | DOWN                                           | N                 | IIPInterface            | F             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| pim neighbor up syslog    | pim neighbor loss syslog  | pim neighbor up syslog    | UP                                             | N                 | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| pim interface down syslog | pim interface down syslog | pim interface down syslog | DOWN                                           | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| pim interface up syslog   | pim interface down syslog | pim interface up syslog   | UP                                             | N                 | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| pim invalid join syslog   | pim invalid join syslog   | pim invalid join syslog   | N/A                                            | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                  | Event Type                         | Event Subtype                      | Subtype Value | Expedites Polling                                      | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|------------------------------------|------------------------------------|------------------------------------|---------------|--------------------------------------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| Card oper status changed           | card down syslog                   | card down syslog                   | off           | N                                                      | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | T        |
| Card oper status changed           | card down syslog                   | card up syslog                     | on            | N                                                      | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| Line down syslog                   | line down syslog                   | line down syslog                   | N/A           | N                                                      | IPortLayer1             | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| Line up syslog                     | line down syslog                   | line up syslog                     | cleared       | N                                                      | IPortLayer1             | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| card out syslog                    | card out syslog                    | card out syslog                    | REMOVED       | physical-command                                       | IModule                 | F             | T         | F                      | 0      | T          | maj      | F             | T           | T        |
| card in syslog                     | card out syslog                    | card in syslog                     | INSERTED      | N                                                      | IModule                 | F             | F         | F                      | 0      | F          | clr      | F             | T           | T        |
| LDP neighbor down syslog           | ldp neighbor down syslog           | ldp neighbor down syslog           | DOWN          | mpls interfaces, label switching table, mpls-ldp-peers | IProfileContainer (LSE) | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| LDP neighbor up syslog             | ldp neighbor down syslog           | ldp neighbor up syslog             | UP            | mpls interfaces, label switching table, mpls-ldp-peers | IProfileContainer (LSE) | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| BGP neighbor down syslog           | bgp neighbor down syslog           | bgp neighbor down syslog           | down / Down   | bgp neighbours                                         | IBgpNeighbourEntry      | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| BGP neighbor up syslog             | bgp neighbor down syslog           | bgp neighbor up syslog             | up / Up       | bgp neighbours                                         | IBgpNeighbourEntry      | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Login authentication failed syslog | login authentication failed syslog | login authentication failed syslog | N/A           | N                                                      | IManagedElement         | F             | F         | F                      | 0      | F          | min      | T             | T           | F        |
| If-Table in sync syslog            | if table in sync syslog            | if table in sync syslog            | N/A           | physical-command                                       | IModule                 | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                 | Event Type                   | Event Subtype                     | Subtype Value        | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------|------------------------------|-----------------------------------|----------------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| bfd session down syslog           | bfd session down syslog      | bfd session down syslog           | down                 | bfd session       | IBfdService             | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| bfd session removed syslog        | bfd session down syslog      | bfd session removed syslog        | removed              | bfd session       | IBfdService             | F             | T         | F                      | 0      | T          | maj      | F             | T           | F        |
| bfd session up syslog             | bfd session down syslog      | bfd session up syslog             | up                   | bfd session       | IBfdService             | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Layer2 G709 alarm syslog          | layer2 G709 alarm syslog     | layer2 G709 alarm syslog          | N/A                  | N                 | DWDM Oid                | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| Layer2 G709 clear syslog          | layer2 G709 alarm syslog     | layer2 G709 clear syslog          | cleared              | N                 | DWDM Oid                | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Layer2 dwdm info syslog           | layer2 dwdm info syslog      | layer2 dwdm info syslog           | N/A                  | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | F             | T           | F        |
| Layer1 PM TCA syslog              | layer1 PM TCA syslog         | layer1 PM TCA syslog              | N/A                  | N                 | DWDM Oid                | F             | F         | F                      | 0      | T          | wrn      | F             | T           | F        |
| Layer2 SPA failure syslog         | layer2 SPA failure syslog    | layer2 SPA failure syslog         | N/A                  | N                 | IManagedElement         | F             | T         | F                      | 0      | T          | min      | F             | T           | F        |
| OSPF routing neighbor down syslog | ospf routing neighbor syslog | ospf routing neighbor down syslog | Down/DOWN            | N                 | IIPInterface            | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| OSPF routing neighbor up syslog   | ospf routing neighbor syslog | ospf routing neighbor up syslog   | Up / LOADING to FULL | N                 | IIPInterface            | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                     | Event Type                            | Event Subtype                         | Subtype Value |   | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------|---|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| OSPFv3 neighbor down syslog           | ospfv3 neighbor syslog                | ospfv3 neighbor down syslog           | Down / DOWN   | N |                   | IManagedElement         | T             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| OSPFv3 neighbor up syslog             | ospfv3 neighbor syslog                | ospfv3 neighbor up syslog             | Up / FULL     | N |                   | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| OSPFv3 routing neighbor down syslog   | ospfv3 routing neighbor down syslog   | ospfv3 routing neighbor down syslog   | Down / DOWN   | N |                   | IManagedElement         | F             | T         | F                      | 0      | F          | maj      | T             | T           | F        |
| OSPFv3 routing neighbor up syslog     | ospfv3 routing neighbor down syslog   | ospfv3 routing neighbor up syslog     | Up / FULL     | N |                   | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| Routing BGP neighbor down syslog      | routing bgp neighbor down syslog      | routing bgp neighbor down syslog      | down / Down   | N |                   | IBgpNeighbourEntry      | F             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| Routing BGP neighbor up syslog        | routing bgp neighbor down syslog      | routing bgp neighbor up syslog        | up / Up       | N |                   | IBgpNeighbourEntry      | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |
| IPv6 Routing BGP neighbor down syslog | ipv6 routing bgp neighbor down syslog | ipv6 routing bgp neighbor down syslog | down / Down   | N |                   | IManagedElement         | F             | T         | F                      | 0      | F          | maj      | F             | T           | F        |
| IPv6 Routing BGP neighbor up syslog   | ipv6 routing bgp neighbor down syslog | ipv6 routing bgp neighbor up syslog   | up / Up       | N |                   | IManagedElement         | F             | F         | F                      | 0      | F          | clr      | F             | T           | F        |

Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                             | Event Type                        | Event Subtype                     | Subtype Value | Expedites Polling          | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------------|-----------------------------------|-----------------------------------|---------------|----------------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| pseudo wire tunnel down syslog                | pseudo wire tunnel syslog         | pseudo wire tunnel down syslog    |               | ce-pw-tunnel-status-telnet | PTPLayer2MplsTunnel     | F             | T         | F                      | 0      | F          | min      | T             | T           | T        |
| pseudo wire tunnel up syslog                  | pseudo wire tunnel syslog         | pseudo wire tunnel up syslog      |               | ce-pw-tunnel-status-telnet | PTPLayer2MplsTunnel     | F             | F         | F                      | 0      | F          | clr      | T             | T           | T        |
| EFP service error disabled syslog             | efp service error disabled syslog | efp service error disabled syslog |               | EFP status                 | IEFP                    | F             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| DWDM feature not implemented yet              | Dwdm not implemented syslog       | Dwdm not implemented syslog       |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | wrn      | false         | T           | F        |
| DWDM fatal error with reason and error number | DWDM fatal error 2 syslog         | DWDM fatal error 2 syslog         |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | false         | T           | F        |
| DWDM fatal error with reason                  | DWDM fatal error syslog           | DWDM fatal error 2 syslog         |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | false         | T           | F        |
| PLIM EIO training errors syslog               | PLIM EIO training errors syslog   | PLIM EIO training errors syslog   |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | false         | T           | F        |
| PLIM Checkpoint Initialization Failure syslog | PLIM checkpoint failure syslog    | PLIM checkpoint failure syslog    |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | min      | false         | T           | F        |
| PLIM ASIC error syslog                        | PLIM asic error syslog            | PLIM asic error syslog            |               | N                          | IManagedElement         | F             | F         | F                      | 0      | T          | min      | false         | T           | F        |



Table 37-6 Cisco IOX Registry Parameters (continued)

| Short Description                       | Event Type                       | Event Subtype                    | Subtype Value | Expedites Polling | Event Source (IMO Name) | Activate Flow | Correlate | Is Correlation Allowed | Weight | Auto Clear | Severity | Is Ticketable | Auto Remove | Flapping |
|-----------------------------------------|----------------------------------|----------------------------------|---------------|-------------------|-------------------------|---------------|-----------|------------------------|--------|------------|----------|---------------|-------------|----------|
| <b>PLIM memory error syslog</b>         | PLIM memory error syslog         | PLIM memory error syslog         |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | false         | T           | F        |
| <b>PLIM squid error syslog</b>          | PLIM squid error syslog          | PLIM squid error syslog          |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | false         | T           | F        |
| <b>PLIM 7 error syslog</b>              | PLIM 7b error syslog             | PLIM 7b error syslog             |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | min      | false         | T           | F        |
| <b>PLIM OC768 critical error syslog</b> | PLIM OC768 critical error syslog | PLIM OC768 critical error syslog |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | maj      | false         | T           | F        |
| <b>PLIM OC768 INFO syslog</b>           | PLIM OC768 INFO syslog           | PLIM OC768 INFO syslog           |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | info     | false         | T           | F        |
| <b>PLIM OC768 debug syslog</b>          | PLIM OC768 debug syslog          | PLIM OC768 debug syslog          |               | N                 | IManagedElement         | F             | F         | F                      | 0      | T          | info     | false         | T           | F        |
| <b>BGP notification syslog</b>          | bgp notification syslog          | bgp notification syslog          |               | N                 | IPhysicalLayer          | T             | T         | F                      | 0      | F          | info     | F             | T           | F        |
| <b>BGP notification syslog</b>          | bgp notification syslog          | bgp notification syslog          |               | N                 | IPhysicalLayer          | T             | T         | F                      | 0      | F          | info     | F             | T           | F        |





## **PART 4**

### **Alarms and Events**





## CHAPTER 38

# Error Reference

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The following topics provide details about the system and event messages in Cisco ANA:

- [Error and Event Messages, page 38-1](#)
- [Message Glossary, page 38-9](#)

## Error and Event Messages

The following tables list errors and events supported by Cisco ANA and viewable in Cisco ANA EventVision in the System tab. The listings are in two parts:

- [Table 38-1 System-Detected Error and Event Messages, page 2](#)
- [Table 38-2 Error and Event Messages, page 8](#)

See [Message Glossary, page 38-9](#), for explanations of abbreviations and acronyms used.

**Table 38-1 System-Detected Error and Event Messages**

| Source OID                       | Message                                                                                               | Severity | Cause                                                                                           | Action                                                                                        |
|----------------------------------|-------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Category: MCRchability</b>    |                                                                                                       |          |                                                                                                 |                                                                                               |
| IMC                              | Agent <i>vne_name</i> , <i>agent_ip</i> is reachable: DNA Unit = <i>unit_ip</i> AVM = <i>avm_id</i>   | CLEARED  | The VNE is reachable.                                                                           | None needed.                                                                                  |
| IMC                              | Agent <i>vne_name</i> , <i>agent_ip</i> is unreachable: DNA Unit = <i>unit_ip</i> AVM = <i>avm_id</i> | MINOR    | Various causes; system or network failure.                                                      | Contact Cisco Support.                                                                        |
| IAvm                             | AVM <i>unit_ip</i> : <i>avm_id</i> ( <i>avm_key</i> ) is reachable                                    | CLEARED  | The AVM is reachable.                                                                           | None needed.                                                                                  |
| IAvm                             | AVM <i>unit_ip</i> : <i>avm_id</i> ( <i>avm_key</i> ) is unreachable                                  | MINOR    | Network or machine failure.                                                                     | Contact Cisco Support.                                                                        |
| IMC                              | Unit <i>unit_ip</i> reachable                                                                         | CLEARED  | The MC is reachable.                                                                            | None needed.                                                                                  |
| IMC                              | Unit <i>unit_ip</i> unreachable                                                                       | MINOR    | System, network, or machine failure.                                                            | Contact Cisco Support.                                                                        |
| <b>Category: alarm threshold</b> |                                                                                                       |          |                                                                                                 |                                                                                               |
| IAvm                             | Violet threshold reached, alarms must be deleted                                                      | CRITICAL | There are too many alarms open in the system.                                                   | Remove alarms.                                                                                |
| IAvm                             | Red threshold reached, deleting alarms!                                                               | CRITICAL | There are too many alarms open in the system and the user has not removed them.                 | The system is deleting some of the alarms.                                                    |
| <b>Category: backup</b>          |                                                                                                       |          |                                                                                                 |                                                                                               |
| IAvm                             | Unable to backup the database because the database is not in archive mode                             | MAJOR    | The database is not configured to work in archive log mode so the database cannot be backed up. | Change the database to archive log mode.                                                      |
| IAvm                             | Unable to delete directory: <i>path</i>                                                               | MAJOR    | Permission problems.                                                                            | Check the directory permissions.                                                              |
| IAvm                             | Unable to delete file: <i>name</i>                                                                    | MAJOR    | Permission problems.                                                                            | Check the file permissions.                                                                   |
| IAvm                             | Error deleting files from: <i>path</i>                                                                | MAJOR    | Permission problems.                                                                            | Check the permissions of the directory containing the files and the permissions on the files. |
| IAvm                             | Error deleting files from: <i>path</i>                                                                | MAJOR    | Permission problems.                                                                            | Check the file permissions.                                                                   |
| <b>Category: bad alarms</b>      |                                                                                                       |          |                                                                                                 |                                                                                               |
| IAvm                             | Found alarms that do not refer to any network element in the system. Deleting <i>count</i> alarms.    | MINOR    | Element removed without first removing its alarms.                                              | The system is removing the relevant alarms.                                                   |
| <b>Category: bad oid</b>         |                                                                                                       |          |                                                                                                 |                                                                                               |
| IAvm                             | <i>count</i> bad oids found in table <i>businessObject</i>                                            | CRITICAL | Bad businessObjects were inserted into the database.                                            | The system is removing them.                                                                  |

Table 38-1 System-Detected Error and Event Messages (continued)

| Source OID                            | Message                                                                                                                                                                                                                                                                   | Severity | Cause                                                                                                                                                       | Action                                                                 |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Category: bos misconfiguration</b> |                                                                                                                                                                                                                                                                           |          |                                                                                                                                                             |                                                                        |
| IElementManagement                    | <i>duplicate_value</i> is configured as <i>existing_element</i> in Unit <i>unit_ip</i> AVM <i>avm_id</i> and also as <i>new_element</i> in Unit <i>new_unit_ip</i> AVM <i>new_avm_id</i>                                                                                  | MAJOR    | XML files were edited manually and incorrectly.<br><br>Note: The existing element is a VNE. The duplicate value is either the VNE's name or its IP address. | Fix XML file.<br>Remove conflicting entry.                             |
| <b>Category: drop affected</b>        |                                                                                                                                                                                                                                                                           |          |                                                                                                                                                             |                                                                        |
| IAvm                                  | Dropping affected Message of size: <i>size</i> the total affected waiting to be saved is: <i>count</i>                                                                                                                                                                    | CRITICAL | The system was shut down while removing affected messages.                                                                                                  | The system removes the remaining affected messages.                    |
| <b>Category: event-rate-limiter</b>   |                                                                                                                                                                                                                                                                           |          |                                                                                                                                                             |                                                                        |
| IAvm                                  | Dropped Events Report<br><br><b>Long Description</b><br>List of dropped events, with the total number of events dropped for each type of event. For example:<br><br>Count type (ID)<br>-----<br>282 dot1qBridge trap (dot1qBridge trap<br>601 generic trap (generic trap) | CRITICAL | There is an event burst in the network. The number of events received exceeded the Cisco ANA threshold. Cisco ANA dropped the excess events.                | Check the network for the root cause of the event burst.               |
| IAvm                                  | <i>number_of_seconds</i> sec limiter for default event type reached CLEARED threshold                                                                                                                                                                                     | CLEARED  | The rate of events received has now dropped below the threshold and is normal.                                                                              | None needed.                                                           |
| IAvm                                  | <i>number_of_seconds</i> sec limiter for default event type reached WARNING threshold                                                                                                                                                                                     | WARNING  | The rate at which events are being received is very close to the defined threshold value. There may be an event burst in the network.                       | Check the network for the root cause of the event burst.               |
| <b>Category: free space</b>           |                                                                                                                                                                                                                                                                           |          |                                                                                                                                                             |                                                                        |
| IAvm                                  | No room for tablespace <i>tablespace_name</i> on the disk                                                                                                                                                                                                                 | CRITICAL | There is no free space on the disk partition that the database occupies.                                                                                    | Free some space on the disk partition.                                 |
| IAvm                                  | No room for <i>object_name</i> in tablespace <i>tablespace_name</i>                                                                                                                                                                                                       | MINOR    | There is not enough free table space to accommodate growth in the table space.                                                                              | The system will increase the table space when the table needs to grow. |

**Table 38-1** System-Detected Error and Event Messages (continued)

| Source OID                          | Message                                                                                        | Severity | Cause                                                                                                                                                                                                                                                                                                | Action                                                                             |
|-------------------------------------|------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Category: license</b>            |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| MCNetwork                           | No license file exists (Evaluation system).                                                    | WARNING  | Cisco ANAis installed without a license file; it is an evaluation system. The message occurs whenever the license file is: <ul style="list-style-type: none"> <li>• Missing.</li> <li>• Invalid signature.</li> <li>• Locked on another MAC or host.</li> <li>• All features are expired.</li> </ul> | Contact your Cisco representative to get a license file.                           |
| MCNetwork                           | Exceeding feature usage (Limited license. Either counted or expired).                          | WARNING  | The license for some feature is either expired or usage exceeded.                                                                                                                                                                                                                                    | Contact your Cisco representative to renew or modify the license for this feature. |
| <b>Category: no stacktrace</b>      |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| IAvm                                | Session discard a msg due to an exception <i>exception_msg</i>                                 | MAJOR    | An exception occurred while handling an internal message.                                                                                                                                                                                                                                            | If this event recurs frequently, check the logs for the exception type.            |
| <b>Category: partitioning</b>       |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| IAvm                                | Unable to split partition <i>partition_name</i> on <i>table_name</i> because it contains data! | CRITICAL | The system did not split the partition before the system started inserting data into it.                                                                                                                                                                                                             | Contact Cisco Support.                                                             |
| <b>Category: queue-size-limiter</b> |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| IAvm                                | Queue Size Limiter Report                                                                      | CRITICAL | There was an event burst in the network. The number of events received exceeded the Cisco ANA threshold. Cisco ANA dropped the excess events.                                                                                                                                                        | Check the network for the root cause of the event burst.                           |
| <b>Category: session timeout</b>    |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| IAvm                                | Session creator <i>creator</i> has timed out (session XID= <i>session_xid</i> )                | MINOR    | The response to the last ping message was longer than the threshold time. This can result from delays and errors in the network or the application.                                                                                                                                                  | Notify Cisco Support (low priority).                                               |
| <b>Category: severity</b>           |                                                                                                |          |                                                                                                                                                                                                                                                                                                      |                                                                                    |
| IAvm                                | Found Integrity problem on <i>problems</i> elements                                            | CRITICAL | There was a problem calculating the severity.                                                                                                                                                                                                                                                        | The system will fix the inaccuracy.                                                |



**Table 38-1 System-Detected Error and Event Messages (continued)**

| Source OID                            | Message                                                                                                                | Severity | Cause                                                                                                                                                                                                                                                                                                | Action                                                                                                               |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Category: tickets capacity</b>     |                                                                                                                        |          |                                                                                                                                                                                                                                                                                                      |                                                                                                                      |
| IAvm                                  | Tickets capacity back to normal.                                                                                       | CLEARED  | The number of tickets Cisco ANA is generating has dropped below the defined threshold value.                                                                                                                                                                                                         | None needed.                                                                                                         |
| IAvm                                  | Tickets capacity overflow, red threshold reached.                                                                      | CRITICAL | The number of new tickets Cisco ANA is generating has reached the defined threshold value.                                                                                                                                                                                                           | Check the network for the root cause of the event burst.                                                             |
| <b>Category: user disabled</b>        |                                                                                                                        |          |                                                                                                                                                                                                                                                                                                      |                                                                                                                      |
| IAvm                                  | Too many failed login, user disabled<br><i>username</i>                                                                | MINOR    | Too many failed login attempts caused Cisco ANA to set the user ID to disabled.                                                                                                                                                                                                                      | Investigate the reason for the user login failures. If the reason was legitimate, reset the user profile to enabled. |
| <b>Category: Device System Events</b> |                                                                                                                        |          |                                                                                                                                                                                                                                                                                                      |                                                                                                                      |
| IElementManagement                    | Agent <i>agent_ip</i> is not loading because of incorrect polling group. BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i> | MINOR    | The polling group defined while adding the agent does not exist or is corrupt.                                                                                                                                                                                                                       | Verify the polling group definition and specify the correct polling group.                                           |
| IElementManagement                    | Configuration Error - Duplicate IP [ <i>existing_ip</i> ]. Will unload device.                                         | CRITICAL | The error can occur when: <ul style="list-style-type: none"> <li>A duplicate agent IP was added by mistake, even if the management IP address on the device is different; or</li> <li>Two devices have a duplicate management IP address and two agents for these two devices were added.</li> </ul> | Remove the agent with the duplicate IP, rectify that on the device, and then add the agent again.                    |
| IElementManagement                    | Configuration Error - Duplicate Key [ <i>existing_key</i> ]. Will unload device.                                       | CRITICAL | Cisco ANA found a duplicate device key and will unload the device.                                                                                                                                                                                                                                   | Assign a unique key to the device, then reload it.                                                                   |
| IElementManagement                    | Agent <i>agent_ip</i> is starting. BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                       | MINOR    | The specified VNE is starting.                                                                                                                                                                                                                                                                       | None needed.                                                                                                         |
| IElementManagement                    | Agent <i>agent_ip</i> is shutting down. BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                  | MINOR    | The specified VNE is shutting down.                                                                                                                                                                                                                                                                  | None needed.                                                                                                         |
| IElementManagement                    | Agent <i>agent_ip</i> not responding: BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                    | MAJOR    | The specified VNE is not responding.                                                                                                                                                                                                                                                                 | Check AVM logs for any errors or memory issues.                                                                      |

**Table 38-1 System-Detected Error and Event Messages (continued)**

| Source OID                         | Message                                                                                                                                                   | Severity | Cause                                                                                                                                                   | Action                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| IElementManagement                 | Agent <i>agent_ip</i> suppressed: BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                                                           | MAJOR    | The specified VNE is not responding. Efforts to restart the VNE have failed, so Cisco ANA is now suppressing the VNE.                                   | Check the VNE and restart manually.                                                |
| IElementManagement                 | Out of Memory                                                                                                                                             | CRITICAL | The AVM memory is insufficient.                                                                                                                         | Increase the amount of memory allocated to the AVM.                                |
| <b>Category: AVM System Events</b> |                                                                                                                                                           |          |                                                                                                                                                         |                                                                                    |
| IAvm                               | AVM <i>avm_id</i> is starting. BOS Unit = <i>unit_ip</i>                                                                                                  | MINOR    | The specified AVM is starting.                                                                                                                          | None needed.                                                                       |
| IAvm                               | AVM <i>avm_id</i> is shutting down. BOS Unit = <i>unit_ip</i>                                                                                             | MINOR    | The specified AVM is shutting down.                                                                                                                     | None needed.                                                                       |
| IAvm                               | AVM <i>avm_id</i> suppressed: BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                                                               | MINOR    | The specified AVM is not responding and Cisco ANA's efforts to restart it have failed multiple times. Cisco ANA is now permanently suppressing the AVM. | Check AVM logs for any evident errors, rectify those errors, and restart manually. |
| IAvm                               | AVM <i>avm_id</i> not responding: BOS Unit = <i>unit_ip</i> AVM = <i>avm_id</i>                                                                           | MAJOR    | The specified AVM is not responding.                                                                                                                    | Check AVM logs for any evident errors, rectify those errors, and restart manually. |
| IAvm                               | Memory usage normal                                                                                                                                       | CLEARED  | The amount of memory the AVM consumes has returned to normal (occurs only after usage was set to HIGH).                                                 | None needed.                                                                       |
| IAvm                               | Memory usage high                                                                                                                                         | WARNING  | The amount of memory the AVM consumes exceeded the HIGH threshold (set as a percentage of total memory; default is 85%).                                | Consider increasing the amount of memory for this AVM.                             |
| IAvm                               | AVM <i>avm_id</i> started. BOS Unit = <i>unit_ip</i>                                                                                                      | MINOR    | The specified AVM has started.                                                                                                                          | None needed.                                                                       |
| IAvm                               | AVM <i>avm_id</i> shut down. BOS Unit = <i>unit_ip</i>                                                                                                    | MINOR    | The specified AVM has shut down.                                                                                                                        | None needed.                                                                       |
| IAvm                               | An outgoing <i>frame_type</i> frame to <i>port_peer_description</i> was dropped                                                                           | MAJOR    | There is insufficient buffer space for outgoing transport frames.                                                                                       | Note the machine's CPU usage and then contact Cisco Support.                       |
| IAvm                               | <i>repeat_count_frames</i> were dropped in the last <i>time</i> seconds - for example an outgoing <i>frame_type</i> frame to <i>port_peer_description</i> | MAJOR    | There is insufficient buffer space. Repeated events were suppressed to avoid an event storm.                                                            | Note the machine's CPU usage and then contact Cisco Support.                       |

Table 38-1 System-Detected Error and Event Messages (continued)

| Source OID                          | Message                                                                                                                                                                                                                                                            | Severity | Cause                                                                                                                                                                                   | Action                                       |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| IAvm                                | A deserialization error occurred: class version error while deserializing a <i>frame_type_name</i> frame from <i>transport_string</i> to <i>transport_string:class_name</i>                                                                                        | MAJOR    | Code incompatibility exists between the source's AVM and the target's AVM.                                                                                                              | Contact Cisco Support.                       |
| IAvm                                | <i>deserialization_error_repeat_count</i> deserialization errors occurred in the last <i>time</i> seconds - for example: class version error while deserializing a <i>frame_type_name</i> frame from <i>transport_string</i> to <i>transport_string:class_name</i> | MAJOR    | A code incompatibility exists; repeated events were suppressed.                                                                                                                         | Contact Cisco Support.                       |
| <b>Category: Unit System Events</b> |                                                                                                                                                                                                                                                                    |          |                                                                                                                                                                                         |                                              |
| IMC                                 | Server <i>unit_ip</i> manual failover initiated. Raising Redundant machine = <i>redundant_unit_ip</i>                                                                                                                                                              | MAJOR    | A manual failover was requested for unit <i>unit_ip</i> . Cisco ANA is attempting to start the specified standby machine.                                                               | None needed.                                 |
| IMC                                 | Server <i>unit_ip</i> not responding. Raising Redundant machine = <i>redundant_unit_ip</i>                                                                                                                                                                         | MAJOR    | A manual failover was requested for unit <i>unit_ip</i> . Cisco ANA is attempting to start the specified standby machine.                                                               | None needed.                                 |
| IMC                                 | Server <i>unit_ip</i> manual failover initiated. No Redundant machine available.                                                                                                                                                                                   | MAJOR    | The High Availability service cannot service the failover request because it cannot find an assigned standby machine.                                                                   | Assign a machine to serve as a standby unit. |
| IMC                                 | Server <i>unit_ip</i> not responding. No Redundant machine available.                                                                                                                                                                                              | MAJOR    | The High Availability service cannot service the failover request because the assigned standby machine <i>unit_ip</i> is not responding and there is no machine assigned to replace it. | Assign a machine to serve as a standby unit. |
| IMC                                 | Registry Possibly out of Sync.                                                                                                                                                                                                                                     | WARNING  | The Registry service has detected that the registry is not synchronized with the golden source.                                                                                         | Reload the unit.                             |
| IMC                                 | BOS Unit <i>unit_ip</i> is starting.                                                                                                                                                                                                                               | MINOR    | The specified unit is starting.                                                                                                                                                         | None needed.                                 |
| IMC                                 | BOS Unit <i>unit_ip</i> is shutting down.                                                                                                                                                                                                                          | MINOR    | The specified unit is shutting down.                                                                                                                                                    | None needed.                                 |
| IMC                                 | Uplink to <i>peer_host_address/peer_AVM_id</i> disabled                                                                                                                                                                                                            | MINOR    | The administrator disabled the uplink to the specified host or peer AVM.                                                                                                                | None needed.                                 |
| IMC                                 | Uplink to <i>peer_host_address/peer_AVM_id</i> enabled                                                                                                                                                                                                             | MINOR    | The administrator disabled the uplink to the specified host or peer AVM.                                                                                                                | None needed.                                 |

**Table 38-1 System-Detected Error and Event Messages (continued)**

| Source OID | Message                                                  | Severity | Cause                                                                      | Action                             |
|------------|----------------------------------------------------------|----------|----------------------------------------------------------------------------|------------------------------------|
| IMC        | Uplink to <i>peer_host_address/peer_AVM_id</i> connected | MINOR    | The uplink connection with the specified host or peer AVM was established. | None needed.                       |
| IMC        | Uplink to <i>peer_host_address/peer_AVM_id</i> down      | MINOR    | The uplink to the specified host or peer AVM was lost.                     | Look for IP connectivity problems. |

**Category: Others**

|                 |                                                                                                                                         |          |                                    |                                                                                        |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|----------------------------------------------------------------------------------------|
| IManagedElement | VNE definitions did not load properly<br><br><b>Long Description</b><br>VNE definitions did not load properly.<br>Reason: <i>reason</i> | CRITICAL | Cisco ANA was unable to load VNEs. | Check the AVM logs for any evident errors, rectify those errors, and restart manually. |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|----------------------------------------------------------------------------------------|

**Table 38-2 Error and Event Messages**

| Description                                                                                                                                                                         | Cause                                                                                                                                                    | Action                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| The key of AVM <i>unit_ip:avmid (avmeap)</i> was changed to <i>newkey</i>                                                                                                           | The Administrator changed the AVM key.                                                                                                                   | None needed.                                                                                |
| Full GC max time exceeded (reached <i>seconds</i> seconds)                                                                                                                          | The system moved some of the heap to the swap.                                                                                                           | Increase the amount of physical memory or reduce the amount of memory allocated to the AVM. |
| AVM not responding, DNA Unit: <i>unit_ip</i> , AVM: <i>avm_id</i>                                                                                                                   | The High Availability service determined that the AVM <i>avm_id</i> on unit <i>unit_ip</i> is not responding.                                            | None needed.                                                                                |
| AVM suppressed, DNA Unit: <i>unit_ip</i> , AVM: <i>avm_id</i>                                                                                                                       | The High Availability service has suppressed AVM <i>avm_id</i> on unit <i>unit_ip</i> . This means that the AVM will not be started again automatically. | Resolve the problem that caused the suppression, then restart the AVM manually.             |
| Out Of Memory, DNA Unit: <i>unit_ip</i> , AVM: <i>avm_id</i>                                                                                                                        | The specified AVM exceeded its allocated memory.                                                                                                         | Assign more memory to the AVM, then restart the AVM.                                        |
| A message was dropped from <i>vne_xid</i> 's mailbox: <i>message_class</i> from <i>XID</i> to <i>XID</i>                                                                            | There is insufficient buffer space in the specified VNE's message queue.                                                                                 | Contact Cisco Support.                                                                      |
| <i>number</i> messages were dropped in the last <i>number</i> seconds – for example this message from <i>vne_xid</i> 's mailbox: <i>message_class</i> from <i>XID</i> to <i>XID</i> | There has been insufficient buffer space in the specified VNE's message queue for the specified time, and repeated events are being suppressed.          | Contact Cisco Support.                                                                      |
| Dropped events report:<br><i>event type:number</i><br><i>event type:number</i>                                                                                                      | The event type reached its rate limit and events of this type were dropped.                                                                              | Contact Cisco Support.                                                                      |

**Table 38-2** Error and Event Messages (continued)

| Description                                                                                               | Cause                                         | Action                 |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------|
| <i>period_in_seconds</i> sec period limiter for <i>event_type</i><br>event type reached WARNING threshold | The event type reached its warning threshold. | Contact Cisco Support. |
| <i>period_in_seconds</i> sec period limiter for <i>event_type</i><br>event type reached CLEARED threshold | The event type reached its cleared threshold. | None needed.           |

## Message Glossary

**Table 38-3** Error Message Glossary

| Term           | Definition                                                                                                                     |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| AVM            | A Cisco ANA Java process that provides the necessary distribution support platform for executing and monitoring multiple VNEs. |
| <i>avm_id</i>  | AVM identifier                                                                                                                 |
| <i>avm_key</i> | AVM key                                                                                                                        |
| BOS            | Cisco ANA                                                                                                                      |
| DNA            | Cisco ANA                                                                                                                      |
| MC             | Cisco ANA unit                                                                                                                 |
| VNE            | Virtual Network Element                                                                                                        |





## CHAPTER 39

# System Security Events

The following table lists the system security events that are displayed in the Security tab in Cisco ANA EventVision. System security events are related to client login and user activity when managing the system and the environment.

The following terms and variables may appear in the security event description:

| Term   | Definition              |
|--------|-------------------------|
| avmid  | AVM identifier          |
| avmkey | AVM key                 |
| BOS    | Cisco ANA               |
| DNA    | Cisco ANA               |
| MC     | Cisco ANA unit          |
| VNE    | Virtual Network Element |

**Table 39-1**      **Security Events**

| Event Name                            | Source OID | Short Description                                                              | Severity | Cause                 | Action       |
|---------------------------------------|------------|--------------------------------------------------------------------------------|----------|-----------------------|--------------|
| <b>Category: Administrator Action</b> |            |                                                                                |          |                       |              |
| avm-added                             | IAvm       | AVM <ip>:<avmid> (<avmkey>) was added.                                         | CLEARED  | Administrator action. | None needed. |
| avm-classesjar-changed                | IAvm       | The class JAR list of AVM <ip>:<avmid> (<avmkey>) was changed to <classesjar>. | CLEARED  | Administrator action. | None needed. |
| avm-disabled                          | IAvm       | AVM <ip>:<avmid> (<avmkey>) was disabled.                                      | CLEARED  | Administrator action. | None needed. |
| avm-enabled                           | IAvm       | AVM <ip>:<avmid> (<avmkey>) was enabled.                                       | CLEARED  | Administrator action. | None needed. |
| avm-high-availability-disabled        | IAvm       | High availability was disabled for AVM <ip>:<avmid> (<avmkey>).                | CLEARED  | Administrator action. | None needed. |
| avm-high-availability-enabled         | IAvm       | High availability was enabled for AVM <ip>:<avmid> (<avmkey>).                 | CLEARED  | Administrator action. | None needed. |

**Table 39-1**      **Security Events (continued)**

| Event Name                            | Source OID               | Short Description                                                             | Severity | Cause                 | Action       |
|---------------------------------------|--------------------------|-------------------------------------------------------------------------------|----------|-----------------------|--------------|
| avm-key-changed                       | IAvm                     | The key of AVM <ip>:<avmid> (<avmkey>) was changed to <newkey>.               | CLEARED  | Administrator action. | None needed. |
| avm-maxmem-changed                    | IAvm                     | The maximum heap size of AVM <ip>:<avmid> (<avmkey>) was changed to <maxmem>. | CLEARED  | Administrator action. | None needed. |
| avm-moved                             | IAvm                     | AVM <ip>:<avmid> (<avmkey>) was moved to <newip>.                             | CLEARED  | Administrator action. | None needed. |
| avm-patchjar-changed                  | IAvm                     | The patch JAR list of AVM <ip>:<avmid> (<avmkey>) was changed to <patchjar>.  | CLEARED  | Administrator action. | None needed. |
| avm-removed                           | IAvm                     | AVM <ip>:<avmid> (<avmkey>) was removed.                                      | CLEARED  | Administrator action. | None needed. |
| avm-restarted                         | IAvm                     | AVM <ip>:<avmid> (<avmkey>) was restarted.                                    | CLEARED  | Administrator action. | None needed. |
| client-license-added                  | IClientLicenseManagement | Client license <key> was added.                                               | CLEARED  | Administrator action. | None needed. |
| client-license-removed                | IClientLicenseManagement | Client license <key> was removed.                                             | CLEARED  | Administrator action. | None needed. |
| element-added                         | IElementManagement       | Element <key> was added to AVM <unitip>:<avmid>.                              | CLEARED  | Administrator action. | None needed. |
| element-alias-added                   | IElementManagement       | The alias <alias> was added to element <key> (in AVM <unitip>:<avmid>).       | CLEARED  | Administrator action. | None needed. |
| element-alias-removed                 | IElementManagement       | The alias <alias> was removed from element <key> (in AVM <unitip>:<avmid>).   | CLEARED  | Administrator action. | None needed. |
| element-disabled                      | IElementManagement       | Element <key> (in AVM <unitip>:<avmid>) was disabled.                         | CLEARED  | Administrator action. | None needed. |
| element-enabled                       | IElementManagement       | Element <key> (in AVM <unitip>:<avmid>) was enabled.                          | CLEARED  | Administrator action. | None needed. |
| element-moved                         | IElementManagement       | Element <key> was moved from AVM <unitip>:<avmid> to AVM <newip>:<newavmid>.  | CLEARED  | Administrator action. | None needed. |
| element-removed                       | IElementManagement       | Element <key> was removed from AVM <unitip>:<avmid>.                          | CLEARED  | Administrator action. | None needed. |
| mc-network-high-availability-disabled | IMCNetwork               | High availability was disabled for the BOS network.                           | CLEARED  | Administrator action. | None needed. |
| mc-network-high-availability-enabled  | IMCNetwork               | High availability was enabled for the BOS network.                            | CLEARED  | Administrator action. | None needed. |



**Table 39-1**      **Security Events (continued)**

| Event Name                               | Source OID              | Short Description                                                                   | Severity | Cause                                                     | Action       |
|------------------------------------------|-------------------------|-------------------------------------------------------------------------------------|----------|-----------------------------------------------------------|--------------|
| permission-added                         | IPermission             | User <username> was granted permission for scope <scope> with role <role>.          | CLEARED  | Administrator executed grant permission to user command.  | None needed. |
| permission-deleted                       | IPermission             | User <username>'s permission for scope <scope> was revoked (previous role: <role>). | CLEARED  | Administrator executed revoke permission to user command. | None needed. |
| permission-role-change<br>d              | IPermission             | User <username>'s role in scope <scope> was changed to <role>.                      | CLEARED  | Administrator executed change role to user command.       | None needed. |
| polling-group-added                      | IPollingGroupManagement | Polling group <name> (description: <description>) was added.                        | CLEARED  | Administrator action.                                     | None needed. |
| polling-group-descripti<br>on-changed    | IPollingGroupManagement | The description of polling group <name> was changed to <description>.               | CLEARED  | Administrator action.                                     | None needed. |
| polling-group-removed                    | IPollingGroupManagement | Polling group <name> (description: <description>) was removed.                      | CLEARED  | Administrator action.                                     | None needed. |
| polling-interval-added                   | IPollingInterval        | Polling interval <group>/<name> (interval: <interval>) was added.                   | CLEARED  | Administrator action.                                     | None needed. |
| polling-interval-change<br>d             | IPollingInterval        | Polling interval <group>/<name> was changed to <interval>.                          | CLEARED  | Administrator action.                                     | None needed. |
| polling-interval-remove<br>d             | IPollingInterval        | Polling interval <group>/<name> (interval: <interval>) was removed.                 | CLEARED  | Administrator action.                                     | None needed. |
| protection-group-added                   | IProtectionGroup        | Protection group <key> (description: <description>) was added.                      | CLEARED  | Administrator action.                                     | None needed. |
| protection-group-descri<br>ption-changed | IProtectionGroup        | The description of protection group <key> was changed to <description>.             | CLEARED  | Administrator action.                                     | None needed. |
| protection-group-remo<br>ved             | IProtectionGroup        | Protection group <key> (description: <description>) was removed.                    | CLEARED  | Administrator action.                                     | None needed. |
| redundant-unit-added                     | IMC                     | DNA Redundant Unit <ip> was added.                                                  | CLEARED  | Administrator action.                                     | None needed. |
| scope-created                            | IScope                  | Scope <scope> was created.                                                          | CLEARED  | Administrator executed create scope command.              | None needed. |

**Table 39-1**      **Security Events (continued)**

| Event Name                      | Source OID                | Short Description                                                                                                                              | Severity | Cause                                                      | Action       |
|---------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------|--------------|
| scope-deleted                   | IScope                    | Scope <scope> was deleted.                                                                                                                     | CLEARED  | Administrator executed delete scope command.               | None needed. |
| scope-elements-added            | IScope                    | The following elements were added to scope <scope>: <elements>.                                                                                | CLEARED  | Administrator executed add elements to scope command.      | None needed. |
| scope-elements-removed          | IScope                    | The following elements were removed from scope <scope>: <elements>.                                                                            | CLEARED  | Administrator executed remove elements from scope command. | None needed. |
| static-link-added               | IStaticTopologyManagement | A static topology link from <source> to <destination> was added.                                                                               | CLEARED  | Administrator action.                                      | None needed. |
| static-link-removed             | IStaticTopologyManagement | The static topology link from <source> to <destination> was removed.                                                                           | CLEARED  | Administrator action.                                      | None needed. |
| transport-uplink-added          | IMCNetwork                | A transport uplink was added between <sourceaddress> (local name: <sourcename>) and <destinationaddress> (local name: <destinationname>).      | CLEARED  | Administrator action.                                      | None needed. |
| transport-uplink-disabled       | IMCNetwork                | The transport uplink between <sourceaddress> (local name: <sourcename>) and <destinationaddress> (local name: <destinationname>) was disabled. | CLEARED  | Administrator action.                                      | None needed. |
| transport-uplink-enabled        | IMCNetwork                | The transport uplink between <sourceaddress> (local name: <sourcename>) and <destinationaddress> (local name: <destinationname>) was enabled.  | CLEARED  | Administrator action.                                      | None needed. |
| transport-uplink-removed        | IMCNetwork                | The transport uplink between <sourceaddress> (local name: <sourcename>) and <destinationaddress> (local name: <destinationname>) was removed.  | CLEARED  | Administrator action.                                      | None needed. |
| unit-added                      | IMC                       | DNA Unit <ip> was added.                                                                                                                       | CLEARED  | Administrator action.                                      | None needed. |
| unit-high-availability-disabled | IMC                       | High availability was disabled for BOS Unit <ip>.                                                                                              | CLEARED  | Administrator action.                                      | None needed. |

**Table 39-1**      **Security Events (continued)**

| Event Name                     | Source OID | Short Description                                                       | Severity | Cause                                                | Action       |
|--------------------------------|------------|-------------------------------------------------------------------------|----------|------------------------------------------------------|--------------|
| unit-high-availability-enabled | IMC        | High availability was enabled for BOS Unit <ip>.                        | CLEARED  | Administrator action.                                | None needed. |
| unit-manual-failover           | IMC        | Manual failover was started in BOS Unit <ip>.                           | CLEARED  | Administrator action.                                | None needed. |
| unit-protection-group-changed  | IMC        | The protection group of BOS Unit <ip> was changed to <protectiongroup>. | CLEARED  | Administrator action.                                | None needed. |
| unit-removed                   | IMC        | BOS Unit <ip> was removed.                                              | CLEARED  | Administrator action.                                | None needed. |
| unit-restart                   | IMC        | BOS Unit <ip> was restarted.                                            | CLEARED  | Administrator action.                                | None needed. |
| unit-restarted                 | IMC        | BOS Unit <ip> was restarted                                             | CLEARED  | Administrator action.                                | None needed. |
| user-created                   | IBOSUser   | User <username> was created                                             | CLEARED  | Administrator executed create user command.          | None needed. |
| user-deleted                   | IBOSUser   | User <username> was deleted.                                            | CLEARED  | Administrator executed delete user command.          | None needed. |
| user-map-added                 | IBOSUser   | User <username> was granted permission to use map <map>.                | CLEARED  | Administrator action.                                | None needed. |
| user-map-removed               | IBOSUser   | User <username>'s permission to use map <map> was revoked.              | CLEARED  | Administrator action.                                | None needed. |
| user-password-changed          | IBOSUser   | User <username>'s password was changed.                                 | CLEARED  | Administrator executed change password command.      | None needed. |
| user-property-changed          | IBOSUser   | The property <property> of user <username> was changed to <value>.      | CLEARED  | Administrator executed change user property command. | None needed. |

Table 39-1 Security Events (continued)

| Event Name                                | Source OID | Short Description                                                                | Severity | Cause                                                                                | Action                                                                                                                            |
|-------------------------------------------|------------|----------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Category: Insufficient Permissions</b> |            |                                                                                  |          |                                                                                      |                                                                                                                                   |
| execute command                           | IAvm       | User <username> doesn't have required permission to run command <command name> . | MAJOR    | A user executed a command with insufficient permissions. Might be a security attack. | Examine the log and identify the user and the command. Take the appropriate action according to organizational security policies. |
| <b>Category: License</b>                  |            |                                                                                  |          |                                                                                      |                                                                                                                                   |
| license_cap_exceeded                      | IAvm       | License capacity exceeded for user = <username>, ip = <ip>.                      | MAJOR    | User attempted to log in but is already using the maximum number of connections.     | Close some of the user connections to the application.                                                                            |
| license_expired                           | IAvm       | License expired for user = <username>, ip = <ip>.                                | MAJOR    | The user's license has expired.                                                      | Buy a license or log in as another user.                                                                                          |
| no_license                                | IAvm       | No license exists for user = <username>, ip = <ip>.                              | MAJOR    | The user does not have a license to use the application.                             | Buy a license.                                                                                                                    |
| <b>Category: Login</b>                    |            |                                                                                  |          |                                                                                      |                                                                                                                                   |
| invalid password                          | IAvm       | Invalid password. Couldn't authenticate user <username>.                         | MINOR    | User entered an invalid password.                                                    | Enter the password correctly.                                                                                                     |
| invalid user                              | IAvm       | Invalid login. Unknown user <username>.                                          | MINOR    | User entered invalid login name.                                                     | Enter the login name correctly.                                                                                                   |
| session number exceeded                   | IAvm       | Number of open sessions for user <username> exceeded.                            | MINOR    | User has opened more sessions than allowed.                                          | Increase the number of allowed sessions for this user or do not open so many.                                                     |
| success                                   | IAvm       | Successful login <username>.                                                     | CLEARED  | User entered the correct login information.                                          | None needed.                                                                                                                      |

**Table 39-1**      **Security Events (continued)**

| Event Name                        | Source OID | Short Description                                                                            | Severity | Cause                                                                                    | Action                                       |
|-----------------------------------|------------|----------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------|----------------------------------------------|
| total number session exceeded     | IAvm       | Maximum open sessions number exceeded (<maxOpenSessions>).                                   | MINOR    | The users of the system have opened too many connections.                                | Close some of the connections to the system. |
| user disabled                     | IAvm       | User <username> is disabled.                                                                 | MINOR    | User tried too many times to log in with an incorrect password; the account is disabled. | Enable the account.                          |
| <b>Category: Logoff</b>           |            |                                                                                              |          |                                                                                          |                                              |
| user logoff                       | IAvm       | User <username> logged off.                                                                  | CLEARED  | User closed the application that was connected to the system.                            | None needed.                                 |
| <b>Category: Password Changed</b> |            |                                                                                              |          |                                                                                          |                                              |
| password changed                  | IAvm       | User <username> changed password.                                                            | CLEARED  | The user changed their password.                                                         | None needed.                                 |
| <b>Category: Password Expired</b> |            |                                                                                              |          |                                                                                          |                                              |
| authenticate                      | IAvm       | Password expired. Couldn't authenticate user <username>.                                     | MINOR    | User password expiration date has arrived.                                               | Update user password.                        |
| disabled                          | IAvm       | Account inactivity timeout expired. Account disabled. Couldn't authenticate user <username>. | MINOR    | The user has not logged in within the specified time period and the account is disabled. | Enable user account.                         |





# CHAPTER 40

## Alarm Source OIDs

---

These topics describe the possible source object identifiers (OIDs) of alarms generated by Cisco ANA. A description of each source OID and OID structure is given, with examples of OIDs and service alarms that use those OIDs as their source.



### Note

The source OID must be unique in the alarm type context. For example, it is not possible to generate multiple different alarms with the same type from the same component using the component OID as the source. An additional differentiator should be added to the base component OID. See [LSE OID \(ILseOid\)](#), page 40-6, for an example.

---

The following source OIDs are described:

- [BGP Neighbor Entry OID \(IBgpNeighborEntryOid\)](#), page 40-2
- [DS0 Bundle OID \(IDS0BundleOid\)](#), page 40-2
- [DS1 Path OID \(IDS1PathOid\)](#), page 40-2
- [DS3 Path OID \(IDS3PathOid\)](#), page 40-3
- [DWDM Controller OID \(IDWDMOid\)](#), page 40-3
- [EFP OID \(IEFPOid\)](#), page 40-3
- [IMA Service \(IIMAGroupOid\)](#), page 40-4
- [IP Interface OID \(IPInterfaceOid\)](#), page 40-4
- [L2TP Peer OID \(IL2tpPeerOid\)](#), page 40-4
- [Logical Port OID \(ILogicalPortOid\)](#), page 40-5
- [LSE OID \(ILseOid\)](#), page 40-6
- [Managed Element OID \(IManagedElementOid\)](#), page 40-7
- [Managed Element OID \(IManagedElementOid\)](#), page 40-7
- [MLPPP OID \(IMLPPPOid\)](#), page 40-7
- [Module OID \(IModuleOid\)](#), page 40-7
- [MPBGP OID \(IMpBgpOid\)](#), page 40-8
- [MPLS TE Tunnel OID \(IMplsTETunnelOid\)](#), page 40-8
- [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9
- [Shelf OID \(IShelfOid\)](#), page 40-9
- [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9

- [VLAN Tagged Interface OID \(IVlanTaggedInterfaceOID\)](#), page 40-12
- [VSI OID \(IVSIOID\)](#), page 40-12

## BGP Neighbor Entry OID (IBgpNeighborEntryOID)

The BGP Neighbor Entry OID is the source OID for any alarms related to BGP neighbors.

The BGP Neighbor Entry source OID supports the BGP Neighbor Loss alarm.

The structure of the BGP Neighbor Entry OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][FWComponentContainer(Type=7)][MpBgp][BgpNeighborEntry(PeerIdentifier=peerIP)(VrfName=vrfName)]}
```

The VrfName identifier in the BGP entry part exists if the entry is under VRF.

### Example

```
{[ManagedElement(Key=PE3-NY-7300)][LogicalRoot][FWComponentContainer(Type=7)][MpBgp][BgpNeighbourEntry(PeerIdentifier=10.0.7.4)(VrfName=Red)]}
```

## DS0 Bundle OID (IDS0BundleOid)

The DS0 Bundle OID is the source OID for any alarms related to DS0 Bundle.

The alarm supported by Cisco ANA with DS0 Bundle OID source OID is:

- DS0 Bundle Down

The structure of the DS0 Bundle OID is:

```
{[ManagedElement(Key=mlppp-mlppp number)][PhysicalRoot][Chassis][Slot(SlotNum=slot number)][Module][Slot(SlotNum=slot number)][Module][Port(PortNumber=port number)][PhysicalLayer][Lop(Id=identifier)][DS0Bundle(BundleLocation=Bundle: location)(Id=identifier)]}
```

### Example

```
{[ManagedElement(Key=mlppp-2)][PhysicalRoot][Chassis][Slot(SlotNum=4)][Module][Slot(SlotNum=3)][Module][Port(PortNumber=T3 4/3/0)][PhysicalLayer][Lop(Id=14)][DS0Bundle(BundleLocation=Bundle: Serial4/3/0/14:0)(Id=0)]}
```

## DS1 Path OID (IDS1PathOid)

The DS1 Path OID is the source OID for any alarms related to DS1 port and link down.

Alarms supported by DS1 Path OID include:

- [DS1 Path Port Down](#)
- [DS1 Path Link Down](#)

The structure of the DS1 Path OID is:

```
{[ManagedElement(Key=element key)][PhysicalRoot][Chassis][Slot(SlotNum=slotnumber)][Module][Slot(SlotNum=slotnumber)][Module][Port(PortNumber=portnumber)][PhysicalLayer][Sonet_SdhHop(Id=hop identifier)][Lop(Id=LOP ID)]}
```



**Example**

```
{ [ManagedElement (Key=ana-dev-7609-1)] [PhysicalRoot] [Chassis] [Slot (SlotNum=8)] [Module \
] [Slot (SlotNum=1)] [Module] [Port (PortNumber=SONET
8/1/0)] [PhysicalLayer] [Sonet_SdhHop (Id=3)] [Lop (Id=3/5/3)] }
```

## DS3 Path OID (IDS3PathOid)

The DS3 Path OID is the source OID for any alarms related to DS3 port down.

Alarms supported by DS3 Path OID include:

- [DS3 Path Port Down](#)
- [DS3 Path Link Down](#)

The structure of the DS3 Path OID is:

```
{ [ManagedElement (Key=element key)] [PhysicalRoot] [Chassis] [Slot (SlotNum=slotnumber)] [Module \
] [Slot (SlotNum=slotnumber)] [Module] [Port (PortNumber=portnumber)] [PhysicalLayer] [Sonet_SdhHo
p (Id=hop identifier)] [Lop (Id=LOP ID)] }
```

**Example**

```
{ [ManagedElement (Key=ana-dev-7609-1)] [PhysicalRoot] [Chassis] [Slot (SlotNum=8)] [Module \
] [Slot (SlotNum=1)] [Module] [Port (PortNumber=SONET
8/1/0)] [PhysicalLayer] [Sonet_SdhHop (Id=3)] [Lop (Id=3/5/3)] }
```

## DWDM Controller OID (IDWDMOid)

The DWDM Controller OID is the IMO class of the DWDM controller. Alarms supported with the DWDM Controller OID include:

- [DWDM Controller Down](#)
- [DWDM G709 Status Down](#)

The structure of the DWDM Controller OID is:

```
{ [ManagedElement (Key=device name)] [PhysicalRoot] [Chassis] [Shelf (ShelfNum=shelfnumber)] [Slot (S
lotNum=slotnumber)] [Module] [Port (PortNumber=portnumber)] [PhysicalLayer] }
```

**Example**

```
{ [ManagedElement (Key=CRS1-simu-41)] [PhysicalRoot] [Chassis] [Shelf (ShelfNum=0)] [Slot (SlotNum
=5)] [Module] [Port (PortNumber=POS0/5/0/0)] [PhysicalLayer] }
```

## EFP OID (IEFPoid)

The structure of the EFP OID is:

```
{ [ManagedElement (Key=deviceName)] [LogicalRoot] [FWComponentContainer (Type=7)] [MpBgp] [Bg
pNeighbourEntry (PeerIdentifier=peerIP) (VrfName=vrfName)] }
```

**Example**

```
{ [ManagedElement (Key=PE3-NY-7300)] [LogicalRoot] [FWComponentContainer (Type=7)] [MpBgp] [BgpNe
ighbourEntry (PeerIdentifier=10.0.7.4) (VrfName=Red)] }
```

## IMA Service (IIMAGroupOid)

The IMA Service OID supports the ATM IMA Service alarm. The structure of the IMA Service OID is:

IIMAGroupOid:

```
{[ManagedElement(Key=ManagedElementkey)] [LogicalRoot] [PhysicalLayerAggregationContainer(Type=type)] [IMAGroup(Id=IMAGroupID)]}
```

### Example

```
{[ManagedElement(Key=vne-146)] [LogicalRoot] [PhysicalLayerAggregationContainer(Type=1)] [IMAGroup(Id=ATM8/1/ima10)]}
```

## IP Interface OID (IPInterfaceOid)

The IP Interface OID is the source OID for any alarms related to the IP interface.

Alarms supported by Cisco ANA with IP Interface source OID are:

- Interface Status
- HSRP Group Status Changed
- Dual Stack IP Changed

The structure of the IP Interface OID can be one of the following:

- IP interface under the global routing (RoutingEntity):  

```
{[ManagedElement(Key=deviceName)] [LogicalRoot] [FWComponentContainer(Type=1)] [RoutingEntity] [IpInterface(IpInterfaceName=ifName)]}
```
- IP interface under a VRF:  

```
{[ManagedElement(Key=deviceName)] [LogicalRoot] [FWComponentContainer(Type=3)] [Vrf(VrfName=vrfName)] [IpInterface(IpInterfaceName=ifName)]}
```

### Examples

IP Interface OID under the RoutingEntity:

```
{[ManagedElement(Key=PE2-TX-GSR)] [LogicalRoot] [FWComponentContainer(Type=1)] [RoutingEntity] [IpInterface(IpInterfaceName=POS0/0)]}
```

IP Interface OID under a VRF:

```
{[ManagedElement(Key=PE-South)] [LogicalRoot] [FWComponentContainer(Type=3)] [Vrf(VrfName=vrfA)] [IpInterface(IpInterfaceName=Serial2/0.400)]}
```

## L2TP Peer OID (IL2tpPeerOid)

Layer 2 Tunneling Protocol (L2TP) modeling in Cisco ANA is available only for Redback SMS devices. L2TP Peer is a component that is used to model administrative aspect of L2TP tunnels. It is basically an entity responsible for creating L2TP tunnels based on its configuration.

The L2TP Peer OID is the source OID for any alarms related to L2TP Peer components.

Alarms supported by Cisco ANA with L2TP Peer source OID are:

- L2TP Peer Not Established

- L2TP Session Threshold

The structure of the L2TP Peer OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][Context(ContextName=contextName)][FWComponentContainer(Type=6)][L2tpPeer(PeerName=peerName)]}
```

#### Example

```
{[ManagedElement(Key=redback)][LogicalRoot][Context(ContextName=l2tpCtx)][FWComponentContainer(Type=6)][L2TPPeer(PeerName=peer5)]}
```

## Logical Port OID (lLogicalPortOid)

A logical port represents a logical ATM/FrameRelay interface which is configured on top of a physical port. One physical port might have multiple logical ports. In ATM, logical ports are differentiated by VP muxing, that is, each logical port is configured with a range of VPIs. This type of configuration exists in Lucent GX/CBX, which are supported by Cisco ANA.

The Logical Port OID is the source OID for any alarms related to logical ports.

The alarm supported by Cisco ANA with the Logical Port source OID is:

- Logical Port Down

The structure of the Logical Port OID can be one of the following:

- Logical port on a module's physical port:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Slot(SlotNum=slotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer][VpMux][LogicalPort(LogicalPortNumber=logicalPortNum)]}
```

- Logical port on a submodule's physical port:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Slot(SlotNum=slotNum)][Module][Slot(SlotNum=subSlotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer][VpMux][LogicalPort(LogicalPortNumber=logicalPortNum)]}
```

- Logical port of a subport:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Slot(SlotNum=slotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer][SubPort(SubPortNumber=subPortNumber)][VpMux][LogicalPort(LogicalPortNumber=logicalPortNum)]}
```

## LSE Entry OID (lMplsEntryOid)

The LSE Entry OID is used as the source OID for any alarms related to LSE entries.

The alarm supported by Cisco ANA with the LSE Entry source OID is:

- Broken LSP Discovered

The structure of the LSE Entry OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][FWComponentContainer(Type=4)][Lse][LSEEntries(InLabel=inLabel)][MplsEntry(OutInterface=outIfOid)]}
```

The OutInterface is the IP interface OID of the outgoing interface.

**Example**

```
{ [ManagedElement (Key=PE1-NY-GSR)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] [LSEEntries (InLabel=74)] [MplsEntry (OutInterface={ [ManagedElement (Key=PE1-NY-GSR)] [LogicalRoot] [FWComponentContainer (Type=1)] [RoutingEntity] [IpInterface (IpInterfaceName=POS0/0)] })] ] }
```

**Note**

The structure of the OutInterface is a separate OID.

## LSE OID (ILseOid)

The Label Switching Entity (LSE) OID is used as the source for various alarms related to MPLS.

Alarms supported by Cisco ANA with LSE OID are:

- MPLS Black Hole Found
- MPLS Interface Removed
- LDP Neighbor Loss

The structure of the LSE OID is:

```
{ [ManagedElement (Key=deviceName)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] }
```

## Alarm Differentiators

Multiple alarms of the same type cannot have the same source. When this occurs, then the LSE OID is used as a base OID and is augmented with a differentiator. A specific alarm differentiator is used for each type of alarm.

The following examples show how specific alarm differentiators are used in the different types of alarms:

**Example 1**

MPLS Black Hole Found—[ServiceEvent(DiffObject=*ifName nextHop*)]

Source OIDs of MPLS Black Hole Found:

```
{ [ManagedElement (Key=RR1-IOU)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] [ServiceEvent (DiffObject=Ethernet0/0 192.168.1.210)] }
```

```
{ [ManagedElement (Key=RR1-IOU)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] [ServiceEvent (DiffObject=Ethernet0/0 192.168.1.310)] }
```

**Example 2**

MPLS Interface Removed—[ServiceEvent(DiffObject=*mplsIfDescr*)]

Source OIDs of MPLS Interface Removed:

```
{ [ManagedElement (Key=PE4-NY-7200)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] [ServiceEvent (DiffObject=MPLS on interface FastEthernet0/1)] }
```

```
{ [ManagedElement (Key=PE4-NY-7200)] [LogicalRoot] [FWComponentContainer (Type=4)] [Lse] [ServiceEvent (DiffObject=MPLS on interface FastEthernet0/2)] }
```

**Example 3**

LDP Neighbor Loss—[ServiceEvent(DiffObject=*peerLdpId*)]

Source OIDs of LDP Neighbor Loss:

```
{ [ManagedElement (Key=CORE2-NY-GSR) ] [LogicalRoot] [FWComponentContainer (Type=4) ] [Lse] [ServiceEvent (DiffObject=172.255.0.1:0) ] }
```

```
{ [ManagedElement (Key=CORE2-NY-GSR) ] [LogicalRoot] [FWComponentContainer (Type=4) ] [Lse] [ServiceEvent (DiffObject=172.255.0.1:5) ] }
```

## Managed Element OID (IManagedElementOid)

Managed Element represents the root component of the VNE. Any alarm related to the top-level component of the VNE will have the Managed Element OID as the source.

Alarms which have Managed Element OID as their source are:

- Device Unreachable
- Device Unsupported
- CPU Overutilized
- Module Unsupported (Investigation State)
- Adaptive Polling
- Cloud Problem (for cloud VNEs)

The structure of the Managed Element OID is:

```
{[ManagedElement(Key=deviceName)]}
```

**Example**

```
{ [ManagedElement (Key=PE4-NY-7200) ] }
```

## MLPPP OID (IMLPPPOid)

The MLPPP OID is the source OID for any alarms related to MLPPP. The structure of the MLPPP OID is:

```
{[ManagedElement(Key=mlppp-key)][LogicalRoot][Context(ContextName=Default context)][EncapsulationAggregationContainer(Type=type)][EncapsulationAggregation(Group=group)]}
```

**Example**

```
{ [ManagedElement (Key=mlppp-2) ] [LogicalRoot] [Context (ContextName=Default context) ] [EncapsulationAggregationContainer (Type=1) ] [EncapsulationAggregation (Group=200) ] }
```

## Module OID (IModuleOid)

The Module OID is the source OID for any alarms related to a card or module.

Alarms which have Module OID as their source are:

- Card Out

- Card Down

Possible structures of the Module OIDs are:

- Module under chassis:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Shelf(ShelfNum=shelfNum)][Slot(SlotNum=slotNum)][Module]}
```

- Module under other module (submodule):

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Shelf(ShelfNum=shelfNum)][Slot(SlotNum=slotNum)][Module][Slot(SlotNum=subSlotNum)][Module]}
```

Shelf is an optional part of the OID.

#### Example

```
{[ManagedElement(Key=CRS-1)][PhysicalRoot][Chassis][Shelf(ShelfNum=0)][Slot(SlotNum=4-Back)][Module][Slot(SlotNum=10)][Module]}
```

## MPBGP OID (IMpBgpOid)

The MPBGP OID will be the source OID for any alarms related to BGP service.

The alarm supported by Cisco ANA with MPBGP source OID is:

- BGP Process Down

The structure of the MPBGP OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][FWComponentContainer(Type=7)][MpBgp]}
```

#### Example

```
{[ManagedElement(Key=Juniper M5)][LogicalRoot][FWComponentContainer(Type=7)][MpBgp]}
```

## MPLS TE Tunnel OID (IMplsTETunnelOid)

The MPLS TE Tunnel OID is the source OID for any alarms related to MPLS TE tunnels.

The alarm supported by Cisco ANA with MPLS TE Tunnel source OID is:

- MPLS TE Tunnel Down

The structure of the MPLS TE Tunnel OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][FWComponentContainer(Type=1)][RoutingEntity][IpInterface(IpInterfaceName=ifName)][MplsTETunnel]}
```

#### Example

```
{[ManagedElement(Key=CRS1-PE)][LogicalRoot][FWComponentContainer(Type=1)][RoutingEntity][IpInterface(IpInterfaceName=tunnel-te0)][MplsTETunnel]}
```



#### Note

The structure of the OID is different when the IP interface is under a VRF (see [IP Interface OID \(IPInterfaceOid\)](#), page 40-4).

## Physical Layer OID (IPhysicalLayerOID)

The Physical Layer OID is the source OID for any alarm related to the physical layer of a port.

Alarms which have Physical Layer OID as their source are:

- Port Down
- Tx/Rx Utilization (no adjacent)
- Tx/Rx Dormant
- Dropped/Discarded Packets
- All IP Interfaces Down

The structure of the Physical Layer OID is:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Shelf(ShelfNum=shelfNum)][Slot(SlotNum=slotNum)][Module][Slot(SlotNum=subSlotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer]}
```

Optional parts of the OID are:

- Shelf
- Second-level slot
- Module representing submodule

PortNum can also be the port name (see the following examples).

### Examples

Source of port down where the port is on a submodule:

```
{[ManagedElement(Key=CRS-1)][PhysicalRoot][Chassis][Shelf(ShelfNum=0)][Slot(SlotNum=4-Back)][Module][Slot(SlotNum=4)][Module][Port(PortNumber=GigabitEthernet0/4/4/1)][PhysicalLayer]}
```

## Shelf OID (IShelfOID)

The Shelf OID is the source OID for any alarms related to shelf.

The alarm which has Shelf OID as its source is:

- Shelf Out

The structure of the Shelf OID is:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Shelf(ShelfNum=shelfNum)]}
```

### Example

```
{[ManagedElement(Key=CRS-1)][PhysicalRoot][Chassis][Shelf(ShelfNum=0)]}
```

## Topological Link OID (ITopologicalLinkOID)

The Topological Link OID is the source OID for any Link Down alarm. It has the following structure:

```
{[TopologicalLink(AEndPoint=AEndOID)(TunnelID=tunnelId)(ZEndPoint=ZEndOID)]}
```

- AEndOID, ZEndOID—The OIDs of the link endpoint components.

- TunnelID—Where multiple links can exist between two components, the TunnelID value is used to distinguish between the links.

## Supported Alarms with Topological Link OID Source

The alarms supported in Cisco ANA which have Topological Link OID source are:

- Link Down—Link down between physical ports, the endpoint OIDs of the physical layer. In this case, the TunnelId is not used and is set to -1. See [Link Down Endpoint OID Structure, page 40-10](#).



### Note

There are various alarm subtypes of link down (for example, Link Down to Admin Down, and Link Down on Unreachable). They all have the same source OID.

- Link Utilization—The source OID is the same as for link down.
- Tx/Rx Utilization—The source OID is the same as for link down where the physical layer component is adjacent.
- GRE Tunnel Down—The endpoint OIDs are the GRE tunnel endpoints. In this case, the TunnelID is not used and is set to -1. See [GRE Tunnel Endpoint OID Structure, page 40-11](#).
- Layer 2 Tunnel Down—The endpoint OIDs are the Layer 2 MPLS tunnel endpoints. In this case, the TunnelID is not used, nor is it initialized. See [Layer 2 MPLS Tunnel Endpoint OID Structure, page 40-11](#).
- BGP Link Down—The endpoint OIDs are the MpBGP. In this case, the TunnelID is not used, nor is it initialized. See [BGP Link Down Endpoint OID Structure, page 40-11](#).
- DS1 Path Link Down—See [DS1 Path Link Down, page 41-19](#).
- DS3 Path Link Down—See [DS3 Path Link Down, page 41-20](#).
- MLPPP Down Due to Admin Down—See [MLPPP Bundle, page 41-33](#).
- MLPPP Down Due to Oper Down—See [MLPPP Bundle, page 41-33](#).

## Link Down Endpoint OID Structure

The structure of the Link Down Endpoint OID is:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Shelf(ShelfNum=shelfNum)][Slot(SlotNum=slotNum)][Module][Slot(SlotNum=subSlotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer]}
```

Optional parts of the Link Down Endpoint OID are:

- Shelf
- Second-level slot
- Module representing a submodule

PortNum can also be the port name (see the following examples).



### Examples

Source of link down where the physical ports are on a module:

```
{ [TopologicalLink (AEndPoint={ [ManagedElement (Key=PE3-NY-7300)] [PhysicalRoot] [Chassis] [Slot (SlotNum=1)] [Module] [Port (PortNumber=FastEthernet1/1)] [PhysicalLayer]]) (TunnelID=-1) (ZEndPoint={ [ManagedElement (Key=PE1-NY-GSR)] [PhysicalRoot] [Chassis] [Slot (SlotNum=1)] [Module] [Slot (SlotNum=1)] [Module] [Port (PortNumber=GigabitEthernet1/1/2)] [PhysicalLayer]]) ) ] }
```

Source of link down where the physical port of AendPoint is on a submodule:

```
{ [TopologicalLink (AEndPoint={ [ManagedElement (Key=PE1-NY-GSR)] [PhysicalRoot] [Chassis] [Slot (SlotNum=1)] [Module] [Slot (SlotNum=1)] [Module] [Port (PortNumber=GigabitEthernet1/1/1)] [PhysicalLayer]]) (TunnelID=-1) (ZEndPoint={ [ManagedElement (Key=NPE1-NY-7600)] [PhysicalRoot] [Chassis] [Slot (SlotNum=4)] [Module] [Port (PortNumber=FastEthernet4/48)] [PhysicalLayer]]) ) ] }
```

See also, [DS3 Path OID \(IDS3PathOid\)](#), page 40-3, [DS3 Path OID \(IDS3PathOid\)](#), page 40-3, [MLPPP OID \(IMLPPPOid\)](#), page 40-7.

## GRE Tunnel Endpoint OID Structure

The structure of the GRE Tunnel Endpoint OID is:

```
{ [ManagedElement (Key=deviceName)] [LogicalRoot] [Context (ContextName=contextName)] [TunnelContainer (TunnelType=4)] [TunnelGre (TunnelName=tunnelName)] }
```

### Examples

Source of GRE Tunnel Down alarm:

```
{ [TopologicalLink (AEndPoint={ [ManagedElement (Key=PE-East-IOU-158)] [LogicalRoot] [Context (ContextName=Default context)] [TunnelContainer (TunnelType=4)] [TunnelGre (TunnelName=Tunnel1)] }) (TunnelID=-1) (ZEndPoint={ [ManagedElement (Key=PE-South-IOU-158)] [LogicalRoot] [Context (ContextName=Default context)] [TunnelContainer (TunnelType=4)] [TunnelGre (TunnelName=Tunnel1)] }) ) ] }
```

Layer 2 Tunnel Down—The endpoint OIDs are the Layer 2 MPLS tunnel endpoints. In this case, the TunnelID is not used and is not initialized.

## Layer 2 MPLS Tunnel Endpoint OID Structure

The structure of the Layer 2 MPLS Tunnel Endpoint OID is:

```
{ [ManagedElement (Key=deviceName)] [LogicalRoot] [Context (ContextName=contextName)] [TunnelContainer (TunnelType=1)] [PTPLayer2MplsTunnel (PeerRouterIp=peerRouterIP) (TunnelId=tunnelId)] }
```

### Example

Source of Layer 2 Tunnel Down:

```
{ [TopologicalLink (AEndPoint={ [ManagedElement (Key=NPE1-NY-7600)] [LogicalRoot] [Context (ContextName=Default context)] [TunnelContainer (TunnelType=1)] [PTPLayer2MplsTunnel (PeerRouterIp=172.255.1.5) (TunnelId=100)] }) (TunnelID=) (ZEndPoint={ [ManagedElement (Key=PE4-NY-7200)] [LogicalRoot] [Context (ContextName=Default context)] [TunnelContainer (TunnelType=1)] [PTPLayer2MplsTunnel (PeerRouterIp=172.255.1.3) (TunnelId=100)] }) ) ] }
```

## BGP Link Down Endpoint OID Structure

The structure of the MpBGP Link Down Endpoint OID is:

```
{[ManagedElement(Key=deviceName)][LogicalRoot][FWComponentContainer(Type=7)]
[TunnelId=tunnelId]}
```

### Example

Source of BGP Link Down:

```
{[TopologicalLink(AEndPoint={ [ManagedElement (Key=PE-East-IOU-159) ] [LogicalRoot] [FWComponentContainer (Type=7) ] [MpBgp] }) (TunnelID=-1) (ZEndPoint={ [ManagedElement (Key=RR2-IOU-159) ] [LogicalRoot] [FWComponentContainer (Type=7) ] [MpBgp] }) ] }
```

## VLAN Tagged Interface OID (IVlanTaggedInterfaceOID)

The VLAN Tagged Interface OID is used as the source OID for alarms related to QinQ or stacked VLANs, such as Subinterface Down.

A subinterface is a logical division of traffic on an interface, such as multiple subnets across one physical interface. A subinterface name is represented as an extension to an interface name using dot notation, such as Interface Gigabit Ethernet 0/1/2/3.10. In this example, the main interface name is Gigabit Ethernet 0/1/2/3 and the subinterface is 10.

The structure of the VLAN Tagged Interface OID is:

```
{[ManagedElement(Key=deviceName)][PhysicalRoot][Chassis][Slot(SlotNum=slotNum)][Module][Slot(SlotNum=subSlotNum)][Module][Port(PortNumber=portNum)][PhysicalLayer][DataLinkLayer][VlanEncapMux][VLANTaggedInterface(InterfaceName=subInterfaceName)]}
```

### Example

```
{[ManagedElement (Key=10.56.101.133) ] [PhysicalRoot] [Chassis] [Slot (SlotNum=4) ] [Module] [Slot (SlotNum=0) ] [Module] [Port (PortNumber=GigabitEthernet4/0/2) ] [PhysicalLayer] [DataLinkLayer] [VlanEncapMux] [VLANTaggedInterface (InterfaceName=GigabitEthernet4/0/2.1) ] }
```

## VSI OID (IVSIID)

The VSI OID is used as a source for VSI IMOs and VSI alarms including VSI Admin Down, VSI Down, and VSI Up.

The VSI OID is structured so that the VPLS name and VPN ID are identifiers for the VSI entity concatenated to the logical context OID.

### Example

```
[ManagedElement (Key=7606S-PE1) ] [LogicalRoot] [Context (ContextName=Default context) ] [FWComponentContainer (Type=10) ] [VSI (VplsInstanceName=eli_VFI) (VpnId=101) ] }
```



# CHAPTER 41

## Supported Service Alarms

---

These topics describe the service alarms supported by Cisco ANA:

- [Service Alarms, page 41-2](#)
- [Registry Parameters, page 41-42](#)

Each alarm is described in a section containing:

- A short description, including background about the network state or system (Cisco ANA) state that caused the alarm. The short description of the service alarm is what appears in the ticket, in the Service tab of Cisco ANA EventVision. The short description for each type and subtype can be viewed in [Registry Parameters, page 41-42](#).

When a flapping event occurs, the short description is changed.



### Note

The name of the service alarm is the same as the short description.

- A table of all the subtype events that represent one of the states the alarm can be in, and a description of when they are issued. For example, the Link Down alarm can have multiple subtype events (states) which include Link Down Due to Admin Down, Link Down Due to Oper Down, and Link Up. The description also shows if the event is a clearing event.
- Information related to the correlation of the alarm, mainly:
  - The alarm issue correlation process and location (local or network).
  - If other alarms can correlate to this alarm.
  - The keys that are used in the correlation process.
  - The specific correlation filters in use for the alarm, if any. The filter indicates if a specific event cannot be selected as the root cause event in the correlation process.
- By default, any new event filters the following events: Cloud Problem, BGP Process Down, LDP Neighbor Down, MPLS Interface Removed, the event itself, and events with lower or equal correlation weight.

Each section describes a group of alarms sharing the same event type.

# Service Alarms

The following service alarms are supported in Cisco ANA:

- [Adaptive Polling, page 41-3](#)
- [All IP Interfaces Down, page 41-4](#)
- [All IP Interfaces Down, page 41-4](#)
- [BGP Link Down, page 41-5](#)
- [BGP Neighbor Loss, page 41-6](#)
- [BGP Process Down, page 41-8](#)
- [Broken LSP Discovered, page 41-8](#)
- [Card Down, page 41-11](#)
- [Card Out, page 41-12](#)
- [CFM Domain Fault, page 41-12](#)
- [Cloud Problem, page 41-13](#)
- [Component Unreachable, page 41-14](#)
- [CPU Utilization, page 41-16](#)
- [Device Unsupported, page 41-17](#)
- [Discard Packets, page 41-17](#)
- [Dropped Packets, page 41-18](#)
- [DS0 Bundle Service Alarm, page 41-19](#)
- [DS1 Path Link Down, page 41-19](#)
- [DS1 Path Port Down, page 41-20](#)
- [DS3 Path Link Down, page 41-20](#)
- [DS3 Path Port Down, page 41-21](#)
- [Dual Stack IP Changed, page 41-21](#)
- [DWDM Controller Down, page 41-22](#)
- [DWDM G709 Status Down, page 41-22](#)
- [EFP Down, page 41-23](#)
- [GRE Keepalive, page 41-23](#)
- [GRE Tunnel Down, page 41-24](#)
- [HSRP Group Status Changed, page 41-24](#)
- [Interface Status, page 41-25](#)
- [Investigation State, page 41-26](#)
- [L2TP Peer Not Established, page 41-27](#)
- [L2TP Sessions Threshold, page 41-28](#)
- [Layer 2 Tunnel Down, page 41-28](#)
- [LDP Neighbor Loss, page 41-29](#)
- [Link Down, page 41-30](#)

- [Link Utilization, page 41-31](#)
- [Logical Port Down, page 41-32](#)
- [Memory Utilization, page 41-33](#)
- [MLPPP Bundle, page 41-33](#)
- [MPLS Black Hole Found, page 41-34](#)
- [MPLS Interface Removed, page 41-35](#)
- [MPLS TE FRR State Changed, page 41-35](#)
- [MPLS TE Tunnel Down, page 41-36](#)
- [Port Down, page 41-37](#)
- [Rx Dormant, page 41-37](#)
- [Rx Utilization, page 41-38](#)
- [Shelf Out, page 41-38](#)
- [Subinterface Down, page 41-39](#)
- [Tx Dormant, page 41-40](#)
- [Tx Utilization, page 41-40](#)
- [VSI Down, page 41-41](#)

## Adaptive Polling

Adaptive polling is a mechanism that handles situations in which the device CPU is crossing a predefined, configurable threshold. It reduces the polling when the CPU reaches high threshold values for a configurable sample, and returns the polling to a normal rate when the CPU reaches the lower threshold. Where the CPU stays high for several samplings, the VNE is automatically moved to the maintenance state to avoid continuous polling of the device.

In all cases, alarms are issued when the device or the VNE state changes.

**Table 41-1**      **Adaptive Polling—Subtype Events**

| Subtype Event Name                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">VNE Switched to Low Polling Rate Due to CPU High Usage</a> | Issued when the CPU level has been above the high threshold (configurable, default=90%) for several samplings (configurable, default=5). The polling rate of the device is lowered by adding a delay between requests (default delay is 500 msec).                                                                                                                                                                                                                                      |
| <a href="#">VNE Switched Back to Regular Polling Rate</a>              | Clearing event. Issued when the CPU level has been below the lower threshold (configurable, default=70%) for several samplings (configurable, default=2). The polling rate of the device is changed back to normal (no delay between requests).                                                                                                                                                                                                                                         |
| <a href="#">VNE Switched to Maintenance Mode Due to CPU High Usage</a> | <p>Issued when the VNE polling rate is lower but the CPU stays high for several samplings (configurable, default=10). The VNE is automatically moved to the maintenance state, which means it stops polling the device.</p> <p>This state cannot be automatically cleared when the CPU usage decreases; the user must manually change the VNE state from the maintenance state to Start (as described in <a href="#">Cisco Active Network Abstraction 3.7 Administrator Guide</a>).</p> |

## Correlation

The alarm correlates to other alarms using the local correlation mechanism with the ManagedElement key. No other alarms can correlate to it.

## Source OID

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

# All IP Interfaces Down

The All IP Interfaces Down alarm is used when *all* IP interfaces configured on the same port are down, and implies that another fault has occurred in lower layers (such as the physical layer). In this case, one alarm is issued, and all IP interface status alarms are correlated to it.

**Table 41-2** All IP Interfaces Down—Subtype Events

| Subtype Event Name                         | Description                                                                                         |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <a href="#">All IP Interfaces Down</a>     | Issued when all the IP interfaces configured above a physical interface change their state to down. |
| <a href="#">Active IP Interfaces Found</a> | Clearing event. Issued when at least one of the IP interfaces changes its state to up.              |

## Correlation

The alarm correlates to other alarms using the local correlation mechanism with the PortLayer1 key representing the physical layer. The PortLayer1 key is the port that all the IP interfaces were configured on.

Other alarms might correlate to this alarm using the physical port key, in particular the Interface Status Down alarm.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

# ATM IMA Service

The ATM IMA Service alarm is generated by the IMA group. IMA Group Down events are generated when the number of IMA group members is reduced by a user-defined percentage configured in the registry. The severity depends on the percentage of member removed. To avoid false correlations, the events are combined with the IMA group status. An IMA group down generates the highest severity. Other severities are user-defined.

**Table 41-3** ATM IMA Service Alarm

| Subtype Event Name             | Description                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------------------|
| <a href="#">IMA Admin Down</a> | Generated when the IMA group is administratively shut down. All the members are correlated to this event. |
| <a href="#">IMA Oper Down</a>  | Generated when the IMA group is operationally down.                                                       |

**Table 41-3**      **ATM IMA Service Alarm (continued)**

| Subtype Event Name                       | Description                                                                                               |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <a href="#">High Priority IMA Down</a>   | Generated when IMA members are removed based on the user-defined minimum input. Its severity is critical. |
| <a href="#">Medium Priority IMA Down</a> | Generated when IMA members are removed based on the user-defined minimum input. Its severity is major.    |
| <a href="#">Low Priority IMA Down</a>    | Generated when IMA members are removed based on the user-defined minimum input. Its severity is minor.    |

### Correlation

The IMA Admin Down alarm can be the root cause of other events, but other ATM IMA events cannot be root cause of other events. No events are correlated.

### Impact Analysis

No impact analysis is performed for this alarm.

### Source OID

See [IMA Service \(IIMAGroupOid\)](#), page 40-4.

## BGP Link Down

When a connection between two BGP peers is lost, no route information is exchanged between the two peers. This situation affects the network connectivity because route entries which are not refreshed start to be dropped from the routing table, causing packets to be dropped.

In this scenario, when a BGP neighbor has an adjacent peer (meaning that it is connected to another BGP neighbor with a discovered link), a BGP Link Down alarm is issued. When the adjacent peer is not managed, a BGP Neighbor Loss alarm is issued. A VNE identifies this situation based on changes in the BGP neighbor table of the device.

Due to the nature of this fault, it is possible that one of the devices may be unreachable. In this case, the respective VNE does not identify the changes in the BGP neighbor table of the unreachable device, but a BGP Link Down is still issued.

A negotiation process between the two link edges is issued when the BGP neighbor entry state changes from Established, indicating that a BGP Link Down should be invoked.

**Table 41-4**      **BGP Link Down—Subtype Events**

| Subtype Event Name | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BGP Link Down      | Issued when a BGP neighbor entry has changed its state from Established to another state, or a BGP neighbor entry that had an Established state has been removed from the BGP neighbors table and the entry has an adjacent peer.<br><br>BGP neighbor state complies with the definitions in BGP4-MIB::bgpPeerState (1.3.6.1.2.1.15.3.1.2). In the case of a state change, any state other than Established implies the connection between the BGP peers is not fully functioning, meaning route information is not exchanged. |
| BGP Link Down VRF  | Issued in the same conditions as the BGP Link Down alarm except that the neighbor is defined in the context of a VRF (BGP connection between PE router and CE router).                                                                                                                                                                                                                                                                                                                                                         |
| BGP Link Up        | Clearing event. Issued when one of the edge BGP neighbor entries has changed its state from any state other than Established to Established. This is the clearing alarm for both the BGP Link Down alarms previously described.                                                                                                                                                                                                                                                                                                |

**Correlation**

The alarm correlates to other alarms using the network correlation mechanism that runs a forward IP flow to the BGP neighbor peer IP. This flow runs a forward flow from each of the BGP neighbors to its peer IP, and might collect the following alarms: Interface Status Down, Port Down, Link Down, Device Unreachable, and so on.

Other alarms might correlate to it using the MPBgp key or the MPBgp key concatenated with the neighbor peer IP. Furthermore, the relevant BGP Neighbor Down syslogs are correlated to the service alarm.

**Note**

The BGP Link Down and BGP Link Down VRF alarms do not filter out the BGP Process Down alarm in the correlation process.

**Source OID**

See [MPBGP OID \(IMpBgpOid\)](#), page 40-8.

**BGP Neighbor Loss**

If BGP connectivity to a specific device in an MPLS VPN network is lost, VPN sites lose connectivity. The VNE models the BGP connection between routers and actively monitors its state. A BGP Neighbor Loss alarm is generated from both sides of the connection when a connectivity loss occurs. Alarms and tickets are issued and impact analysis information displayed.

The correlation engine identifies various faults that affect the BGP connection and reports them as the root cause for the BGP Neighbor Loss alarm, for example, Link Down, CPU Overutilized, and Link Data Loss.

**Note**

BGP Neighbor Loss alarms are not correlated to each other. They are correlated to the root cause of the connectivity loss.



The BGP Neighbor Loss alarm is detected actively by the system, and service alarms are generated. The system also supports BGP neighbor down syslogs.

When the VNE BGP component polls the BGP neighbor status (expedite or normal polling) and finds that an entry for a neighbor no longer exists or its state changed from Established to another state, the BGP component issues a BGP Neighbor Loss alarm. This alarm causes the BGP component to issue a Root Cause Analysis (RCA) correlation flow to find the root cause. If RCA does not find an alarm to correlate, the VNE sends the alarm to the gateway as a ticket.

If a BGP neighbor loss occurs and the BGP component has no other BGP PE links, all VRFs with route entries to the PE as BGP next hops are true-affected. This information is sent as an update to the previous BGP Neighbor Loss alarm.

**Table 41-5** *BGP Neighbor Loss—Subtype Events*

| Subtype Event Name    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BGP Neighbor Loss     | Issued when a BGP neighbor entry has changed its state from Established to another state, or when a BGP neighbor entry with the Established state has been removed from the BGP neighbors table.<br><br>BGP neighbor state complies with the definitions in BGP4-MIB::bgpPeerState (1.3.6.1.2.1.15.3.1.2). In the case of a state change, any state other than Established implies that the connection between the BGP peers is not fully functioning, meaning that the route information is not exchanged. |
| BGP Neighbor Loss VRF | Issued in the same conditions as the BGP Neighbor Loss alarm, except that the neighbor is defined in the context of a VRF (BGP connection between PE router and CE router).                                                                                                                                                                                                                                                                                                                                 |
| BGP Neighbor Found    | Clearing event. Issued when a BGP neighbor entry has changed its state from any state other than Established to the Established state, or a new BGP neighbor entry that has an Established state has been discovered in the BGP neighbors table. This is the clearing alarm of both neighbor loss alarms previously described.                                                                                                                                                                              |

## Correlation

The alarm correlates to other alarms using the network correlation mechanism that runs a forward IP flow to the BGP neighbor peer IP. This flow runs a forward flow from each of the BGP neighbors to its peer IP, and might collect the following alarms: Interface Status Down, Port Down, Link Down, Device Unreachable, and so on.

Other alarms might correlate to it using the MPBgp key or the MPBgp key concatenated with the neighbor peer IP. Furthermore, the relevant BGP Neighbor Down syslogs are correlated to the service alarm.



### Note

The BGP Neighbor Loss and BGP Neighbor Loss VRF alarms do not filter out the BGP Process Down alarm in the correlation process.

## Impact Analysis

The alarm issues an impact analysis process that calculates the affected services of this fault. In this case, the affected service is represented as a pair of VRFs that cannot communicate due to this BGP Neighbor Loss fault.

The affected pair (service) can be marked as potentially affected or real affected. In this case, because the BGP reports on a neighbor loss only after a hold-time interval (default 180 sec), in which it did not get the hello message from its neighbor, it assumes that the connection was lost and cannot be recovered. The identified affected pairs are marked as real affected.

#### Source OID

See [MPBGP OID \(IMpBgpOid\)](#), page 40-8.

## BGP Process Down

A Cisco ANA query checks the status of the BGP process when the VNE BGP component polls for the status and configuration of its BGP neighbors (expedite or normal polling). If the BGP process is not running, the VNE BGP component issues a BGP Process Down alarm. This alarm is always a ticket and does not try to correlate to other alarms. All BGP Neighbors Down alarms issued in response to the BGP Process Down alarm are correlated to the BGP Process Down ticket.

**Table 41-6** BGP Process Down—Subtype Events

| Subtype Event Name               | Description                                                                                                                                                                              |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">BGP Process Down</a> | Issued when the BGP process/service is down after it was up. The BGP component in the VNE identifies this change, updates its state, and issues the alarm.                               |
| <a href="#">BGP Process Up</a>   | Clearing event. Issued when the BGP process/service changes its state back to up. The BGP component in the VNE identifies this change, updates its state, and issues the clearing alarm. |

#### Correlation

Due to the nature of this alarm, it cannot be correlated to other alarms, thus this alarm does not try to run any correlation process.

Other alarms might correlate to it using the MPBgp key, in particular BGP Neighbor Loss alarms caused by this failure correlate to it.

#### Source OID

See [MPBGP OID \(IMpBgpOid\)](#), page 40-8.

## Broken LSP Discovered

A Broken LSP Discovered alarm is issued as a companion to the MPLS Black Hole Found alarm (see [MPLS Black Hole Found](#), page 41-110.)

A Broken LSP Discovered event means that an LSP, at some point, went through an MPLS black hole. Because of this, the MPLS labels were removed from the packet, and one of the following scenarios occurs:

- If the packet contains more than one MPLS label (data contained in the packet is VPN traffic), the packet is dropped or is forwarded to an incorrect destination. This happens because the IP header in the packet belongs to a different routing domain.

- If the packet contains only one MPLS label (data contained in the packet belongs to the same routing domain), the packet continues to be forwarded based on the IP header information instead of the MPLS labels. This is not a problem.

The following information applies to the Broken LSP Discovered alarm:

- This alarm does not have a clearing alarm, which means that after it is issued, its severity cannot be changed.
- To overcome the previous limitation, the alarm auto-clear flag is set to true. This means that this alarm severity does not have an impact on the severity of other alarms that it correlates to.
- Though the Broken LSP Discovered alarm is issued as a companion to the MPLS Black Hole Found, it does not imply that it is issued from the same device that issued the MPLS Black Hole Found alarm.

After an MPLS Black Hole Found alarm is issued, a process starts and looks for broken LSPs that go through this MPLS black hole. The process of discovering the broken LSPs is as follows:

1. At the VNE on which the MPLS Black Hole Found was issued, all label switching entries that were destined for the black hole have an untagged out label. All MPLS labels are removed from packets traversing using this label switching entry.
2. Each untagged label switching entry starts traversing the LSP using a backward flow.



**Note** The direction of a backward flow traversing the VNE model is opposite that of a standard packet flow traversing the network.

3. On each device traversed in the backward flow, Cisco ANA checks for configured MPLS-based services on the device. The following identification services are supported:
  - Existence of VRFs (BGP/MPLS VPN services based on RFC2547).
  - Existence of MPLS Layer2 tunnels (PWE3 services based on RFC4448).
4. If the device contains such services, a Broken LSP Discovered alarm is issued for each LSP traversed backward to that point.

This means that only PE routers issue such alarms. It is possible that the same LSP has entry points in multiple devices, and thus multiple alarms are issued for it.

5. Information that is important for each broken LSP alarm issued is the entry point (label switching entry) and the exit point (the IP subnet destination).

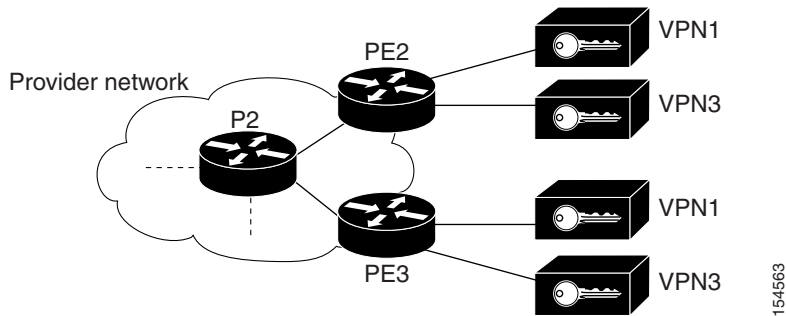
This information is used in the impact analysis process to identify the relevant affected pairs (services).

In the network described in [Figure 41-1](#), the shortest path from PE2 to PE3 is PE2 < > P2 < > PE3. The link between P2 and PE3 is an MPLS link, meaning interfaces on both sides of the link are configured as MPLS interfaces. Also assume that for some reason, the MPLS configuration is incomplete or incorrect; for example:

- Only one interface is configured as an MPLS interface.
- The label distribution protocol is configured differently on both interfaces (protocol mismatch).

In this case, the label switching table on P2 and PE3 will have untagged entries for the LSPs between PE2 and PE3. If PE2 and PE3 have VPN services (for example VRFs and pseudowires), the outcome will be that the data flow between PE2 and PE3 will be affected.

**Figure 41-1 Example of an MPLS Black Hole Scenario**



In this case, Cisco ANA does the following:

- Identifies untagged label switching entries on P2 and PE3.
- Issues MPLS Black Hole Found alarms on the interfaces on both sides of the link (since the LSP is unidirectional).
- Initiates a backward flow starting from the link on the specific untagged entries and identifies the two LSPs traversing the link:
  - LSP from PE2 to PE3
  - LSP from PE3 to PE2
- Issues Broken LSP Discovered alarms on both LSPs in PE2 and PE3, which are correlated to the corresponding MPLS Black Hole Found alarm.



**Note**

The clearing alarm does not activate flows to locate the LSPs that were passing through it in order to issue a clearing alarm for Broken LSPs, but rather uses the auto-clear functionality. The gateway periodically reviews the tickets and checks if all the alarms under each ticket are cleared or configured as auto-cleared alarms and whether the gateway correlation timeout has passed, in which case the gateway closes the ticket.

After the MPLS Black Hole alarm clears, and the configured gateway correlation timeout period is reached, the gateway can close the ticket because all the alarms correlated to MPLS Black Hole and Broken LSP are auto-cleared.



**Note**

If an MPLS Network Link Down event causes an IP reroute and an LDP redistribution, new LSPs might be redirected through nonMPLS segments, which will create a black hole. In this case, Broken LSP Discovered alarms are issued. However, the discovered broken LSPs are correlated to the Link Down alarm and not to the MPLS Black Hole Found alarm.

**Table 41-7 Broken LSP Discovered—Subtype Events**

| Subtype Event Name    | Description                                                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Broken LSP Discovered | Issued as a companion to the MPLS Black Hole Found alarm as described previously. For every LSP traversing the black hole, a Broken LSP Discovered alarm is issued. There is no clearing event. |

## Correlation

This alarm is correlated by definition to one of the following:

- The MPLS Black Hole Found that triggered the discovery of this broken LSP.
- Link Down alarm, if the link down caused the MPLS traffic to change its course and pass through the black hole.

No other alarms can correlate to it.

## Impact Analysis

The alarm issues an impact analysis process that identifies the local affected services of this fault. In this case, affected services can be of two types:

- A pair of VRFs that cannot communicate due to this broken LSP (for BGP/MPLS VPN services).
- A pair of MPLS Layer 2 tunnel edges representing a PWE3 service endpoint.

The affected pairs in this alarm are marked as potentially affected.



### Note

The system can be configured to present the affected pairs for BGP/MPLS VPN services as pairs of VRF IP interfaces instead of just the VRFs. This creates, in most cases, additional pairs that might cause a load on the system. Configuring them as IP interfaces is disabled by default.

## Source OID

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7 (the LSE entry that is the entry point to the broken LSP).

## Card Down

The Card Down alarm represents a state in which a card is not operational. This can be caused by a hardware failure, or by changing the administrative state of the card.

**Table 41-8**      **Card Down—Subtype Events**

| Subtype Event Name        | Description                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Card Down</a> | Issued when the operational state of a card is changed to down. This can be caused by a hardware failure, or by changing the administrative state of the card |
| <a href="#">Card Up</a>   | Clearing event. Issued when the operational state of the card changes back to up.                                                                             |

## Correlation

Due to the nature of this alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

Other alarms might correlate to it using the Card key.

## Source OID

See [Module OID \(IModuleOid\)](#), page 40-7.

## Card Out

The Card Out alarm represents a state where a card is removed from the device. The Card Out alarm is also issued when a device stops reporting on the existence of a card due to another failure, even if the card is actually still in the device. It is assumed that any functionality that was implemented by the card is not working anymore if the card had no redundancy configuration.



**Note**

When a Card Out alarm occurs, Cisco ANA NetworkVision displays an alarm icon next to the affected card in the inventory display. Even though the card has been physically removed, it is still displayed in Cisco ANA NetworkVision so that you can identify which network element is generating the alarm.

**Table 41-9**      **Card Out—Subtype Events**

| Subtype Event Name          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Card Out</a>    | Issued when a card is removed from the device. It is possible that some card failures are identified as Card Out because the device does not report on the card's existence after a failure.                                                                                                                                                                                                                                                                                 |
| <a href="#">Subcard Out</a> | Issued when a card that is contained in another card is removed from the device. When a card that contains other cards is removed, in addition to the Card Out alarm issued on the main card, a Subcard Out alarm is issued for each of its subcards. It is possible that some failures of cards that contain subcards are identified as Card Down on the parent card and Subcard Out for the subcards, because the device stops reporting on the existence of the subcards. |
| <a href="#">Card In</a>     | Clearing event. Issued when the card is inserted back into the device.                                                                                                                                                                                                                                                                                                                                                                                                       |

### Correlation

Due to the nature of the Card Out alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket. The Subcard Out alarm correlates to other alarms using the local correlation mechanism with Subcard key and its parent Card key.

Other alarms might correlate to it using the Card and Subcard keys.

### Source OID

See [Module OID \(IModuleOid\)](#), page 40-7.

## CFM Domain Fault

The CFM Domain Fault service alarm is created for every CFM domain having at least one event attached to an entity belonging to that domain (Maintenance Association, Maintenance End Point, and Remote Maintenance End Point). The CFM Domain Fault service alarm is cleared after all the correlated events are cleared.

Events can be aggregated as long as they have a common source OID.

The CFM application is used to aggregate the different CFM syslogs/traps by domain.

The domain OID is contained in the MEP OID.

**Table 41-10 CFM Domain Fault**

| Subtype Event Name          | Description                                                                                                                                                            |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CFM Domain Aggregation Down | Created for every domain having at least one event attached to an entity belonging to the domain: Maintenance Association, Maintenance End Point (MEP), or Remote MEP. |
| CFM Domain Aggregation Up   | Issued after all correlated events are cleared.                                                                                                                        |

**Correlation**

Because Cisco ANA does not discover CFM topologies, CFM event correlation is not available.

**Source OID**

IMaintenanceDomainOID

## Cloud Problem

Cloud VNEs represent unmanaged network segments, so that operations such PathTracer and Root Cause Analysis (RCA) can be viewed or processed end-to-end. A Cloud VNE represents the unmanaged segment of a network as a single device to which two or more managed segments of the network can be connected.

In a network in which a segment of the network is unmanaged, Cisco ANA runs a correlation flow to find the root cause. If no root cause is found within the managed segment, a Cloud Problem service alarm is created, to which events are correlated.

**Table 41-11 Cloud Problem—Subtype Events**

| Subtype Event Name | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cloud Problem      | <p>An alarm might use network correlation using IP-based forward flow to a destination. During the flow, the alarm collects possible alarms with which to correlate. If it can find no such alarms, and the flow has traversed a Cloud VNE (a network segment unmanaged by Cisco ANA), at the end of the flow a Cloud Problem alarm is issued. The original alarm is correlated to it.</p> <p>This alarm does not have a clearing alarm, thus the severity of the Cloud Problem alarm is informational.</p> |

**Correlation**

Due to the nature of the Cloud Problem alarm, the event does not try to correlate to another event, but creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

**Note**

When required, a correlation filter filters the Cloud Problem alarm. This enables or disables the ability of an alarm to create a Cloud Problem alarm and to correlate to it. The default value is false for all alarms in the system, meaning that an alarm does not correlate to the Cloud Problem alarm by default. However, there are several events that override the default configuration (these events are specific to Cisco devices) and are set to true, as follows:

- BGP Neighbor Down syslog
- OSPF Neighbor Loss syslog
- EIGRP Router Query to Neighbors Timeouted syslog

As described previously, other alarms might be correlated to it using the logic in the Cloud Problem subalarm. See [Cloud Problem, page 41-13](#).

**Note**

The Cloud Problem alarm does not filter the BGP Process Down alarm in the correlation process.

**Source OID**

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

## Component Unreachable

A VNE might be configured to poll its respective device in multiple network protocols (for example both SNMP and Telnet). In addition, each protocol can be configured for reachability testing. This means that when the VNE stops responding using a protocol, the device is considered unreachable.

**Table 41-12**      *Component Unreachable—Subtype Events*

| Subtype Event Name                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Component Unreachable</a> | <p>Issued when the device is not responding to at least one of the network protocols that are configured for reachability.</p> <p>The VNE uses a retry mechanism to make sure the problem persists for a certain configurable duration before issuing an alarm. This means that it is resilient during short periods of network packet loss.</p> <p><b>Note</b> Cisco ANA will generate Device Unreachable events, with corresponding SNMP Timeout messages in the AVN log file, for devices with nonunique SNMP engine IDs. These IDs are normally derived from the device's unique MAC address and assigned automatically. They can also be user-customized. We recommend that you avoid custom SNMP engine IDs. If you do use them, make sure they are unique.</p> |
| <a href="#">Component Reachable</a>   | Clearing event. Issued when the device responds to all the network protocols that are configured for reachability.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Source OID**

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7 (the managed element of the Cloud VNE).



## Checking Reachability

Reachability used by the VNEs (to check the reachability between the VNEs and network elements) depends on the configuration of the VNE, and involves multiple connectivity tests using SNMP, Telnet/SSH, and ICMP, as appropriate.

The following table describes the various situations where an NE fails to respond to the protocols:

**Table 41-13 Unreachable Network Elements**

| VNE Type    | Protocol Used to Check Reachability                                                                                                                                                                                                                                                                                                                                              | Action Taken When NE Fails to Respond                                                                                                                                                                                                                                                                                                                           | Action Taken When NE is Reachable                                                                                                                                                             |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ICMP VNE    | ICMP only. During the ICMP test, the unit pings the NE every configured interval.                                                                                                                                                                                                                                                                                                | ICMP ping is suspended, and a VNE Unreachable event is sent to the Cisco ANA Gateway. Thereafter, only the reachability tests are run to detect when the device is reachable again.                                                                                                                                                                             | ICMP ping is restarted, and the alarm is cleared.                                                                                                                                             |
| Generic VNE | <ul style="list-style-type: none"> <li>SNMP only (default). Polls the sysoid of the NE using an <b>SNMP get</b> command during the SNMP reachability test, and expects to receive a response; or</li> <li>SNMP only (default), and adding an ICMP test.</li> </ul>                                                                                                               | <p>General polling is suspended, and a VNE Unreachable event is sent to the Cisco ANA Gateway. Thereafter, only the reachability tests are run to detect when the device is reachable again.</p> <p>If more than one protocol is used, it is enough for one of them to become unreachable to generate the event. The event is generic to all the protocols.</p> | <ul style="list-style-type: none"> <li>General polling is restarted, and all commands are sent to the device, smoothed across the polling interval.</li> <li>The alarm is cleared.</li> </ul> |
| Full VNE    | <ul style="list-style-type: none"> <li>SNMP only (default). Polls the sysoid of the NE using an <b>SNMP get</b> command during the SNMP reachability test, and expects to receive a response; or</li> <li>SNMP only (default), and adding ICMP and Telnet. During the Telnet test, the unit sends <b>Enter</b> via the open session and expects to get a prompt back.</li> </ul> | <p>General polling is suspended, and a VNE Unreachable event is sent to the Cisco ANA Gateway. Thereafter, only the reachability tests are run to detect when the device is reachable again.</p> <p>If more than one protocol is used, it is enough for one of them to become unreachable to generate the event. The event is generic to all the protocols.</p> | <ul style="list-style-type: none"> <li>General polling is restarted, and all commands are sent to the device, smoothed across the polling interval.</li> <li>The alarm is cleared.</li> </ul> |

Each of these scenarios has two possible settings in the registry:

- Track reachability (true/false). The default is true.

When this parameter is true, reachability is tracked according to the specific protocol (ICMP, SNMP, Telnet, and so forth).

When this parameter is false, the test is not performed.

- Lazy reachability (true/false). The default is false. This parameter determines whether there is a dedicated reachability command in charge of tracking reachability or whether reachability is determined by the regular polled commands.

When this parameter is true, reachability is based on polling, and a dedicated command is not activated.

When this parameter is false, a dedicated SNMP command is activated, and this test verifies the response from a specific SNMP OID (sysoid is the default that can be changed).

After the first failure of a command and all its retries, the device is considered unreachable. At this point, Cisco ANA starts to poll the device using the dedicated reachability command (see [Table 41-13](#)) [Figure 41-1](#) [Figure 41-1](#). In normal track reachability mode (lazy=false), the reachability commands run all the time. When the reachability test succeeds for the first time, it stops running and the device is considered reachable again.

**Note**

Changes to the registry should be performed only with the support of Cisco. For details, contact your Cisco account representative.

**Correlation**

The alarm correlates to other alarms using the network correlation mechanism, which runs a forward IP flow from the global routing entity to the management IP address (that is, to the IP address of the unit on which the VNE resides). This flow might collect the following alarms: Device Unreachable, Link Down, Port Down, Interface Status Down, BGP Neighbor Loss, and so forth.

Other alarms might correlate to it using the ManagedElement key.

**Note**

The Device Unreachable alarm filters out the Link Down on Unreachable alarm in the correlation process. Events with the same weight are not filtered out.

**Source OID**

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

**CPU Utilization**

VNEs are configured to trace their device CPU utilization. An alarm is issued when device CPU utilization crosses a configured threshold. The thresholds, as defined in the registry under the managed element, are:

- Upper threshold—80%
- Lower threshold—40%

**Table 41-14** CPU Utilization—Subtype Events

| Subtype Event Name                     | Description                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------|
| <a href="#">CPU Overutilized</a>       | Issued when the device CPU usage is above the configured upper threshold.              |
| <a href="#">CPU Normal Utilization</a> | Clearing event. Issued when the device CPU usage returns to below the lower threshold. |

**Correlation**

Due to the nature of CPU utilization alarms, the event does not try to correlate to another event; it creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarm tries to correlate to this alarm.

## Source OID

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

# Device Unsupported

A VNE identifies various loading situations that prevent regular operation of the VNE. When such a situation occurs, the VNE issues a Device Unsupported alarm.

**Table 41-15**     *Device Unsupported—Subtype Events*

| Subtype Event Name                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Device Unsupported</a> | Issued for the following scenarios: <ul style="list-style-type: none"><li>• The device type identified by its sysOid is not identified by the system.</li><li>• The device software version is not supported, and the VNE is configured to react when a device is unsupported. Other possible actions are: use the default version, load generic VNE, or load ICMP VNE.</li><li>• Registry problems occur when trying to load generic or ICMP VNEs.</li><li>• The VNE failed to retrieve the device sysOid or software version.</li></ul> |

## Correlation

Due to the nature of the Device Unsupported alarm, the event does not try to correlate to another event and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

## Source OID

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

# Discard Packets

VNEs are configured to trace the discarded packet counters on their device ports. An alarm is issued when the discarded counter for a port crosses the configured thresholds. The thresholds, as defined in the registry under PortLayer1, are:

- Upper threshold—500 packets per second.
- Lower threshold—50 packets per second.

**Table 41-16**     *Discard Packets—Subtype Events*

| Subtype Event Name                     | Description                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <a href="#">Discard Packets</a>        | Issued when the number of discarded packets on a device port is higher than the configured threshold.                 |
| <a href="#">Normal Discard Packets</a> | Clearing alarm. Issued when the number of discarded packets on a devices port is lower than the configured threshold. |

## Correlation

Due to the nature of the Discard Packets alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

## Impact Analysis

By default, impact analysis is not supported for this alarm, but it can be enabled. If enabled, a flow starts to collect all the affected services passing this port. The endpoint of such services can be any termination point, such as an IP interface, VC, Port, VRF, and so on.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

# Dropped Packets

VNEs are configured to trace the dropped packet counters on their device ports. An alarm is issued when a dropped packet counter from a port crosses the configured thresholds. The thresholds, as defined in the registry under PortLayer1, are:

- Upper threshold—500 packets per second.
- Lower threshold—50 packets per second.

**Table 41-17**      *Dropped Packets—Subtype Events*

| Subtype Event Name                               | Description                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <a href="#">Dropped Packets on Port</a>          | Issued when the number of dropped packets on a device port is higher than the configured threshold.                |
| <a href="#">Stopped Dropping Packets on Port</a> | Clearing event. Issued when the number of dropped packets on a device port is lower than the configured threshold. |

## Correlation

Due to the nature of the Dropped Packets on Port alarm, the event does not try to correlate to another event. It creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

## Impact Analysis

By default, impact analysis is not supported for this alarm, but it can be enabled. If enabled, a flow starts to collect all the affected services passing this port. The endpoint of such services can be any termination point, such as an IP interface, VC, port, VRF, and so on.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

## DS0 Bundle Service Alarm

DS0 Bundle is a logical interface with an administration and operational status. The DS0Bundle Service alarm is generated when the administration or operational status changes.

**Table 41-18**      *DS0 Bundle Service—Subtype Events*

| Subtype Event Name                    | Description                                                         |
|---------------------------------------|---------------------------------------------------------------------|
| <a href="#">DS0 Bundle Admin Down</a> | Generated when the DS0 Bundle status changes from OK to Admin Down. |
| <a href="#">DS0 Bundle Oper Down</a>  | Generated when the DS0 Bundle status changes from OK to Oper Down.  |
| <a href="#">DS0 Bundle Up</a>         | Generated when the DS0 Bundle status changes from Not OK to OK.     |

### Correlation

This alarm will be correlated to lower layer events, such as Port Down. Upper layer events can be correlated to this event.

### Source OID

See [DS0 Bundle OID \(IDS0BundleOid\)](#), page 40-2.

## DS1 Path Link Down

DS1 Path Link Down is generated when an administrative or operational path shutdown occurs.

**Table 41-19**      *DS1 Path Link Down—Subtype Events*

| Subtype Event Name                                   | Description                                            |
|------------------------------------------------------|--------------------------------------------------------|
| <a href="#">DS1 Path Link Down Due to Admin Down</a> | Generated when the path is administratively shut down. |
| <a href="#">DS1 Path Link Down Due to Oper Down</a>  | Generated when the path is operatively shut down.      |
| <a href="#">DS1 Path Link Up</a>                     | Generated when the DS1 path is up.                     |

### Correlation

DS1 Path Link Down can be correlated to lower level alarms, such as Port Down. It can be the root cause for higher level alarms.

### Source OID

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9, where each end point is a [DS1 Path OID \(IDS1PathOid\)](#), page 40-2.

## DS1 Path Port Down

DS1 Path Port Down is generated when an administrative or operational path shutdown occurs.

**Table 41-20**      *DS1 Path Port Down—Subtype Events*

| Subtype Event Name                 | Description                               |
|------------------------------------|-------------------------------------------|
| <a href="#">DS1 Path Port Down</a> | Generated when the DS1 port path is down. |
| <a href="#">DS1 Path Port Up</a>   | Generated when the DS1 port path is up.   |

### Correlation

DS1 Path Port Down can be correlated to lower level alarms, such as Port Down. It can be the root cause for higher level alarms.

### Source OID

See [DS1 Path OID \(IDS1PathOid\)](#), page 40-2.

## DS3 Path Link Down

DS3 Path Link Down is generated due to administrative or operational shutdown of the path.

**Table 41-21**      *DS3 Path Link Down—Subtype Events*

| Subtype Event Name                                   | Description                                            |
|------------------------------------------------------|--------------------------------------------------------|
| <a href="#">DS3 Path Link Down Due to Admin Down</a> | Generated when the path is administratively shut down. |
| <a href="#">DS3 Path Link Down Due to Oper Down</a>  | Generated when the path is operatively shut down.      |
| <a href="#">DS3 Path Link Up</a>                     | Generated when the DS1 path is up.                     |

### Correlation

DS3 Path Link Down can be correlated to lower level alarms, such as Port Down. It can be the root cause for higher level alarms.

### Source OID

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9, where each end point is a [DS3 Path OID \(IDS3PathOid\)](#), page 40-3.

## DS3 Path Port Down

DS3 Path Port Down is generated when an administrative or operational path shutdown occurs.

**Table 41-22**      *DS3 Path Port Down—Subtype Events*

| Subtype Event Name                 | Description                               |
|------------------------------------|-------------------------------------------|
| <a href="#">DS3 Path Port Down</a> | Generated when the DS3 port path is down. |
| <a href="#">DS3 Path Port Up</a>   | Generated when the DS3 port path is up.   |

### Correlation

DS3 Path Port Down can be correlated to lower level alarms, such as Port Down. It can be the root cause for higher level alarms.

### Source OID

See [DS3 Path OID \(IDS3PathOid\)](#), page 40-3.

## Dual Stack IP Changed

The dual stack IP interface alarm generates events when an interface goes from a dual IP address (IPv4 and IPv6) to a single stack, and when it goes from a single stack to a dual. That is, the event is generated when an IPv6 (global unicast address) or IPv4 address is removed from an interface. The event does not do any correlation but can be a root cause.

**Table 41-23**      *Dual Stack IP Changed*

| Subtype Event Name                    | Description                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Dual Stack IP Removed</a> | Generated when all IPv6 (global unicast address) or all IPv4 addresses are removed from a dual-stack (two IP addresses) interface.                                         |
| <a href="#">Dual Stack IP Added</a>   | Generated when an IPv6 (global unicast address) or IPv4 address is configured on a single-stack (one IP address) interface that was previously configured as a dual stack. |

### Correlation

No correlation is performed for this alarm.

### Impact Analysis

No impact analysis is performed for this alarm.

### Source OID

See [IP Interface OID \(IPInterfaceOid\)](#), page 40-4.

## DWDM Controller Down

The DWDM controller has an Up and Admin-Down status. The DWDM Controller Down alarm is generated when the DWDM controller state changes. A DWDM Controller Down ticket is generated. The DWDM Controller Down alarm is based on polling results.

**Table 41-24** DWDM Controller Down

| Subtype Event Name   | Description         |
|----------------------|---------------------|
| DWDM Controller Down | The alarm trigger.  |
| DWDM Controller Up   | The clearing alarm. |

### Correlation

No correlation is performed for this alarm.

### Impact Analysis

No impact analysis is performed for this alarm.

### Source OID

See [DWDM Controller OID \(IDWDMOid\)](#), page 40-3.

## DWDM G709 Status Down

The DWDM G709 wrapper has a status of up and down, The DWDM G709 Status Down alarm is generated when the G709 wrapper state changes, and the DWDM G709 Status Down ticket is generated. The alarm is based on the polling result; if the DWDM G709 wrapper status changes, the service alarm is triggered.

**Table 41-25** DWDM G709 Status Down

| Subtype Event Name    | Description         |
|-----------------------|---------------------|
| DWDM G709 Status Down | The alarm trigger.  |
| DWDM G709 Status Up   | The clearing alarm. |

### Correlation

No correlation is performed for this alarm.

### Impact Analysis

No impact analysis is performed for this alarm.

### Source OID

See [DWDM Controller OID \(IDWDMOid\)](#), page 40-3.



## EFP Down

The EFP Down alarm represents a state in which an Ethernet flow point (EFP) administrative or operational status changes from up to down. The alarm is cleared after the status value is set to up.

The polling of the status property can happen at every standard polling interval, or can be expedited following syslog handling.

The severity of the service alarms is Major, with the exception of EFP Up, which has the severity Cleared.

**Table 41-26** EFP Down — Subtype Events

| Subtype Event Name                             | Description                                                                      |
|------------------------------------------------|----------------------------------------------------------------------------------|
| <a href="#">EFP Admin Down</a>                 | EFP is in administrative status down.                                            |
| <a href="#">EFP Down Due to Error Disabled</a> | EFT is in operational status down and the error disabled property value is true. |
| <a href="#">EFP Oper Down</a>                  | EFP is in operational status down.                                               |
| <a href="#">EFP Up</a>                         | Clearing event. Issued when the EFP status returns to up.                        |

### Correlation

The generated service alarm searches for its root cause through the correlation mechanism. In addition, the EFP Down alarm is the root cause for every relevant network event caused by the EFP Down event.

### Source OID

See [EFP OID \(IEFPOID\)](#), page 40-3.

## GRE Keepalive

The GRE Keepalive alarm is generated when the GRE keepalive attribute is not configured or has been removed from a discovered GRE tunnel.

**Table 41-27** GRE Keepalive—Subtype Events

| Subtype Event Name                | Description                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <a href="#">Keepalive Not Set</a> | The alarm triggering event when GRE Keepalive is not configured. The event is ticketable with a minor severity. |
| <a href="#">Keepalive Set</a>     | The clearing event.                                                                                             |

### Correlation

No correlation is performed for this alarm.

### Impact Analysis

No impact analysis is performed for this alarm.

## Source OID

See [GRE Tunnel Endpoint OID Structure](#), page 40-11.

# GRE Tunnel Down

Generic routing encapsulation (GRE) tunnels are basically stateless, meaning that when the tunnel is down, the tunnel edges might not identify this situation and continue reporting the tunnel as up. To overcome this, the GRE tunnel edge can be configured to send *keepalive* messages. If at some point a GRE tunnel edge does not receive keepalive messages, it can change its state to down.

The GRE Tunnel Down alarm is supported only on GRE tunnels that are configured with keepalive messages. When keepalive is configured on the GRE tunnel edge, if a failure occurs in the GRE tunnel at any point, both IP interfaces of the GRE tunnel edges change their state to down. This ensures that the alarm is identified. If keepalive is not configured on the GRE tunnel edge, because the alarm creation is triggered by the state change of the IP interface of the GRE tunnel, the GRE Tunnel Down alarm might not be generated.

**Table 41-28** GRE Tunnel Down—Subtype Events

| Subtype Event Name              | Description                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">GRE Tunnel Down</a> | Issued when a GRE link exists between the two tunnel edges and the state of the IP interface of one of the GRE tunnel edges changes to down. A simple negotiation procedure is done to avoid sending the event from both edges of the GRE tunnel, and a GRE Tunnel Down event is issued. |
| <a href="#">GRE Tunnel Up</a>   | Clearing event. Issued when the IP interface state changes back to up. The clearing event is issued even if the GRE link does not exist (for example, if you have chosen to clear and remove the event).                                                                                 |

## Correlation

The GRE Tunnel Down alarm tries to correlate to other alarms using the network correlation mechanism that runs a forward IP flow from the local GRE tunnel edge to the tunnel destination IP. This flow might collect the following alarms: Link Down, Port Down, Interface Status Down, and more.

Other alarms might correlate to it using the TunnelGre key.

## Source OID

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9 (each endpoint is Layer 2 GRE Tunnel OID (ITunnelGreOid)).

# HSRP Group Status Changed

Hot Standby Router Protocol (HSRP) is used in IP networks and allows one router to automatically assume the function of the second router if the second router fails. The current support relates to the instance where only one backup router is configured in the HSRP group, though it is possible to configure more than one.

**Table 41-29 HSRP Group Status Changed—Subtype Events**

| Subtype Event Name                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Primary HSRP Interface Is Not Active</a>   | <p>Issued when the primary interface within an HSRP group has changed its state to down. This means that one of the other interfaces in the group becomes the active interface in the group.</p> <p>This alarm tries to correlate to other alarms using the network correlation mechanism that runs a forward IP flow from the local global routing entity to the HSRP group backup interface IP.</p> <p>Alarms can correlate to this alarm using the local IPInterface key.</p> |
| <a href="#">Primary HSRP Interface Is Active</a>       | <p>Clearing event for the Primary HSRP Interface Is Not Active alarm. Issued when the primary interface within a HSRP group has changed its state back to up after it was down. This means that if one of the other interfaces in the group was currently active it becomes secondary. This alarm is the clearing alarm for the Primary HSRP Interface Is Not Active alarm.</p>                                                                                                  |
| <a href="#">Secondary HSRP Interface Is Active</a>     | <p>Issued when a secondary interface within an HSRP group has changed its state to up. This happens when the original active interface changes its state to down and the backup interface takes over.</p> <p>This alarm tries to correlate to other alarms using the network correlation mechanism that runs a forward IP flow from the local global routing entity to the HSRP group virtual IP.</p> <p>Alarms can correlate to this alarm using the local IPInterface key.</p> |
| <a href="#">Secondary HSRP Interface Is Not Active</a> | <p>Clearing event for the Secondary HSRP Interface Is Active alarm. Issued when a secondary interface within a HSRP group has changed its state back to down after it was up. This means that the original active interface in that group has changed its state to up.</p>                                                                                                                                                                                                       |

### Correlation

For correlation to work, there must be a correlation path between the routers. Correlation details are described in the relevant subtype events in [Table 41-29](#).

### Source OID

See [IP Interface OID \(IPInterfaceOid\)](#), page 40-4 (IP interface of the active or secondary interface).

## Interface Status

VNEs are configured to trace the operational state of their IP interfaces. When the status of an IP interface changes, the VNE issues the relevant alarm. There are multiple subtype events for Interface Status Down, and the subtype that is issued depends on the scenario. Each has a different behavior; these are described in [Table 41-30](#).

**Table 41-30**      **Interface Status—Subtype Events**

| Subtype Event Name                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Interface Status Down GRE Tunnel</a><br>(GRE tunnel)                                       | <p>Issued when the IP interface on a GRE tunnel changes its state to down.</p> <p>Correlation—This alarm issues a local correlation process and tries to correlate to the GRE Tunnel Down alarm. If the GRE tunnel down does not exist (for example, in the case where no GRE link exists), the alarm is issued as the root cause. When the GRE tunnel is issued from the other edge of the tunnel, it uses the local alarm to correlate to it.</p> <p>Other alarms might correlate to it using the IPInterface key. This includes alarms such as Device Unreachable or any other alarms that perform network correlation and where the correlation flow traverses the IP interface.</p>                        |
| <a href="#">Interface Status Down Connection</a><br>(connection that is a point-to-point connection)   | <p>Issued when a point-to-point IP interface changes its state to down. The identification of this type of interface is done using the following:</p> <ol style="list-style-type: none"> <li>1. The subnet mask is /30 or /31.</li> <li>2. The IP interface is on one VC encapsulation.</li> </ol> <p>Correlation—The alarm correlates to other alarms using the network correlation mechanism that runs a forward down IP flow from the IP interface to other IP addresses in the IP interface's IP address subnet. This flow might collect the following alarms: Link Down, Port Down, and so on.</p> <p>Other alarms might correlate to it using the IPInterface or the physical port (PortLayer1) keys.</p> |
| <a href="#">Interface Status Down Nonconnection</a><br>(nonconnection that is a multipoint connection) | <p>Issued when a point-to-point IP interface changes its state to down. The identification of this type of interface is done using the following:</p> <ol style="list-style-type: none"> <li>1. The number of encapsulations under the IP interface/MPLS is greater than one.</li> <li>2. Any other case not covered in the previously-described scenarios.</li> </ol> <p>Correlation—The alarm correlates to other alarms using the network correlation mechanism that runs a forward down flow from the IP interface to the physical port (PortLayer1) under this interface.</p>                                                                                                                              |
| <a href="#">Interface Status Up</a>                                                                    | <p>Clearing event. Issued when an IP interface changes its operational state from down to up.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Correlation

Correlation details are described in the relevant subtype events in [Table 41-30](#).

## Source OID

See [IP Interface OID \(IPInterfaceOid\)](#), page 40-4.

## Investigation State

Situations might occur where one or more physical components (specifically modules) are not identified by the physical investigation component in a VNE. This is not an unusual scenario because many devices have large sets of supported modules, and not all of the modules may be supported by the VNE. The Investigation State alarm is issued in this scenario.

**Table 41-31 Investigation State—Subtype Events**

| Subtype Event Name                  | Description                                                                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Investigation State</a> | Issued when one or more modules are not identified by the physical investigation component of the VNE.<br><br>There is no clearing event. |

**Correlation**

Due to the nature of the Investigation State alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

**Source OID**

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

## L2TP Peer Not Established

This alarm is specific to the Redback Networks implementation of Layer 2 Tunneling Protocol (L2TP), and is based on the state of an L2TP peer that is basically a logical entity from which L2TP tunnels are created. The L2TP peer is also used as a container for these L2TP tunnels. The alarm is issued when the L2TP peer has an incorrect tunnel configuration and the tunnels between the L2TP access concentrator (LAC) and the L2TP network server (LNS) cannot be created.

**Table 41-32 L2TP Peer Not Established—Subtype Events**

| Subtype Event Name                        | Description                                                                                                                                                                                                                    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">L2TP Peer Not Established</a> | Issued when the L2TP peer has an incorrect configuration, and L2TP tunnels cannot be created between the LAC and the LNS. This is identified by querying the state of the L2TP peer tunnels that do not change to Established. |
| <a href="#">L2TP Peer Is Removed</a>      | Issued when the L2TP peer is removed from the L2TP peer list, or when the first tunnel in the peer changes its state from Established to another state.                                                                        |
| <a href="#">L2TP Peer Established</a>     | Clearing event. Issued when at least one tunnel of the L2TP peer is in an Established state.                                                                                                                                   |

**Correlation**

The alarm correlates to other alarms using the network correlation mechanism that runs a forward down flow from the L2TP peer to the remote IP.

Other alarms can correlate to this alarm using the local L2TPpeer key.

**Source OID**

See [L2TP Peer OID \(IL2tpPeerOid\)](#), page 40-4.

## L2TP Sessions Threshold

This alarm is specific to the Redback Networks implementation of L2TP and is implemented as a TCA of the number of sessions in a L2TP peer. The alarm is issued when the number of L2TP sessions related to the L2TP peer crosses a configurable threshold.

**Table 41-33 L2TP Sessions Threshold—Subtype Events**

| Subtype Event Name                                            | Description                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">L2TP Sessions Count Exceeds Maximum Threshold</a> | Issued when the number of active sessions associated with the L2TP peer crosses a configurable threshold (the default is 80%). The calculation is done as follows:<br><br>$\text{active-sessions}/(\text{max-session-per-tunnel} * \text{max-tunnels-per-peer}) * 100.$ |
| <a href="#">L2TP Sessions Count Has Returned to Normal</a>    | Clearing event. Issued when the number of active sessions associated with the L2TP peer drops below the lower threshold (the default is 70%).                                                                                                                           |

### Correlation

Due to the nature of the L2TP Sessions Count Exceeds Maximum Threshold alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

### Source OID

See [L2TP Peer OID \(IL2tpPeerOid\)](#), page 40-4.



#### Note

This alarm is implemented as TCA, which means that no information about this alarm is found in the standard event-related registry.

## Layer 2 Tunnel Down

A Layer 2 tunnel represents a point-to-point pseudowire in the network, also known as an AToM. This alarm is issued when the operational state of a Layer 2 tunnel changes.

**Table 41-34 Layer 2 Tunnel Down—Subtype Events**

| Subtype Event Name                  | Description                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Layer 2 Tunnel Down</a> | Issued when the operational state of the Layer 2 tunnel changes its state to down. This can happen due to a problem between the two edges of the tunnel or on the local tunnel interface.<br><br>When the state changes on both edges, a simple negotiation procedure is done to avoid sending the alarm from both edges of the Layer 2 tunnel. |
| <a href="#">Layer 2 Tunnel Up</a>   | Clearing event. Issued when the Layer 2 tunnel changes its state back to up.                                                                                                                                                                                                                                                                    |

## Correlation

Because this alarm can be caused by multiple conditions, it issues multiple network correlation flows, which run as follows:

- A network flow from the Layer 2 tunnel to the remote IP to identify problems that occur between the tunnel edges.  
This flow might collect the following alarms: Link Down, Port Down, MPLS alarms, and so on.
- A network flow from the local Layer 2 tunnel edge to the physical port on which it is configured, to identify problems that occur on the local physical interface.  
This flow might collect the following alarms: Link Down, Port Down, and so on.
- A network flow from the remote Layer 2 tunnel edge to the physical port on which it is configured, to identify problems that occur on the remote physical interface.  
This flow might collect the following alarms: Link Down, Port Down, and so on.

Any alarm can correlate to this alarm using the PTPLayer2MplsTunnel (which represents the Layer 2 tunnel edge) key.



### Note

The Layer 2 Tunnel Down alarm does not filter out the LDP Neighbor Down alarm in the correlation process.

## Source OID

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9 (each endpoint is Layer 2 Mpls Tunnel OID (IPTPMplsLayer2TunnelOid)).

## LDP Neighbor Loss

LDP enables neighboring P or PE routers acting as LSRs to discover peers in an MPLS network to which they can establish LDP sessions. The sessions allow the routers to negotiate and exchange labels used for forwarding packets.

If a session to an LDP neighbor goes down, an LDP Neighbor Down alarm is issued. This can happen as the result of a failure in the TCP connection used by the LDP session, or if the interface is no longer running MPLS. The LDP neighbor down alarm is cleared by a corresponding LDP Neighbor Up alarm.

The alarm is issued when a peer is removed from the table in the LDP Neighbors tab. The alarm runs a correlation flow to detect the network core triggering event. A root cause analysis is performed to find the root cause. The alarm initiates an IP-based flow toward the peer transport address destination. If an alarm is found during the flow, that alarm is correlated to the LDP Neighbor Down alarm.



### Note

The LDP Neighbor Down alarm can correlate to the MPLS Interface Removed alarm.

VNEs are configured to trace the state of the current LDP neighbor of their devices. The VNE issues the relevant alarm when it identifies that an existing LDP neighbor has been removed, or that an LDP neighbor that was removed has been restored.

The identification of this alarm is expedited by notifications such as syslogs or traps.

**Table 41-35** *LDP Neighbor Loss—Subtype Events*

| Subtype Event Name                | Description                                                                                                   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------|
| <a href="#">LDP Neighbor Down</a> | Issued when an LDP neighbor of the device that was previously discovered is removed.                          |
| <a href="#">LDP Neighbor Up</a>   | Clearing event. Issued when the LDP neighbor that was previously removed is restored and is currently active. |

**Correlation**

This alarm issues a network correlation flow that runs a forward down flow from the global routing entity to the LDP peer IP address.

This flow might collect the following alarms: MPLS Interface Removed, Link Down, Port Down, and so on.

Any alarm can correlate to this alarm using the LDPpeer or LDPpeerDiscoverySources keys.

**Note**

The LDP Neighbor Down alarm does not filter out the MPLS Interface Removed alarm in the correlation process.

**Source OID**

See [LSE OID \(ILseOid\)](#), page 40-6 (Label Switching Entity with the differentiator object of the LDP peer).

**Link Down**

This is one of the basic service alarms supported in the system. When a port has an adjacent peer (that is, it is connected to another port and has a discovered link), and its operational state changes from up to down or from down to up, the alarm is issued. When the port is not adjacent, a Port Down alarm is issued instead of a Link Down alarm. See [Port Down](#), page 41-37.

The negotiation process between the two link edges occurs when the port's operational state changes to down to identify the exact event that should be issued.

**Table 41-36** *Link Down—Subtype Events*

| Subtype Event Name                          | Description                                                                                                                                                                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Link Down Due to Admin Down</a> | Issued when the admin state of at least one of the link ports changes to down.<br><br>Correlation—Due to the nature of this alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway that is the root cause alarm of the ticket. |
| <a href="#">Link Down Due to Oper Down</a>  | Issued when the admin state is up on both ports and none of the scenarios described below occur.<br><br>Correlation—This alarm issues a local correlation process and tries to correlate to other alarms using the physical port (PortLayer1) key.                           |



**Table 41-36**      *Link Down—Subtype Events (continued)*

| Subtype Event Name                          | Description                                                                                                                                                                                                                                                                                           |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Link Down Due to Card Event</a> | Issued when at least one of the ports is on a card that was removed from the device, or is currently in an operational down state.<br><br>Correlation—This alarm issues a local correlation process and tries to correlate to other alarms (specifically Card Out or Card Down) using the Module key. |
| <a href="#">Link Down on Unreachable</a>    | Issued when at least one of the ports is on a device that is currently unreachable by its VNE.<br><br>Correlation—This alarm issues a local correlation process in order to correlate to the Device Unreachable alarm (using the ManagedElement key).                                                 |
| <a href="#">Link Up</a>                     | Clearing event. Issued when the port operational state changes back to up.                                                                                                                                                                                                                            |

Link Down supports flapping with the following subevents:

- Link Down Flapping
- Link Down Flapping Update
- Link Down Stopped Flapping Cleared
- Link Down Stopped Flapping Noncleared

**Note**

In Cisco ANA EventVision, these flapping subevent names are displayed in the event's short description field.

**Correlation**

Other alarms can try to correlate to any link down alarm using the physical port (PortLayer1) key.

**Source OID**

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9 (where each endpoint is [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9).

## Link Utilization

VNEs are configured to trace the Rx and Tx counters on their device ports, where a port has an adjacent peer (that is, it is connected to another port), and it already issued a Rx Overutilized or Tx Overutilized alarm. (For more information on these alarms, see [Rx Utilization](#), page 41-38 and [Tx Utilization](#), page 41-40.) This alarm has complementary functionality so that all the utilization alarms from both ports of the link correlate to it, instead of issuing multiple root cause alarms.

**Table 41-37**      **Link Utilization—Subtype Events**

| Subtype Event Name                      | Description                                                                                                                                                                                                                                                |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Link Overutilized</a>       | Issued after Tx Overutilized or Rx Overutilized alarms are issued on a physical port, if the port has an adjacent peer to enable correlation of all port level utilizations alarms from the ports on both sides of the link to one link utilization alarm. |
| <a href="#">Link Utilization Normal</a> | Clearing event. Issued if both sides of the link send clearing alarms on the Tx utilization and Rx utilization alarms.                                                                                                                                     |

### Correlation

Due to the nature of this alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

Other alarms can correlate to this alarm using the physical port (PortLayer1) key.

### Source OID

See [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9 (where each endpoint is [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9).

## Logical Port Down

Logical ports are logical interfaces that are defined on physical ports. Logical ports are used to logically separate the traffic of the physical port, and to control the separated traffic in a different manner. Logical ports are currently implemented in Cisco ANA for specific VNE types (for example, Lucent WAN Switches) and specific technologies (such as ATM and Frame Relay). Each logical port has an independent administrative and operational state. When the operational state of a logical port changes, the VNE issues an alarm.

**Table 41-38**      **Logical Port Down—Subtype Events**

| Subtype Event Name                | Description                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------------------|
| <a href="#">Logical Port Down</a> | Issued when the operational state of a logical port changes to down.                    |
| <a href="#">Logical Port Up</a>   | Clearing event. Issued when the operational state of a logical port changes back to up. |

### Correlation

This alarm issues a local correlation process and tries to correlate to alarms on the physical port using the physical port (PortLayer1) key. Possible alarms that this alarm can correlate to are Link Down, Port Down, or any alarm on the physical port.

Other alarms might correlate to it using the logical port key, including alarms that perform network correlation, and the correlation flow traverses the logical port.

**Note**

The Logical Port Down alarm does not filter out the BGP Process Down alarm in the correlation process.

**Source OID**

See [Logical Port OID \(ILogicalPortOid\)](#), page 40-5.

## Memory Utilization

VNEs are configured to trace their device memory utilization. A memory utilization alarm is issued when the device memory utilization crosses a configured threshold. The thresholds, as defined in the registry under ManagedElement, are:

- Upper threshold—80%
- Lower threshold—40%

**Table 41-39**      **Memory Utilization—Subtype Events**

| Subtype Event Name                  | Description                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------|
| <a href="#">Memory Overutilized</a> | Issued when the device memory usage is above the configured upper threshold.           |
| <a href="#">Memory OK</a>           | Clearing event. Issued when the device memory usage is back below the lower threshold. |

**Correlation**

Due to the nature of the Memory Utilization alarm, the event does not try to correlate to another event, and creates a new ticket in the gateway where the event is the root cause alarm of the ticket.

No other alarms can correlate to this alarm.

**Source OID**

See [Managed Element OID \(IManagedElementOid\)](#), page 40-7.

## MLPPP Bundle

MLPPP Bundle does not generate a Service alarm for each endpoint; it generate the alarm for links. If a link is not available, the service alarm is generated for individual endpoints. MLPPP Bundle can be a root cause. However, it cannot be correlated to other service alarms; that is, another event cannot be the root cause of MLPPP Down. MLPPP Bundle is ticketable.

**Table 41-40**      **MLPPP Bundle Service Alarm**

| Subtype Event Name                           | Description                                                                      |
|----------------------------------------------|----------------------------------------------------------------------------------|
| <a href="#">MLPPP Down Due To Flapping</a>   | Generated when MLPPP is down due to flapping.                                    |
| <a href="#">MLPPP Down Flapping Update</a>   | Generated when MLPPP flapping update occurs.                                     |
| <a href="#">MLPPP Down Flapping Proxy</a>    | Generated when MLPPP is down due to flapping proxy.                              |
| <a href="#">MLPPP Down Due To Admin Down</a> | Generated when MLPPP is administratively shut down on either side.               |
| <a href="#">MLPPP Down Due To Oper Down</a>  | Generated when MLPPP is down but neither endpoint is administratively shut down. |
| <a href="#">MLPPP Up</a>                     | Generated when either side changes to up.                                        |

## Correlation

MLPPP Down cannot be correlated to other events. However, other events can correlate to MLPPP Down.

## Impact Analysis

No impact analysis is performed for this alarm.

## Source OID

See [MLPPP OID \(IMLPPPOid\)](#), page 40-7 or [Topological Link OID \(ITopologicalLinkOid\)](#), page 40-9, where each endpoint is a [MLPPP OID \(IMLPPPOid\)](#), page 40-7.

# MPLS Black Hole Found

An MPLS black hole is an abnormal termination of an MPLS path (an LSP) inside an MPLS network. An MPLS black hole exists when there are untagged entries destined for a known PE router on a specific interface. Note that the untagged interfaces might exist in the network in normal situations. For example, where the boundary of the MPLS cloud has untagged interfaces, this is still considered normal.

MPLS black hole cause the loss of all the MPLS labels on a packet, including the VPN information that lies in the inner MPLS label. Therefore, if a packet goes through an untagged interface, the VPN information is lost. The VPN information loss translates directly to VPN sites losing connectivity.

Black hole alarms are detected in either of the following situations:

- When the system is loaded for the first time and performs the initial discovery of the network.
- Changes in the network are identified through the ongoing discovery process.

**Table 41-41**      **MPLS Black Hole Found—Subtype Events**

| Subtype Event Name                      | Description                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">MPLS Black Hole Found</a>   | Issued when an MPLS interface has at least one untagged LSP leading to a known PE router; in other words, an LSE entry changed to an Untagged action with a PE as a next hop. After an MPLS Black Hole Found alarm is issued, a process begins looking for broken LSPs that go through the MPLS black hole. See <a href="#">Broken LSP Discovered</a> , page 41-8. |
| <a href="#">MPLS Black Hole Cleared</a> | Clearing event. Issued when the MPLS interface that had untagged LSPs to a known PE router has no more untagged entries to any known PE neighbor.                                                                                                                                                                                                                  |

## Correlation

The MPLS Black Hole Found alarm can correlate to MPLS Interface Removed and LDP Neighbor Loss alarms. Broken LSP Discovered alarms can correlate to MPLS Black Hole Found alarms.



### Note

The MPLS Black Hole Found alarm does not filter out the MPLS Interface Removed and LDP Neighbor Down alarms in the correlation process.

**Source OID**

See [LSE OID \(ILseOid\)](#), page 40-6 (appended with a differentiator of the next hop interface name).

**MPLS Interface Removed**

The MPLS interface is basically a representation of the MPLS sublayer in an interface configuration. The interface can be configured with or without MPLS capabilities. If this type of configuration change takes place while the VNE is loaded, it issues MPLS interface removed or added alarms.

**Table 41-42** *MPLS Interface Removed—Subtype Events*

| Subtype Event Name                     | Description                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">MPLS Interface Removed</a> | Issued when an MPLS interface has at least one untagged LSP leading to a known PE router (that is, an LSE entry changed to an Untagged action with a PE as a next hop). After an MPLS Black Hole Found alarm is issued, a process that looks for broken LSPs that go through this MPLS black hole is started. See <a href="#">Broken LSP Discovered</a> , page 41-8. |
| <a href="#">MPLS Interface Added</a>   | Clearing event. Issued when the MPLS capabilities of an interface are enabled after they were disabled.                                                                                                                                                                                                                                                              |

**Correlation**

The alarm correlates to other alarms using the network correlation mechanism which runs a forward flow to the underlying physical port. This flow might collect the Card Out and Card Down alarms, because the only other cases in which it happens are due to other faults that are hardware related.

Other alarms might correlate to it using the MPLS key, including MPLS black hole alarms, MPLS TE Tunnel Down alarm, and so on.

**Source OID**

See [LSE OID \(ILseOid\)](#), page 40-6 (Label Switching Entity with differentiator object of the MPLS interface description).

**MPLS TE FRR State Changed**

The MPLS TE FRR State Changed service alarm is triggered when the backup MPLS TE FRR tunnel changes from Ready to Active, and from Active to Ready.

**Table 41-43** *MPLS TE FRR State Changed*

| Subtype Event Name                                  | Description                                                                                                                                             |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">MPLS TE FRR State Changed to Active</a> | Generated when the status of the protecting MPLS TE FRR tunnel changes from Ready to Active because of a network failure in the primary tunnel segment. |
| <a href="#">MPLS TE FRR State Changed to Ready</a>  | Generated when the status of the protecting MPLS TE FRR tunnel changes back to Ready.                                                                   |

## Correlation

Correlation is performed.

## Impact Analysis

No impact analysis is performed for this alarm.

## Source OID

See [MPLS TE Tunnel OID \(IMplsTETunnelOid\)](#), page 40-8.

# MPLS TE Tunnel Down

VNEs are configured to trace the operational state of their MPLS TE tunnel interfaces. When the state of the tunnel changes, the VNE issues the relevant alarm.

**Table 41-44** *MPLS TE Tunnel Down—Subtype Events*

| Subtype Event Name                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">MPLS TE Tunnel Down</a> | <p>Issued when the tunnel changes its state to down.</p> <p>MPLS TE Tunnel Down alarm supports flapping with the following subevents:</p> <ul style="list-style-type: none"> <li>• MPLS TE Tunnel Flapping</li> <li>• MPLS TE Tunnel Update</li> <li>• MPLS TE Tunnel Stopped Flapping Cleared</li> <li>• MPLS TE Tunnel Stopped Flapping Noncleared</li> </ul> <p><b>Note</b> In Cisco ANA EventVision, these flapping subevent names are displayed in the event's short description field.</p> |
| <a href="#">MPLS TE Tunnel Up</a>   | Clearing event. Issued when an MPLS TE tunnel changes its operational state from down to up.                                                                                                                                                                                                                                                                                                                                                                                                     |

## Correlation

For all the down alarms, any other alarm can try to correlate to this alarm using the MPLS TE tunnel OID (IMplsTETunnelOid) key. The alarm correlates to other alarms using the network correlation mechanism that runs a forward down IP flow from the MPLS TE tunnel to its tunnel destination IP address. This flow might collect the following alarms: Link Down, Port Down, and so on.

The MPLS TE Tunnel Down alarm does not filter out the BGP Process Down alarm in the correlation process.

## Source OID

See [MPLS TE Tunnel OID \(IMplsTETunnelOid\)](#), page 40-8.

## Port Down

When a physical port does not have an adjacent peer (that is, it is connected to another port) and its operational state changes from up to down, or from down to up, port down alarms are issued. When the port does have an adjacent peer, instead of a Port Down alarm, a similar Link Down alarm is issued. See [Link Down, page 41-30](#).

**Table 41-45** *Port Down—Subtype Events*

| Subtype Event Name                          | Description                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Port Down</a>                   | <p>Issued when the operational state of a physical port changes to down.</p> <p>Port Down supports flapping with the following subevents:</p> <ul style="list-style-type: none"> <li>• Port Down Flapping</li> <li>• Port Down Flapping Update</li> <li>• Port Down Stopped Flapping Cleared</li> <li>• Port Down Stopped Flapping Noncleared.</li> </ul> |
| <a href="#">Port Down Due to Card Event</a> | <p>Issued when the port is on a card that was removed from the device or is currently in an operational down state.</p> <p>Correlation—This alarm issues a local correlation process and tries to correlate to other alarms (specifically Card Out or Card Down) using the Module key.</p>                                                                |
| <a href="#">Port Up</a>                     | Clearing event. Issued when the operational state of a logical port changes back to up.                                                                                                                                                                                                                                                                   |

### Correlation

For all the down alarms, any other alarm can try to correlate to this alarm using the physical port (PortLayer1) key.

### Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

## Rx Dormant

VNEs are configured to trace the Rx packet counters on their device ports. An alarm is issued when the Rx counter on a port drops below the configured threshold.



#### Note

This alarm is disabled by default.

**Table 41-46** *Rx Dormant—Subtype Events*

| Subtype Event Name                | Description                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Rx Dormant</a>        | Issued when the number of Rx packets on a device port is lower than the configured threshold.                                  |
| <a href="#">Rx Dormant Normal</a> | Clearing event. Issued when the number of Rx packets on a device port returns to a number lower than the configured threshold. |

## Correlation

The port Rx Dormant alarm does not start a correlation process and is always issued as a root cause alarm.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

# Rx Utilization

VNEs are configured to trace the Rx packet counters on their device ports. An alarm is issued when a the Rx counter for a port crosses the configured thresholds. The thresholds, as defined in the registry under PortLayer1, are:

- Upper threshold—75%
- Lower threshold—50%

When a port has an adjacent peer (that is, it is connected to another port) a Link Utilization alarm is also issued. For more information on these alarms, see [Link Utilization](#), page 41-31.

**Table 41-47** Rx Utilization—Subtype Events

| Subtype Event Name                    | Description                                                                                                                    |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Rx Overutilized</a>       | Issued when the number of Rx packets on a device port is higher than the configured threshold.                                 |
| <a href="#">Rx Utilization Normal</a> | Clearing event. Issued when the number of Rx packets on a device port returns to a number lower than the configured threshold. |

## Correlation

The Rx utilization alarms do not start a correlation process. No other alarms can correlate to this alarm, because there are no supported alarms that can be affected by the Rx utilization alarm.

## Impact Analysis

By default, impact analysis is not supported for this alarm, but can be enabled. If it is enabled, a flow starts to collect all the affected services passing this port. The endpoint of such services can be any termination point, such as an IP interface, VC, port, VRF, and so on.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

# Shelf Out

The Shelf Out alarm represents a state in which the shelf is removed from the device. The Shelf Out alarm is also issued when the device stops reporting on the existence of a shelf due to another failure, even if the shelf is actually still in the device. It is assumed that any functionality that was implemented by the shelf is not working anymore if the shelf had no redundancy configuration.



**Table 41-48 Shelf Out—Subtype Events**

| Subtype Event Name        | Description                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Shelf Out</a> | Issued when a shelf is removed from the device. It is possible that some shelf failures are identified as Shelf Out, because the device does not report on the shelf's existence after the failure. |
| <a href="#">Shelf In</a>  | Clearing event. Issued when the shelf is inserted back into the device.                                                                                                                             |

**Correlation**

Due to the nature of the Shelf Out alarm, it does not start a correlation process and is always issued as a root cause alarm.

Other alarms might correlate to it using the Shelf key, such as the Card Out alarm.

**Source OID**

See [Shelf OID \(IShelfOid\)](#), page 40-9.

## Subinterface Down

QinQ technology refers to the nesting of a VLAN header in an Ethernet frame in an already existing VLAN header. Both VLAN headers must be of the type 802.1Q. When one VLAN header is nested within another VLAN header, they are often referred to as *stacked VLANs*. QinQ technology allows service provider networks to carry traffic with double-tagged, stacked VLAN (802.1Q-in-Q) headers of multiple customers while maintaining the VLAN and Layer 2 protocol configurations of each customer without impacting the traffic of other customers.

A subinterface is a logical division of traffic on an interface, such as multiple subnets across one physical interface. A subinterface name is represented as an extension to an interface name using dot notation, such as Interface Gigabit Ethernet 0/1/2/3.10. In this example, the main interface name is Gigabit Ethernet 0/1/2/3 and the subinterface is 10.

A Subinterface Down alarm is issued when the administrative or operational state of an Ethernet subinterface of a stacked VLAN changes. This state can be polled at standard polling intervals or can be expedited following syslog handling.

**Table 41-49 Subinterface Down—Subtype Events**

| Subtype Event Name                      | Description                                                                                                       |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <a href="#">Subinterface Down</a>       | Issued when the operational status of the subinterface changes from up to down.                                   |
| <a href="#">Subinterface Admin Down</a> | Issued when the administrative status of the subinterface changes from up to down.                                |
| <a href="#">Subinterface Up</a>         | Clearing event. Issued when the operational or administrative status of the subinterface changes from down to up. |

## Correlation

The Subinterface Down event searches for the root cause through the correlation mechanism. The Subinterface Admin Down event does not search for the root cause through the correlation mechanism. Subinterface Down is the root cause for every relevant network event caused by the Subinterface Down event.

## Source OID

See [VLAN Tagged Interface OID \(IVlanTaggedInterfaceOID\)](#), page 40-12.

## Tx Dormant

VNEs are configured to trace the Tx packet counters on their device ports. An alarm is issued when an Rx counter on a port drops below the configured thresholds. The upper and lower thresholds are defined in the registry under PortLayer1.



### Note

This alarm is disabled by default.

**Table 41-50** *Tx Dormant—Subtype Events*

| Subtype Event Name                | Description                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Tx Dormant</a>        | Issued when the number of Tx packets on a device port is lower than the configured threshold.                                   |
| <a href="#">Tx Dormant Normal</a> | Clearing event. Issued when the number of Tx packets on a device port returns to a number higher than the configured threshold. |

## Correlation

The port Tx Dormant alarm does not start a correlation process and is always issued as a root cause alarm.

## Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

## Tx Utilization

VNEs are configured to trace the Tx packets counters on their device ports. An alarm is issued when a Rx counter on a port crosses the configured thresholds. The thresholds, as defined in the registry under PortLayer1, are:

- Upper threshold—75%
- Lower threshold—50%

When a port has an adjacent peer (that is, it is connected to another port), a Link Utilization alarm is also issued. For more information on these alarms, see [Link Utilization](#), page 41-31.

**Table 41-51 Tx Utilization—Subtype Events**

| Subtype Event Name                    | Description                                                                                                                    |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Tx Overutilized</a>       | Issued when the number of Tx packets on a device port is higher than the configured threshold.                                 |
| <a href="#">Tx Utilization Normal</a> | Clearing event. Issued when the number of Tx packets on a device port returns to a number lower than the configured threshold. |

### Correlation

The port Tx Utilization alarm does not start a correlation process. No other alarm tries to correlate to this alarm, because there are no supported alarms that can be affected by the Tx Utilization on Port alarm.

### Impact Analysis

By default, impact analysis is not supported for this alarm, but can be enabled. If impact analysis is enabled, a flow starts to collect all the affected services passing this port. The endpoint of such services can be any termination point, such as an IP interface, VC, port, VRF, and so on.

### Source OID

See [Physical Layer OID \(IPhysicalLayerOid\)](#), page 40-9.

## VSI Down

The VSI Down alarm represents a state in which a virtual switch instance (VSI) administrative or operational status changes from up to down. The alarm is cleared after the status value is set to up.

The polling of the status property can happen at every standard polling interval, but it can be expedited following the trap handling of one of the following:

- VLAN interface status change of a VLAN that is connected to a VSI.
- Pseudowire status change of a pseudowire configured on the VSI.

The severity of the service alarms is Major, except for VSI Admin Down alarm.

**Table 41-52 VSI Down —Subtype Events**

| Subtype Event Name             | Description                           |
|--------------------------------|---------------------------------------|
| <a href="#">VSI Down</a>       | VSI is in operational status down.    |
| <a href="#">VSI Admin Down</a> | VSI is in administrative status down. |
| <a href="#">VSI Up</a>         | VSI status is up.                     |

### Correlation

The VSI Down alarm does not start a correlation process and is always issued as a root cause alarm.

### Source OID

See [VSI OID \(IVSIOID\)](#), page 40-12.

# Registry Parameters

The following registry parameters are included in this section:

- [Adaptive Polling, page 41-43](#)
- [All IP Interfaces Down, page 41-45](#)
- [ATM IMA Down, page 41-46](#)
- [BGP Link Down, page 41-50](#)
- [BGP Neighbor Loss, page 41-52](#)
- [BGP Process Down, page 41-53](#)
- [Broken LSP Discovered, page 41-54](#)
- [Card Down, page 41-55](#)
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- [CFM Domain Fault, page 41-57](#)
- [Cloud Problem, page 41-58](#)
- [Component Unreachable, page 41-60](#)
- [CPU Utilization, page 41-61](#)
- [Device Unsupported, page 41-62](#)
- [Discard Packets, page 41-63](#)
- [Dropped Packets, page 41-64](#)
- [DSO Bundle, page 41-65](#)
- [DS1 Path Link Down, page 41-67](#)
- [DS1 Path Port Down, page 41-70](#)
- [DS3 Path Link Down, page 41-72](#)
- [DS3 Path Port Down, page 41-75](#)
- [Dual Stack IP Changed, page 41-77](#)
- [DWDM Controller, page 41-79](#)
- [DWDM G709 Status, page 41-81](#)
- [EFP Down, page 41-83](#)
- [GRE Keepalive, page 41-85](#)
- [GRE Tunnel Down, page 41-87](#)
- [HSRP Group Status Changed, page 41-88](#)
- [Interface Status, page 41-90](#)
- [Investigation State, page 41-92](#)
- [L2TP Peer Not Established, page 41-93](#)
- [L2TP Sessions Threshold, page 41-95](#)
- [Layer 2 Tunnel Down, page 41-96](#)
- [LDP Neighbor Loss, page 41-98](#)
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- [Link Utilization, page 41-102](#)
- [Logical Port Down, page 41-103](#)
- [Memory Utilization, page 41-105](#)
- [MLPPP Bundle, page 41-106](#)
- [MPLS Black Hole Found, page 41-110](#)
- [MPLS Interface Removed, page 41-111](#)
- [MPLS TE FRR State Changed, page 41-112](#)
- [MPLS TE Tunnel Down, page 41-114](#)
- [Port Down, page 41-116](#)
- [Rx Dormant, page 41-118](#)
- [Rx Utilization, page 41-119](#)
- [Shelf Out, page 41-121](#)
- [Subinterface Down, page 41-122](#)
- [Tx Dormant, page 41-123](#)
- [Tx Utilization, page 41-124](#)
- [VSI Down, page 41-125](#)

## Adaptive Polling

**Table 41-53** VNE Switched to Low Polling Rate Due to CPU High Usage

| Service Alarm Setting   | Registry Parameter                                                       |
|-------------------------|--------------------------------------------------------------------------|
| Type                    | Adaptive Polling                                                         |
| Subtype                 | high polling interval                                                    |
| Correlation information | activate-flow=false                                                      |
|                         | correlate=true                                                           |
|                         | is-correlation-allowed=false                                             |
|                         | weight=0                                                                 |
| Northbound metadata     | alarm-type=124                                                           |
|                         | auto-cleared=false                                                       |
|                         | auto-removed=true                                                        |
|                         | functionality-type=SERVICE                                               |
|                         | severity=MAJOR                                                           |
|                         | gw-correlation-timeout=1200000                                           |
|                         | is-ticketable=true                                                       |
|                         | send-to-gw=true                                                          |
|                         | short-description=VNE switched to low polling rate due to CPU high usage |

**Table 41-54 VNE Switched to Maintenance Mode Due to CPU High Usage**

| Service Alarm Setting   | Registry Parameter                                                       |
|-------------------------|--------------------------------------------------------------------------|
| Type                    | Adaptive polling                                                         |
| Subtype                 | maintenance                                                              |
| Correlation information | activate-flow=false                                                      |
|                         | correlate=true                                                           |
|                         | is-correlation-allowed=false                                             |
|                         | weight=0                                                                 |
| Northbound metadata     | alarm-type=124                                                           |
|                         | auto-cleared=false                                                       |
|                         | auto-removed=true                                                        |
|                         | functionality-type=SERVICE                                               |
|                         | severity=CRITICAL                                                        |
|                         | gw-correlation-timeout=1200000                                           |
|                         | is-ticketable=true                                                       |
|                         | send-to-gw=true                                                          |
|                         | short-description=VNE switched to maintenance mode due to CPU high usage |

**Table 41-55 VNE Switched Back to Regular Polling Rate**

| Service Alarm Setting   | Registry Parameter                                          |
|-------------------------|-------------------------------------------------------------|
| Type                    | Adaptive polling                                            |
| Subtype                 | regular polling interval                                    |
| Correlation information | activate-flow=false                                         |
|                         | correlate=false                                             |
|                         | is-correlation-allowed=false                                |
|                         | weight=0                                                    |
| Northbound metadata     | alarm-type=124                                              |
|                         | auto-cleared=false                                          |
|                         | auto-removed=true                                           |
|                         | functionality-type=SERVICE                                  |
|                         | severity=CLEARED                                            |
|                         | gw-correlation-timeout=1200000                              |
|                         | is-ticketable=false                                         |
|                         | send-to-gw=true                                             |
|                         | short-description=VNE switched back to regular polling rate |

## All IP Interfaces Down

**Table 41-56 Active IP Interfaces Found**

| Event Setting           | Registry Parameter                           |
|-------------------------|----------------------------------------------|
| Type                    | All IP interfaces down                       |
| Subtype                 | active ip interfaces found                   |
| Correlation information | activate-flow=false                          |
|                         | correlate=false                              |
|                         | is-correlation-allowed=false                 |
|                         | weight=0                                     |
| Northbound metadata     | alarm-type=837                               |
|                         | auto-cleared=false                           |
|                         | auto-removed=true                            |
|                         | functionality-type=SERVICE                   |
|                         | severity=CLEARED                             |
|                         | gw-correlation-timeout=1200000               |
|                         | is-ticketable=false                          |
|                         | send-to-gw=true                              |
|                         | short-description=Active ip interfaces found |
| Flapping information    | clear-interval=240000                        |
|                         | flapping-interval=60000                      |
|                         | flapping-threshold=5                         |
|                         | update-interval=200000                       |
|                         | update-threshold=20                          |

**Table 41-57 All IP Interfaces Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | all ip interfaces down      |
| Subtype                 | all ip interfaces down      |
| Correlation information | activate-flow=false         |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | weight=750                  |

**Table 41-57 All IP Interfaces Down (continued)**

| Event Setting        | Registry Parameter                       |
|----------------------|------------------------------------------|
| Northbound metadata  | alarm-type=837                           |
|                      | auto-cleared=false                       |
|                      | auto-removed=true                        |
|                      | functionality-type=SERVICE               |
|                      | severity=MAJOR                           |
|                      | gw-correlation-timeout=1200000           |
|                      | is-ticketable=true                       |
|                      | send-to-gw=true                          |
|                      | short-description=All ip interfaces down |
| Flapping information | clear-interval=240000                    |
|                      | flapping-interval=60000                  |
|                      | flapping-threshold=5                     |
|                      | update-interval=200000                   |
|                      | update-threshold=20                      |

## ATM IMA Down

**Table 41-58 IMA Admin Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | IMA Down                    |
| Subtype                 | IMA Admin Down              |
| Correlation information | activate-flow=false         |
|                         | correlate=false             |
|                         | is-correlation-allowed=true |
|                         | weight=110000               |



**Table 41-58 IMA Admin Down (continued)**

| Event Setting       | Registry Parameter                          |
|---------------------|---------------------------------------------|
| Northbound metadata | alarm-type=681                              |
|                     | auto-cleared=false                          |
|                     | auto-removed=true                           |
|                     | auto-removed-timeout=5000000                |
|                     | duplication-counter=1                       |
|                     | functionality-type=SERVICE                  |
|                     | gw-correlation-timeout=1200000              |
|                     | is-ticketable=true                          |
|                     | priority=0                                  |
|                     | reduction-counter=1                         |
|                     | send-to-gw=true                             |
|                     | severity=CRITICAL                           |
|                     | short-description=ima administratively down |

**Table 41-59 IMA Oper Down**

| Event Setting           | Registry Parameter                       |
|-------------------------|------------------------------------------|
| Type                    | IMA Down                                 |
| Subtype                 | IMA Oper Down                            |
| Correlation information | activate-flow=false                      |
|                         | correlate=false                          |
|                         | is-correlation-allowed=false             |
|                         | weight=800                               |
| Northbound metadata     | alarm-type=680                           |
|                         | auto-cleared=false                       |
|                         | auto-removed=true                        |
|                         | auto-removed-timeout=5000000             |
|                         | duplication-counter=1                    |
|                         | functionality-type=SERVICE               |
|                         | gw-correlation-timeout=1200000           |
|                         | is-ticketable=true                       |
|                         | priority=0                               |
|                         | reduction-counter=1                      |
|                         | send-to-gw=true                          |
|                         | severity=MAJOR                           |
|                         | short-description=ima operationally down |

**Table 41-60 High Priority IMA Down**

| Event Setting           | Registry Parameter                       |
|-------------------------|------------------------------------------|
| Type                    | IMA Down                                 |
| Subtype                 | High Priority IMA Down                   |
| Correlation information | activate-flow=false                      |
|                         | correlate=false                          |
|                         | is-correlation-allowed=false             |
|                         | weight=800                               |
| Northbound metadata     | alarm-type=680                           |
|                         | auto-cleared=false                       |
|                         | auto-removed=true                        |
|                         | auto-removed-timeout=5000000             |
|                         | duplication-counter=1                    |
|                         | functionality-type=SERVICE               |
|                         | gw-correlation-timeout=1200000           |
|                         | is-ticketable=true                       |
|                         | priority=0                               |
|                         | reduction-counter=1                      |
|                         | send-to-gw=true                          |
|                         | severity=CRITICAL                        |
|                         | short-description=high priority ima down |

**Table 41-61 Medium Priority IMA Down**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | IMA Down                     |
| Subtype                 | Medium Priority IMA Down     |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | weight=800                   |

**Table 41-61 Medium Priority IMA Down (continued)**

| Event Setting       | Registry Parameter                       |
|---------------------|------------------------------------------|
| Northbound metadata | alarm-type=680                           |
|                     | auto-cleared=false                       |
|                     | auto-removed=true                        |
|                     | auto-removed-timeout=5000000             |
|                     | duplication-counter=1                    |
|                     | functionality-type=SERVICE               |
|                     | gw-correlation-timeout=1200000           |
|                     | is-ticketable=true                       |
|                     | priority=0                               |
|                     | reduction-counter=1                      |
|                     | send-to-gw=true                          |
|                     | severity=MAJOR                           |
|                     | short-description=high priority ima down |

**Table 41-62 Low Priority IMA Down**

| Event Setting           | Registry Parameter                       |
|-------------------------|------------------------------------------|
| Type                    | IMA Down                                 |
| Subtype                 | Low Priority IMA Down                    |
| Correlation information | activate-flow=false                      |
|                         | correlate=false                          |
|                         | is-correlation-allowed=false             |
|                         | weight=800                               |
| Northbound metadata     | alarm-type=680                           |
|                         | auto-cleared=false                       |
|                         | auto-removed=true                        |
|                         | auto-removed-timeout=5000000             |
|                         | duplication-counter=1                    |
|                         | functionality-type=SERVICE               |
|                         | gw-correlation-timeout=1200000           |
|                         | is-ticketable=true                       |
|                         | priority=0                               |
|                         | reduction-counter=1                      |
|                         | send-to-gw=true                          |
|                         | severity=MINOR                           |
|                         | short-description=high priority ima down |

## BGP Link Down

**Table 41-63** *BGP Link Down*

| Event Setting           | Registry Parameter              |
|-------------------------|---------------------------------|
| Type                    | BGP link down                   |
| Subtype                 | BGP link down                   |
| Correlation information | activate-flow=true              |
|                         | correlate=true                  |
|                         | is-correlation-allowed=true     |
|                         | weight=599                      |
| Northbound metadata     | alarm-type=1221                 |
|                         | auto-cleared=false              |
|                         | auto-removed=true               |
|                         | functionality-type=SERVICE      |
|                         | severity=MAJOR                  |
|                         | gw-correlation-timeout=1200000  |
|                         | is-ticketable=true              |
|                         | send-to-gw=true                 |
|                         | short-description=BGP link down |

## BGP Link Down VRF

**Table 41-64** *BGP Link Down VRF*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | BGP link down               |
| Subtype                 | BGP link down vrf           |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | weight=400                  |

**Table 41-64 BGP Link Down VRF (continued)**

| Event Setting       | Registry Parameter                  |
|---------------------|-------------------------------------|
| Northbound metadata | alarm-type=1221                     |
|                     | auto-cleared=false                  |
|                     | auto-removed=true                   |
|                     | functionality-type=SERVICE          |
|                     | severity=MAJOR                      |
|                     | gw-correlation-timeout=1200000      |
|                     | is-ticketable=true                  |
|                     | send-to-gw=true                     |
|                     | short-description=BGP link down vrf |

## BGP Link Up

**Table 41-65 BGP Link Up**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | BGP link down                  |
| Subtype                 | BGP link up                    |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=1221                |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=BGP link up  |

## BGP Neighbor Loss

**Table 41-66 BGP Neighbor Found**

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Type                    | BGP neighbor loss                    |
| Subtype                 | BGP neighbor found                   |
| Correlation information | activate-flow=false                  |
|                         | correlate=false                      |
|                         | is-correlation-allowed=false         |
|                         | weight=0                             |
| Northbound metadata     | alarm-type=127                       |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=CLEARED                     |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=false                  |
|                         | send-to-gw=true                      |
|                         | short-description=BGP neighbor found |

**Table 41-67 BGP Neighbor Loss**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | BGP neighbor loss                   |
| Subtype                 | BGP neighbor loss                   |
| Correlation information | activate-flow=true                  |
|                         | correlate=true                      |
|                         | is-correlation-allowed=true         |
|                         | weight=800                          |
| Northbound metadata     | alarm-type=127                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=MAJOR                      |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=true                  |
|                         | send-to-gw=true                     |
|                         | short-description=BGP neighbor loss |

**Table 41-68 BGP Neighbor Loss VRF**

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | BGP neighbor loss                       |
| Subtype                 | bgp-neighbor-loss-vrf                   |
| Correlation information | activate-flow=true                      |
|                         | correlate=true                          |
|                         | is-correlation-allowed=true             |
|                         | weight=400                              |
| Northbound metadata     | alarm-type=127                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=MAJOR                          |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | send-to-gw=true                         |
|                         | short-description=BGP neighbor loss vrf |

## BGP Process Down

**Table 41-69 BGP Process Down**

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Type                    | bgp-process-down                   |
| Subtype                 | bgp-process-down                   |
| Correlation information | activate-flow=false                |
|                         | correlate=false                    |
|                         | is-correlation-allowed=true        |
|                         | weight=850                         |
| Northbound metadata     | alarm-type=1501                    |
|                         | auto-cleared=false                 |
|                         | auto-removed=true                  |
|                         | functionality-type=SERVICE         |
|                         | severity=CRITICAL                  |
|                         | gw-correlation-timeout=1200000     |
|                         | is-ticketable=true                 |
|                         | send-to-gw=true                    |
|                         | short-description=BGP process down |

**Table 41-70** *BGP Process Up*

| Event Setting           | Registry Parameter               |
|-------------------------|----------------------------------|
| Type                    | bgp-process-down                 |
| Subtype                 | bgp-process-up                   |
| Correlation information | activate-flow=false              |
|                         | correlate=false                  |
|                         | is-correlation-allowed=false     |
|                         | weight=0                         |
| Northbound metadata     | alarm-type=1501                  |
|                         | auto-cleared=false               |
|                         | auto-removed=true                |
|                         | functionality-type=SERVICE       |
|                         | severity=CLEARED                 |
|                         | gw-correlation-timeout=1200000   |
|                         | is-ticketable=false              |
|                         | send-to-gw=true                  |
|                         | short-description=BGP process up |

## Broken LSP Discovered

**Table 41-71** *Broken LSP Discovered*

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | Broken LSP discovered                   |
| Subtype                 | Broken LSP discovered                   |
| Correlation information | activate-flow=false                     |
|                         | correlate=true                          |
|                         | is-correlation-allowed=false            |
|                         | weight=0                                |
| Northbound metadata     | alarm-type=129                          |
|                         | auto-cleared=true                       |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=MAJOR                          |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | send-to-gw=true                         |
|                         | short-description=Broken LSP discovered |



# Card Down

**Table 41-72**      *Card Down*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | card down                      |
| Subtype                 | card down                      |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=100000                  |
| Northbound metadata     | alarm-type=11                  |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=Card down    |

**Table 41-73**      *Card Up*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | card down                      |
| Subtype                 | card up                        |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=11                  |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Card up      |

# Card Out

**Table 41-74**      **Card In**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | card out                       |
| Subtype                 | card in                        |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=3                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Card in      |

**Table 41-75**      **Card Out**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | card out                       |
| Subtype                 | card out                       |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=100000                  |
| Northbound metadata     | alarm-type=3                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=Card out     |

**Table 41-76 Subcard Out**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | card out                       |
| Subtype                 | subcard out                    |
| Correlation information | activate-flow=false            |
|                         | correlate=true                 |
|                         | is-correlation-allowed=true    |
|                         | weight=1000                    |
| Northbound metadata     | alarm-type=3                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=Card out     |

## CFM Domain Fault

**Table 41-77 CFM Domain Aggregation Down**

| Event Setting           | Registry Parameter                         |
|-------------------------|--------------------------------------------|
| Type                    | CFM Domain Fault                           |
| Subtype                 | CFM Domain Aggregation Down                |
| Correlation information | activate-flow=false                        |
|                         | correlate=false                            |
|                         | is-correlation-allowed=true                |
|                         | weight=2                                   |
| Northbound metadata     | alarm-type=3016                            |
|                         | auto-cleared=false                         |
|                         | auto-removed=true                          |
|                         | auto-removed-timeout=5000000               |
|                         | duplication-counter=1                      |
|                         | functionality-type=SERVICE                 |
|                         | gw-correlation-timeout=9223372036854775807 |
|                         | is-ticketable=true                         |
|                         | priority=0                                 |

**Table 41-77** CFM Domain Aggregation Down (continued)

| Event Setting | Registry Parameter                 |
|---------------|------------------------------------|
|               | reduction-counter=1                |
|               | send-to-gw=true                    |
|               | severity=INFO                      |
|               | short-description=CFM Domain fault |

**Table 41-78** CFM Domain Aggregation Up

| Event Setting           | Registry Parameter                         |
|-------------------------|--------------------------------------------|
| Type                    | CFM Domain Fault                           |
| Subtype                 | CFM Domain Aggregation Up                  |
| Correlation information | activate-flow=false                        |
|                         | correlate=false                            |
|                         | is-correlation-allowed=false               |
|                         | weight=0                                   |
| Northbound metadata     | alarm-type=3016                            |
|                         | auto-cleared=false                         |
|                         | auto-removed=true                          |
|                         | auto-removed-timeout=5000000               |
|                         | duplication-counter=1                      |
|                         | functionality-type=SERVICE                 |
|                         | gw-correlation-timeout=1200000             |
|                         | is-ticketable=false                        |
|                         | priority=0                                 |
|                         | reduction-counter=1                        |
|                         | send-to-gw=true                            |
|                         | severity=CLEARED                           |
|                         | short-description=CFM Domain fault cleared |

## Cloud Problem

**Table 41-79** Cloud Problem

| Event Setting | Registry Parameter |
|---------------|--------------------|
| Type          | cloud problem      |
| Subtype       | cloud problem      |

**Table 41-79**      *Cloud Problem (continued)*

| Event Setting           | Registry Parameter              |
|-------------------------|---------------------------------|
| Correlation information | activate-flow=false             |
|                         | correlate=false                 |
|                         | is-correlation-allowed=true     |
|                         | weight=2000                     |
| Northbound metadata     | alarm-type=122                  |
|                         | auto-cleared=false              |
|                         | auto-removed=true               |
|                         | functionality-type=SERVICE      |
|                         | severity=INFO                   |
|                         | gw-correlation-timeout=1200000  |
|                         | is-ticketable=true              |
|                         | send-to-gw=true                 |
|                         | short-description=cloud problem |

**Table 41-80**      *Cloud Problem Fixed*

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Type                    | cloud problem                         |
| Subtype                 | cloud up                              |
| Correlation information | activate-flow=false                   |
|                         | correlate=false                       |
|                         | is-correlation-allowed=false          |
|                         | weight=0                              |
| Northbound metadata     | alarm-type=122                        |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | functionality-type=SERVICE            |
|                         | severity=CLEARED                      |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=false                   |
|                         | send-to-gw=true                       |
|                         | short-description=cloud problem fixed |

# Component Unreachable

**Table 41-81**      **Component Reachable**

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Type                    | component unreachable              |
| Subtype                 | component reachable                |
| Correlation information | activate-flow=false                |
|                         | correlate=false                    |
|                         | is-correlation-allowed=false       |
|                         | weight=0                           |
| Northbound metadata     | alarm-type=5                       |
|                         | auto-cleared=false                 |
|                         | auto-removed=true                  |
|                         | functionality-type=SERVICE         |
|                         | severity=CLEARED                   |
|                         | gw-correlation-timeout=1200000     |
|                         | is-ticketable=false                |
|                         | send-to-gw=true                    |
|                         | short-description=Device reachable |

**Table 41-82**      **Component Unreachable**

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Type                    | component unreachable                |
| Subtype                 | component unreachable                |
| Correlation information | activate-flow=true                   |
|                         | correlate=true                       |
|                         | is-correlation-allowed=true          |
|                         | weight=600                           |
| Northbound metadata     | alarm-type=5                         |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=MAJOR                       |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=true                   |
|                         | send-to-gw=true                      |
|                         | short-description=Device unreachable |

## CPU Utilization

**Table 41-83 CPU Normal Utilization**

| Event Setting           | Registry Parameter                       |
|-------------------------|------------------------------------------|
| Type                    | cpu utilization                          |
| Subtype                 | cpu normal use                           |
| Correlation information | activate-flow=false                      |
|                         | correlate=false                          |
|                         | is-correlation-allowed=false             |
|                         | weight=0                                 |
| Northbound metadata     | alarm-type=17                            |
|                         | auto-cleared=false                       |
|                         | auto-removed=true                        |
|                         | functionality-type=SERVICE               |
|                         | severity=CLEARED                         |
|                         | gw-correlation-timeout=1200000           |
|                         | is-ticketable=false                      |
|                         | send-to-gw=true                          |
|                         | short-description=CPU normal utilization |

**Table 41-84 CPU Overutilized**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | cpu utilization                     |
| Subtype                 | cpu over utilized                   |
| Correlation information | activate-flow=false                 |
|                         | correlate=false                     |
|                         | is-correlation-allowed=false        |
|                         | weight=0                            |
| Northbound metadata     | alarm-type=17                       |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=MAJOR                      |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=true                  |
|                         | send-to-gw=true                     |
|                         | short-description=CPU over utilized |

## Device Unsupported

**Table 41-85**     *Device Initializing*

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Type                    | device unsupported                    |
| Subtype                 | device initializing                   |
| Correlation information | activate-flow=false                   |
|                         | correlate=false                       |
|                         | is-correlation-allowed=false          |
|                         | weight=0                              |
| Northbound metadata     | alarm-type=16                         |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | functionality-type=SERVICE            |
|                         | severity=CRITICAL                     |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=true                    |
|                         | send-to-gw=true                       |
|                         | short-description=Device initializing |

**Table 41-86**     *Device Unsupported*

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Type                    | device unsupported                   |
| Subtype                 | device unsupported                   |
| Correlation information | activate-flow=false                  |
|                         | correlate=false                      |
|                         | is-correlation-allowed=false         |
|                         | weight=0                             |
| Northbound metadata     | alarm-type=16                        |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=CRITICAL                    |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=true                   |
|                         | send-to-gw=true                      |
|                         | short-description=Device unsupported |



## Discard Packets

**Table 41-87**      *Discard Packets*

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Type                    | discard packets                      |
| Subtype                 | discard packets                      |
| Correlation information | activate-flow=false                  |
|                         | correlate=true                       |
|                         | is-correlation-allowed=false         |
|                         | weight=0                             |
| Northbound metadata     | alarm-type=9                         |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=MINOR                       |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=true                   |
|                         | send-to-gw=true                      |
|                         | short-description=Drops exceed limit |

**Table 41-88**      *Normal Discard Packets*

| Event Setting           | Registry Parameter                         |
|-------------------------|--------------------------------------------|
| Type                    | discard packets                            |
| Subtype                 | normal discard packets                     |
| Correlation information | activate-flow=false                        |
|                         | correlate=false                            |
|                         | is-correlation-allowed=false               |
|                         | weight=0                                   |
| Northbound metadata     | alarm-type=9                               |
|                         | auto-cleared=false                         |
|                         | auto-removed=true                          |
|                         | functionality-type=SERVICE                 |
|                         | severity=CLEARED                           |
|                         | gw-correlation-timeout=1200000             |
|                         | is-ticketable=false                        |
|                         | send-to-gw=true                            |
|                         | short-description=Drops don't exceed limit |

## Dropped Packets

**Table 41-89 Dropped Packets on Port**

| Event Setting           | Registry Parameter                        |
|-------------------------|-------------------------------------------|
| Type                    | dropped packets                           |
| Subtype                 | dropped packets                           |
| Correlation information | activate-flow=false                       |
|                         | correlate=false                           |
|                         | is-correlation-allowed=false              |
|                         | weight=0                                  |
| Northbound metadata     | alarm-type=10                             |
|                         | auto-cleared=false                        |
|                         | auto-removed=true                         |
|                         | functionality-type=SERVICE                |
|                         | severity=MINOR                            |
|                         | gw-correlation-timeout=1200000            |
|                         | is-ticketable=true                        |
|                         | send-to-gw=true                           |
|                         | short-description=Dropped packets on port |

**Table 41-90 Stopped Dropping Packets on Port**

| Event Setting           | Registry Parameter                                 |
|-------------------------|----------------------------------------------------|
| Type                    | dropped packets                                    |
| Subtype                 | normal dropped packets                             |
| Correlation information | activate-flow=false                                |
|                         | correlate=false                                    |
|                         | is-correlation-allowed=false                       |
|                         | weight=0                                           |
| Northbound metadata     | alarm-type=10                                      |
|                         | auto-cleared=false                                 |
|                         | auto-removed=true                                  |
|                         | functionality-type=SERVICE                         |
|                         | severity=CLEARED                                   |
|                         | gw-correlation-timeout=1200000                     |
|                         | is-ticketable=false                                |
|                         | send-to-gw=true                                    |
|                         | short-description=Stopped dropping packets on port |

## DSO Bundle

**Table 41-91**      *DSO Bundle Admin Down*

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | DSO Bundle Down                         |
| Subtype                 | DSO Bundle Admin Down                   |
| Correlation information | activate-flow=false                     |
|                         | correlate=false                         |
|                         | is-correlation-allowed=true             |
|                         | root-cause-timeout=420000               |
|                         | weight=750                              |
| Northbound metadata     | alarm-type=660                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | auto-removed-timeout=5000000            |
|                         | duplication-counter=1                   |
|                         | functionality-type=SERVICE              |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | priority=0                              |
|                         | reduction-counter=1                     |
|                         | send-to-gw=true                         |
|                         | severity=MAJOR                          |
|                         | short-description=ds0 bundle admin down |

**Table 41-92**      *DSO Bundle Oper Down*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DSO Bundle Down             |
| Subtype                 | DSO Bundle Oper Down        |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=725                  |

**Table 41-92** *DSO Bundle Oper Down (continued)*

| Event Setting       | Registry Parameter                     |
|---------------------|----------------------------------------|
| Northbound metadata | alarm-type=660                         |
|                     | auto-cleared=false                     |
|                     | auto-removed=true                      |
|                     | auto-removed-timeout=5000000           |
|                     | duplication-counter=1                  |
|                     | functionality-type=SERVICE             |
|                     | gw-correlation-timeout=1200000         |
|                     | is-ticketable=true                     |
|                     | priority=0                             |
|                     | reduction-counter=1                    |
|                     | send-to-gw=true                        |
|                     | severity=MAJOR                         |
|                     | short-description=ds0 bundle oper down |

**Table 41-93** *DSO Bundle Up*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DSO Bundle Down              |
| Subtype                 | DSO Bundle Up                |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-93** *DS0 Bundle Up (continued)*

| Event Setting       | Registry Parameter              |
|---------------------|---------------------------------|
| Northbound metadata | alarm-type=660                  |
|                     | auto-cleared=false              |
|                     | auto-removed=true               |
|                     | auto-removed-timeout=5000000    |
|                     | duplication-counter=1           |
|                     | functionality-type=SERVICE      |
|                     | gw-correlation-timeout=1200000  |
|                     | is-ticketable=false             |
|                     | priority=0                      |
|                     | reduction-counter=1             |
|                     | send-to-gw=true                 |
|                     | severity=CLEARED                |
|                     | short-description=ds0 bundle up |

## DS1 Path Link Down

**Table 41-94** *DS1 Path Link Down Due to Admin Down*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS1 Path Link Down          |
| Subtype                 | DS1 Path Link Admin Down    |
| Correlation information | activate-flow=false         |
|                         | correlate=false             |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=815                  |

**Table 41-94**      *DS1 Path Link Down Due to Admin Down (continued)*

| Event Setting       | Registry Parameter                                     |
|---------------------|--------------------------------------------------------|
| Northbound metadata | alarm-type=1344                                        |
|                     | auto-cleared=false                                     |
|                     | auto-removed=true                                      |
|                     | auto-removed-timeout=5000000                           |
|                     | duplication-counter=1                                  |
|                     | functionality-type=SERVICE                             |
|                     | gw-correlation-timeout=1200000                         |
|                     | is-ticketable=true                                     |
|                     | priority=0                                             |
|                     | reduction-counter=1                                    |
|                     | send-to-gw=true                                        |
|                     | severity=CRITICAL                                      |
|                     | short-description=DS1 Path Link down due to admin down |

**Table 41-95**      *DS1 Path Link Down Due to Oper Down*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS1 Path Link Down          |
| Subtype                 | DS1 Path Link Oper Down     |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=810                  |

**Table 41-95** *DS1 Path Link Down Due to Oper Down (continued)*

| Event Setting       | Registry Parameter                                    |
|---------------------|-------------------------------------------------------|
| Northbound metadata | alarm-type=1344                                       |
|                     | auto-cleared=false                                    |
|                     | auto-removed=true                                     |
|                     | auto-removed-timeout=5000000                          |
|                     | duplication-counter=1                                 |
|                     | functionality-type=SERVICE                            |
|                     | gw-correlation-timeout=1200000                        |
|                     | is-ticketable=true                                    |
|                     | priority=0                                            |
|                     | reduction-counter=1                                   |
|                     | send-to-gw=true                                       |
|                     | severity=CRITICAL                                     |
|                     | short-description=DS1 Path Link down due to oper down |

**Table 41-96** *DS1 Path Link Up*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DS1 Path Link Down           |
| Subtype                 | DS1 Path Link Up             |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-96 DS1 Path Link Up (continued)**

| Event Setting       | Registry Parameter                 |
|---------------------|------------------------------------|
| Northbound metadata | alarm-type=1344                    |
|                     | auto-cleared=false                 |
|                     | auto-removed=true                  |
|                     | auto-removed-timeout=5000000       |
|                     | duplication-counter=1              |
|                     | functionality-type=SERVICE         |
|                     | gw-correlation-timeout=1200000     |
|                     | is-ticketable=false                |
|                     | priority=0                         |
|                     | reduction-counter=1                |
|                     | send-to-gw=true                    |
|                     | severity=CLEARED                   |
|                     | short-description=DS1 Path Link up |

## DS1 Path Port Down

**Table 41-97 DS1 Path Port Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS1 Path Port Down          |
| Subtype                 | DS1 Path Port Down          |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=810                  |



**Table 41-97 DS1 Path Port Down (continued)**

| Event Setting       | Registry Parameter              |
|---------------------|---------------------------------|
| Northbound metadata | alarm-type=1322                 |
|                     | auto-cleared=false              |
|                     | auto-removed=true               |
|                     | auto-removed-timeout=5000000    |
|                     | duplication-counter=1           |
|                     | functionality-type=SERVICE      |
|                     | gw-correlation-timeout=1200000  |
|                     | is-ticketable=true              |
|                     | priority=0                      |
|                     | reduction-counter=1             |
|                     | send-to-gw=true                 |
|                     | severity=MAJOR                  |
|                     | short-description=DS1 Path down |

**Table 41-98 DS1 Path Port Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DS1 Path Port Down           |
| Subtype                 | DS1 Path Port Up             |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-98 DS1 Path Port Up (continued)**

| Event Setting       | Registry Parameter             |
|---------------------|--------------------------------|
| Northbound metadata | alarm-type=1322                |
|                     | auto-cleared=false             |
|                     | auto-removed=true              |
|                     | auto-removed-timeout=5000000   |
|                     | duplication-counter=1          |
|                     | functionality-type=SERVICE     |
|                     | gw-correlation-timeout=1200000 |
|                     | is-ticketable=false            |
|                     | priority=0                     |
|                     | reduction-counter=1            |
|                     | send-to-gw=true                |
|                     | severity=CLEARED               |
|                     | short-description=DS1 Path up  |

## DS3 Path Link Down

**Table 41-99 DS3 Path Link Down Due to Admin Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS3 Path Link Down          |
| Subtype                 | DS3 Path Link Admin Down    |
| Correlation information | activate-flow=false         |
|                         | correlate=false             |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=825                  |

**Table 41-99 DS3 Path Link Down Due to Admin Down (continued)**

| Event Setting       | Registry Parameter                                     |
|---------------------|--------------------------------------------------------|
| Northbound metadata | alarm-type=1356                                        |
|                     | auto-cleared=false                                     |
|                     | auto-removed=true                                      |
|                     | auto-removed-timeout=5000000                           |
|                     | duplication-counter=1                                  |
|                     | functionality-type=SERVICE                             |
|                     | gw-correlation-timeout=1200000                         |
|                     | is-ticketable=true                                     |
|                     | priority=0                                             |
|                     | reduction-counter=1                                    |
|                     | send-to-gw=true                                        |
|                     | severity=CRITICAL                                      |
|                     | short-description=DS3 Path Link down due to admin down |

**Table 41-100 DS3 Path Link Down Due to Oper Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS3 Path Link Down          |
| Subtype                 | DS3 Path Link Oper Down     |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=820                  |

**Table 41-100 DS3 Path Link Down Due to Oper Down (continued)**

| Event Setting       | Registry Parameter                                    |
|---------------------|-------------------------------------------------------|
| Northbound metadata | alarm-type=1356                                       |
|                     | auto-cleared=false                                    |
|                     | auto-removed=true                                     |
|                     | auto-removed-timeout=5000000                          |
|                     | duplication-counter=1                                 |
|                     | functionality-type=SERVICE                            |
|                     | gw-correlation-timeout=1200000                        |
|                     | is-ticketable=true                                    |
|                     | priority=0                                            |
|                     | reduction-counter=1                                   |
|                     | send-to-gw=true                                       |
|                     | severity=CRITICAL                                     |
|                     | short-description=DS3 Path Link down due to oper down |

**Table 41-101 DS3 Path Link Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DS3 Path Link Down           |
| Subtype                 | DS3 Path Link Up             |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-101 DS3 Path Link Up (continued)**

| Event Setting       | Registry Parameter             |
|---------------------|--------------------------------|
| Northbound metadata | alarm-type=1356                |
|                     | auto-cleared=false             |
|                     | auto-removed=true              |
|                     | auto-removed-timeout=5000000   |
|                     | duplication-counter=1          |
|                     | functionality-type=SERVICE     |
|                     | gw-correlation-timeout=1200000 |
|                     | is-ticketable=false            |
|                     | priority=0                     |
|                     | reduction-counter=1            |
|                     | send-to-gw=true                |
|                     | severity=CLEARED               |
|                     | short-description=DS3 Path up  |

## DS3 Path Port Down

**Table 41-102 DS3 Path Port Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | DS3 Path Port Down          |
| Subtype                 | DS3 Path Port Down          |
| Correlation information | activate-flow=true          |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | root-cause-timeout=420000   |
|                         | weight=820                  |

**Table 41-102 DS3 Path Port Down (continued)**

| Event Setting       | Registry Parameter                      |
|---------------------|-----------------------------------------|
| Northbound metadata | alarm-type=660                          |
|                     | auto-cleared=false                      |
|                     | auto-removed=true                       |
|                     | auto-removed-timeout=5000000            |
|                     | duplication-counter=1                   |
|                     | functionality-type=SERVICE              |
|                     | gw-correlation-timeout=1200000          |
|                     | is-ticketable=true                      |
|                     | priority=0                              |
|                     | reduction-counter=1                     |
|                     | send-to-gw=true                         |
|                     | severity=MAJOR                          |
|                     | short-description=ds0 bundle admin down |

**Table 41-103 DS3 Path Port Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DS3 Path Port Down           |
| Subtype                 | DS3 Path Port Up             |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-103 DS3 Path Port Up (continued)**

| Event Setting       | Registry Parameter                     |
|---------------------|----------------------------------------|
| Northbound metadata | alarm-type=660                         |
|                     | auto-cleared=false                     |
|                     | auto-removed=true                      |
|                     | auto-removed-timeout=5000000           |
|                     | duplication-counter=1                  |
|                     | functionality-type=SERVICE             |
|                     | gw-correlation-timeout=1200000         |
|                     | is-ticketable=true                     |
|                     | priority=0                             |
|                     | reduction-counter=1                    |
|                     | send-to-gw=true                        |
|                     | severity=MAJOR                         |
|                     | short-description=ds0 bundle oper down |

## Dual Stack IP Changed

**Table 41-104 Dual Stack IP Removed**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | Dual stack IP changed        |
| Subtype                 | Dual stack IP removed        |
| Correlation information | activate-flow=true           |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=820                   |

**Table 41-104** *Dual Stack IP Removed (continued)*

| Event Setting       | Registry Parameter                      |
|---------------------|-----------------------------------------|
| Northbound metadata | alarm-type=1170                         |
|                     | auto-cleared=false                      |
|                     | auto-removed=true                       |
|                     | auto-removed-timeout=5000000            |
|                     | duplication-counter=1                   |
|                     | functionality-type=SERVICE              |
|                     | gw-correlation-timeout=1200000          |
|                     | is-ticketable=true                      |
|                     | priority=0                              |
|                     | reduction-counter=1                     |
|                     | send-to-gw=true                         |
|                     | severity=MINOR                          |
|                     | short-description=Dual stack IP removed |

**Table 41-105** *Dual Stack IP Added*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DS3 Path Port Down           |
| Subtype                 | DS3 Path Port Up             |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |



**Table 41-105** *Dual Stack IP Added (continued)*

| Event Setting       | Registry Parameter                    |
|---------------------|---------------------------------------|
| Northbound metadata | alarm-type=1170                       |
|                     | auto-cleared=false                    |
|                     | auto-removed=true                     |
|                     | auto-removed-timeout=5000000          |
|                     | duplication-counter=1                 |
|                     | functionality-type=SERVICE            |
|                     | gw-correlation-timeout=1200000        |
|                     | is-ticketable=false                   |
|                     | priority=0                            |
|                     | reduction-counter=1                   |
|                     | send-to-gw=true                       |
|                     | severity=CLEARED                      |
|                     | short-description=Dual stack IP added |

## DWDM Controller

**Table 41-106** *DWDM Controller Down*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DWDM Controller              |
| Subtype                 | DWDM Controller Down         |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-106 DWDM Controller Down (continued)**

| Event Setting       | Registry Parameter                     |
|---------------------|----------------------------------------|
| Northbound metadata | alarm-type=1888                        |
|                     | auto-cleared=false                     |
|                     | auto-removed=true                      |
|                     | auto-removed-timeout=5000000           |
|                     | duplication-counter=1                  |
|                     | functionality-type=SERVICE             |
|                     | gw-correlation-timeout=1200000         |
|                     | is-ticketable=true                     |
|                     | priority=0                             |
|                     | reduction-counter=1                    |
|                     | send-to-gw=true                        |
|                     | severity=MAJOR                         |
|                     | short-description=dwdm controller down |

**Table 41-107 DWDM Controller Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DWDM Controller              |
| Subtype                 | DWDM Controller Up           |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-107 DWDM Controller Up (continued)**

| Event Setting       | Registry Parameter                   |
|---------------------|--------------------------------------|
| Northbound metadata | alarm-type=1888                      |
|                     | auto-cleared=false                   |
|                     | auto-removed=true                    |
|                     | auto-removed-timeout=5000000         |
|                     | duplication-counter=1                |
|                     | functionality-type=SERVICE           |
|                     | gw-correlation-timeout=1200000       |
|                     | is-ticketable=false                  |
|                     | priority=0                           |
|                     | reduction-counter=1                  |
|                     | send-to-gw=true                      |
|                     | severity=CLEARED                     |
|                     | short-description=dwdm controller up |

## DWDM G709 Status

**Table 41-108 DWDM G709 Status Down**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DWDM G709 Status             |
| Subtype                 | DWDM G709 Status Down        |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-108 DWDM G709 Status Down (continued)**

| Event Setting       | Registry Parameter                      |
|---------------------|-----------------------------------------|
| Northbound metadata | alarm-type=1889                         |
|                     | auto-cleared=false                      |
|                     | auto-removed=true                       |
|                     | auto-removed-timeout=5000000            |
|                     | duplication-counter=1                   |
|                     | functionality-type=SERVICE              |
|                     | gw-correlation-timeout=1200000          |
|                     | is-ticketable=true                      |
|                     | priority=0                              |
|                     | reduction-counter=1                     |
|                     | send-to-gw=true                         |
|                     | severity=MINOR                          |
|                     | short-description=dwdm g709 status down |

**Table 41-109 DWDM G709 Status Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | DWDM G709 Status             |
| Subtype                 | DWDM G709 Status Up          |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | root-cause-timeout=420000    |
|                         | weight=0                     |

**Table 41-109 DWDM G709 Status Up (continued)**

| Event Setting       | Registry Parameter                    |
|---------------------|---------------------------------------|
| Northbound metadata | alarm-type=1889                       |
|                     | auto-cleared=false                    |
|                     | auto-removed=true                     |
|                     | auto-removed-timeout=5000000          |
|                     | duplication-counter=1                 |
|                     | functionality-type=SERVICE            |
|                     | gw-correlation-timeout=1200000        |
|                     | is-ticketable=false                   |
|                     | priority=0                            |
|                     | reduction-counter=1                   |
|                     | send-to-gw=true                       |
|                     | severity=CLEARED                      |
|                     | short-description=dwdm g709 status up |

## EFP Down

**Table 41-110 EFP Admin Down**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | efp down                       |
| Subtype                 | efp admin down                 |
| Correlation information | activate-flow=true             |
|                         | correlate=true                 |
|                         | is-correlation-allowed=true    |
|                         | weight=849                     |
| Northbound metadata     | alarm-type=918                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=EFP Down     |

**Table 41-111 EFP Down Due to Error Disabled**

| Event Setting           | Registry Parameter                               |
|-------------------------|--------------------------------------------------|
| Type                    | efp down                                         |
| Subtype                 | efp down due to error disabled                   |
| Correlation information | activate-flow=true                               |
|                         | correlate=true                                   |
|                         | is-correlation-allowed=true                      |
|                         | weight=849                                       |
| Northbound metadata     | alarm-type=918                                   |
|                         | auto-cleared=false                               |
|                         | auto-removed=true                                |
|                         | functionality-type=SERVICE                       |
|                         | severity=MAJOR                                   |
|                         | gw-correlation-timeout=1200000                   |
|                         | is-ticketable=true                               |
|                         | send-to-gw=true                                  |
|                         | short-description=EFP down due to error disabled |

**Table 41-112 EFP Oper Down**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | efp down                       |
| Subtype                 | efp oper down                  |
| Correlation information | activate-flow=true             |
|                         | correlate=true                 |
|                         | is-correlation-allowed=true    |
|                         | weight=849                     |
| Northbound metadata     | alarm-type=918                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=EFP down     |

**Table 41-113** *EFP Up*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | efp down                       |
| Subtype                 | efp up                         |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=918                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=EFP up       |

## GRE Keepalive

**Table 41-114** *Keepalive Not Set*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | Keepalive                    |
| Subtype                 | Keepalive not set            |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | weight=0                     |

**Table 41-114** *Keepalive Not Set (continued)*

| Event Setting       | Registry Parameter                         |
|---------------------|--------------------------------------------|
| Northbound metadata | alarm-type=915                             |
|                     | auto-cleared=false                         |
|                     | auto-removed=true                          |
|                     | auto-removed-timeout=5000000               |
|                     | duplication-counter=1                      |
|                     | functionality-type=SERVICE                 |
|                     | gw-correlation-timeout=1200000             |
|                     | is-ticketable=true                         |
|                     | priority=0                                 |
|                     | reduction-counter=1                        |
|                     | send-to-gw=true                            |
|                     | severity=MINOR                             |
|                     | short-description=Keepalive not configured |

**Table 41-115** *Keepalive Set*

| Event Setting           | Registry Parameter                     |
|-------------------------|----------------------------------------|
| Type                    | Keepalive                              |
| Subtype                 | Keepalive set                          |
| Correlation information | activate-flow=false                    |
|                         | correlate=false                        |
|                         | is-correlation-allowed=false           |
|                         | weight=0                               |
| Northbound metadata     | alarm-type=915                         |
|                         | auto-cleared=false                     |
|                         | auto-removed=true                      |
|                         | auto-removed-timeout=5000000           |
|                         | duplication-counter=1                  |
|                         | functionality-type=SERVICE             |
|                         | gw-correlation-timeout=1200000         |
|                         | is-ticketable=false                    |
|                         | priority=0                             |
|                         | reduction-counter=1                    |
|                         | send-to-gw=true                        |
|                         | severity=CLEARED                       |
|                         | short-description=Keepalive configured |



## GRE Tunnel Down

**Table 41-116** GRE Tunnel Down

| Event Setting           | Registry Parameter                |
|-------------------------|-----------------------------------|
| Type                    | GRE tunnel down                   |
| Subtype                 | GRE tunnel down                   |
| Correlation information | activate-flow=true                |
|                         | correlate=true                    |
|                         | is-correlation-allowed=true       |
|                         | weight=830                        |
| Northbound metadata     | alarm-type=358                    |
|                         | auto-cleared=false                |
|                         | auto-removed=true                 |
|                         | functionality-type=SERVICE        |
|                         | severity=MAJOR                    |
|                         | gw-correlation-timeout=1200000    |
|                         | is-ticketable=true                |
|                         | send-to-gw=true                   |
|                         | short-description=GRE tunnel down |

**Table 41-117** GRE Tunnel Up

| Event Setting           | Registry Parameter              |
|-------------------------|---------------------------------|
| Type                    | GRE tunnel down                 |
| Subtype                 | GRE tunnel up                   |
| Correlation information | activate-flow=false             |
|                         | correlate=false                 |
|                         | is-correlation-allowed=false    |
|                         | weight=0                        |
| Northbound metadata     | alarm-type=358                  |
|                         | auto-cleared=false              |
|                         | auto-removed=true               |
|                         | functionality-type=SERVICE      |
|                         | severity=CLEARED                |
|                         | gw-correlation-timeout=1200000  |
|                         | is-ticketable=false             |
|                         | send-to-gw=true                 |
|                         | short-description=GRE tunnel up |

## HSRP Group Status Changed

**Table 41-118 Primary HSRP Interface Is Active**

| Event Setting           | Registry Parameter                                 |
|-------------------------|----------------------------------------------------|
| Type                    | hsrp group status changed                          |
| Subtype                 | Primary HSRP interface is active                   |
| Correlation information | activate-flow=false                                |
|                         | correlate=false                                    |
|                         | is-correlation-allowed=false                       |
|                         | weight=0                                           |
| Northbound metadata     | alarm-type=22                                      |
|                         | auto-cleared=false                                 |
|                         | auto-removed=true                                  |
|                         | functionality-type=SERVICE                         |
|                         | severity=CLEARED                                   |
|                         | gw-correlation-timeout=1200000                     |
|                         | is-ticketable=false                                |
|                         | send-to-gw=true                                    |
|                         | short-description=Primary HSRP interface is active |

**Table 41-119 Primary HSRP Interface Is Not Active**

| Event Setting           | Registry Parameter                                     |
|-------------------------|--------------------------------------------------------|
| Type                    | hsrp group status changed                              |
| Subtype                 | Primary HSRP interface is not active                   |
| Correlation information | activate-flow=true                                     |
|                         | correlate=true                                         |
|                         | is-correlation-allowed=true                            |
|                         | weight=720                                             |
| Northbound metadata     | alarm-type=22                                          |
|                         | auto-cleared=false                                     |
|                         | auto-removed=true                                      |
|                         | functionality-type=SERVICE                             |
|                         | severity=MAJOR                                         |
|                         | gw-correlation-timeout=1200000                         |
|                         | is-ticketable=true                                     |
|                         | send-to-gw=true                                        |
|                         | short-description=Primary HSRP interface is not active |

**Table 41-120 Secondary HSRP Interface Is Active**

| Event Setting           | Registry Parameter                                   |
|-------------------------|------------------------------------------------------|
| Type                    | hsrp group status changed                            |
| Subtype                 | Secondary HSRP interface is active                   |
| Correlation information | activate-flow=true                                   |
|                         | correlate=true                                       |
|                         | is-correlation-allowed=true                          |
|                         | weight=720                                           |
| Northbound metadata     | alarm-type=22                                        |
|                         | auto-cleared=false                                   |
|                         | auto-removed=true                                    |
|                         | functionality-type=SERVICE                           |
|                         | severity=MAJOR                                       |
|                         | gw-correlation-timeout=1200000                       |
|                         | is-ticketable=true                                   |
|                         | send-to-gw=true                                      |
|                         | short-description=Secondary HSRP interface is active |

**Table 41-121 Secondary HSRP Interface Is Not Active**

| Event Setting           | Registry Parameter                                       |
|-------------------------|----------------------------------------------------------|
| Type                    | hsrp group status changed                                |
| Subtype                 | Secondary HSRP interface is not active                   |
| Correlation information | activate-flow=false                                      |
|                         | correlate=false                                          |
|                         | is-correlation-allowed=false                             |
|                         | weight=0                                                 |
| Northbound metadata     | alarm-type=22                                            |
|                         | auto-cleared=false                                       |
|                         | auto-removed=true                                        |
|                         | functionality-type=SERVICE                               |
|                         | severity=CLEARED                                         |
|                         | gw-correlation-timeout=1200000                           |
|                         | is-ticketable=false                                      |
|                         | send-to-gw=true                                          |
|                         | short-description=Secondary HSRP interface is not active |

## Interface Status

**Table 41-122** *Interface Status Down GRE Tunnel*

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | interface status                        |
| Subtype                 | interface status down GRE tunnel        |
| Correlation information | activate-flow=false                     |
|                         | correlate=true                          |
|                         | is-correlation-allowed=true             |
|                         | weight=825                              |
| Northbound metadata     | alarm-type=700                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=MAJOR                          |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | send-to-gw=true                         |
|                         | short-description=Interface status down |
| Flapping information    | clear-interval=240000                   |
|                         | flapping-interval=60000                 |
|                         | flapping-threshold=5                    |
|                         | update-interval=200000                  |
|                         | update-threshold=20                     |

**Table 41-123** *Interface Status Down Connection*

| Event Setting           | Registry Parameter               |
|-------------------------|----------------------------------|
| Type                    | interface status                 |
| Subtype                 | interface status down connection |
| Correlation information | activate-flow=true               |
|                         | correlate=true                   |
|                         | is-correlation-allowed=true      |
|                         | weight=500                       |

**Table 41-123** *Interface Status Down Connection (continued)*

| Event Setting        | Registry Parameter                      |
|----------------------|-----------------------------------------|
| Northbound metadata  | alarm-type=700                          |
|                      | auto-cleared=false                      |
|                      | auto-removed=true                       |
|                      | functionality-type=SERVICE              |
|                      | severity=MAJOR                          |
|                      | gw-correlation-timeout=1200000          |
|                      | is-ticketable=true                      |
|                      | send-to-gw=true                         |
|                      | short-description=Interface status down |
| Flapping information | clear-interval=240000                   |
|                      | flapping-interval=60000                 |
|                      | flapping-threshold=5                    |
|                      | update-interval=200000                  |
|                      | update-threshold=20                     |

**Table 41-124** *Interface Status Down Nonconnection*

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | interface status                        |
| Subtype                 | interface status down non connection    |
| Correlation information | activate-flow=true                      |
|                         | correlate=true                          |
|                         | is-correlation-allowed=true             |
|                         | weight=700                              |
| Northbound metadata     | alarm-type=700                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=MAJOR                          |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | send-to-gw=true                         |
|                         | short-description=Interface status down |

**Table 41-124** *Interface Status Down Nonconnection (continued)*

| Event Setting        | Registry Parameter      |
|----------------------|-------------------------|
| Flapping information | clear-interval=240000   |
|                      | flapping-interval=60000 |
|                      | flapping-threshold=5    |
|                      | update-interval=200000  |
|                      | update-threshold=20     |

**Table 41-125** *Interface Status Up*

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Type                    | interface status                      |
| Subtype                 | interface status up                   |
| Correlation information | activate-flow=false                   |
|                         | correlate=false                       |
|                         | is-correlation-allowed=false          |
|                         | weight=0                              |
| Northbound metadata     | alarm-type=700                        |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | functionality-type=SERVICE            |
|                         | severity=CLEARED                      |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=false                   |
|                         | send-to-gw=true                       |
| Flapping information    | short-description=Interface status up |
|                         | clear-interval=240000                 |
|                         | flapping-interval=60000               |
|                         | flapping-threshold=5                  |
|                         | update-interval=200000                |
|                         | update-threshold=20                   |

## Investigation State

**Table 41-126** *Investigation State*

| Event Setting | Registry Parameter                     |
|---------------|----------------------------------------|
| Type          | investigation state                    |
| Subtype       | investigation state module unsupported |

**Table 41-126 Investigation State (continued)**

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Correlation information | activate-flow=false                  |
|                         | correlate=false                      |
|                         | is-correlation-allowed=false         |
|                         | weight=0                             |
| Northbound metadata     | alarm-type=262                       |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=CRITICAL                    |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=true                   |
|                         | send-to-gw=true                      |
|                         | short-description=Module unsupported |

## L2TP Peer Not Established

**Table 41-127 L2TP Peer Established**

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | l2tp peer not established               |
| Subtype                 | l2tp peer established                   |
| Correlation information | activate-flow=false                     |
|                         | correlate=false                         |
|                         | is-correlation-allowed=false            |
|                         | weight=0                                |
| Northbound metadata     | alarm-type=185                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=CLEARED                        |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=false                     |
|                         | send-to-gw=true                         |
|                         | short-description=l2tp peer established |

**Table 41-127 L2TP Peer Established (continued)**

| Event Setting        | Registry Parameter      |
|----------------------|-------------------------|
| Flapping information | clear-interval=240000   |
|                      | flapping-interval=60000 |
|                      | flapping-threshold=5    |
|                      | update-interval=200000  |
|                      | update-threshold=20     |

**Table 41-128 L2TP Peer Is Removed**

| Event Setting           | Registry Parameter                     |
|-------------------------|----------------------------------------|
| Type                    | l2tp peer not established              |
| Subtype                 | l2tp peer is removed                   |
| Correlation information | activate-flow=true                     |
|                         | correlate=true                         |
|                         | is-correlation-allowed=false           |
|                         | weight=0                               |
| Northbound metadata     | alarm-type=185                         |
|                         | auto-cleared=false                     |
|                         | auto-removed=true                      |
|                         | functionality-type=SERVICE             |
|                         | severity=MAJOR                         |
|                         | gw-correlation-timeout=1200000         |
|                         | is-ticketable=false                    |
|                         | send-to-gw=true                        |
| Flapping information    | short-description=l2tp peer is removed |
|                         | clear-interval=240000                  |
|                         | flapping-interval=60000                |
|                         | flapping-threshold=5                   |
|                         | update-interval=200000                 |
|                         | update-threshold=20                    |

**Table 41-129 L2TP Peer Not Established**

| Event Setting | Registry Parameter        |
|---------------|---------------------------|
| Type          | l2tp peer not established |
| Subtype       | l2tp peer not established |



**Table 41-129 L2TP Peer Not Established (continued)**

| Event Setting           | Registry Parameter                          |
|-------------------------|---------------------------------------------|
| Correlation information | activate-flow=true                          |
|                         | correlate=true                              |
|                         | is-correlation-allowed=false                |
|                         | weight=0                                    |
| Northbound metadata     | alarm-type=185                              |
|                         | auto-cleared=false                          |
|                         | auto-removed=true                           |
|                         | functionality-type=SERVICE                  |
|                         | severity=MAJOR                              |
|                         | gw-correlation-timeout=1200000              |
|                         | is-ticketable=true                          |
|                         | send-to-gw=true                             |
|                         | short-description=l2tp peer not established |
| Flapping information    | clear-interval=240000                       |
|                         | flapping-interval=60000                     |
|                         | flapping-threshold=5                        |
|                         | update-interval=200000                      |
|                         | update-threshold=20                         |

## L2TP Sessions Threshold

**Table 41-130 L2TP Sessions Count Exceeds Maximum Threshold**

| Event Setting           | Registry Parameter                        |
|-------------------------|-------------------------------------------|
| Type                    | l2tp sessions threshold                   |
| Subtype                 | l2tp sessions count exceeds max threshold |
| Correlation information | activate-flow=false                       |
|                         | correlate=true                            |
|                         | is-correlation-allowed=false              |
|                         | weight=0                                  |

**Table 41-130 L2TP Sessions Count Exceeds Maximum Threshold (continued)**

| Event Setting       | Registry Parameter                                          |
|---------------------|-------------------------------------------------------------|
| Northbound metadata | alarm-type=N/A (TCA alarm)                                  |
|                     | auto-cleared=false                                          |
|                     | auto-removed=true                                           |
|                     | functionality-type=SERVICE                                  |
|                     | severity=MINOR                                              |
|                     | gw-correlation-timeout=1200000                              |
|                     | is-ticketable=true                                          |
|                     | send-to-gw=true                                             |
|                     | short-description=l2tp sessions count exceeds max threshold |

**Table 41-131 L2TP Sessions Count Has Returned to Normal**

| Event Setting           | Registry Parameter                                           |
|-------------------------|--------------------------------------------------------------|
| Type                    | l2tp sessions threshold                                      |
| Subtype                 | l2tp sessions count has returned to normal                   |
| Correlation information | activate-flow=false                                          |
|                         | correlate=false                                              |
|                         | is-correlation-allowed=false                                 |
|                         | weight=0                                                     |
| Northbound metadata     | alarm-type=N/A (TCA alarm)                                   |
|                         | auto-cleared=false                                           |
|                         | auto-removed=true                                            |
|                         | functionality-type=SERVICE                                   |
|                         | severity=CLEARED                                             |
|                         | gw-correlation-timeout=1200000                               |
|                         | is-ticketable=false                                          |
|                         | send-to-gw=true                                              |
|                         | short-description=l2tp sessions count has returned to normal |

## Layer 2 Tunnel Down

**Table 41-132 Layer 2 Tunnel Down**

| Event Setting | Registry Parameter  |
|---------------|---------------------|
| Type          | layer 2 tunnel down |
| Subtype       | layer 2 tunnel down |

**Table 41-132 Layer 2 Tunnel Down (continued)**

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Correlation information | activate-flow=true                    |
|                         | correlate=true                        |
|                         | is-correlation-allowed=false          |
|                         | weight=0                              |
| Northbound metadata     | alarm-type=179                        |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | functionality-type=SERVICE            |
|                         | severity=MINOR                        |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=true                    |
|                         | send-to-gw=true                       |
|                         | short-description=Layer 2 tunnel down |

**Table 41-133 Layer 2 Tunnel Up**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | layer 2 tunnel down                 |
| Subtype                 | layer 2 tunnel up                   |
| Correlation information | activate-flow=false                 |
|                         | correlate=false                     |
|                         | is-correlation-allowed=false        |
|                         | weight=0                            |
| Northbound metadata     | alarm-type=179                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=CLEARED                    |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=false                 |
|                         | send-to-gw=true                     |
|                         | short-description=Layer 2 tunnel up |

## LDP Neighbor Loss

**Table 41-134 LDP Neighbor Down**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | LDP neighbor loss                   |
| Subtype                 | LDP neighbor down                   |
| Correlation information | activate-flow=true                  |
|                         | correlate=true                      |
|                         | is-correlation-allowed=true         |
|                         | weight=670                          |
| Northbound metadata     | alarm-type=557                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=MAJOR                      |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=true                  |
|                         | send-to-gw=true                     |
|                         | short-description=LDP neighbor down |

**Table 41-135 LDP Neighbor Up**

| Event Setting           | Registry Parameter                |
|-------------------------|-----------------------------------|
| Type                    | LDP neighbor loss                 |
| Subtype                 | LDP neighbor up                   |
| Correlation information | activate-flow=false               |
|                         | correlate=false                   |
|                         | is-correlation-allowed=false      |
|                         | weight=0                          |
| Northbound metadata     | alarm-type=557                    |
|                         | auto-cleared=false                |
|                         | auto-removed=true                 |
|                         | functionality-type=SERVICE        |
|                         | severity=CLEARED                  |
|                         | gw-correlation-timeout=1200000    |
|                         | is-ticketable=false               |
|                         | send-to-gw=true                   |
|                         | short-description=LDP neighbor up |

# Link Down

**Table 41-136** *Link Down Due to Admin Down*

| Event Setting           | Registry Parameter                            |
|-------------------------|-----------------------------------------------|
| Type                    | link down                                     |
| Subtype                 | link down due to admin down                   |
| Correlation information | activate-flow=false                           |
|                         | correlate=false                               |
|                         | is-correlation-allowed=true                   |
|                         | weight=850                                    |
| Northbound metadata     | alarm-type=1                                  |
|                         | auto-cleared=false                            |
|                         | auto-removed=true                             |
|                         | functionality-type=SERVICE                    |
|                         | severity=CRITICAL                             |
|                         | gw-correlation-timeout=1200000                |
|                         | is-ticketable=true                            |
|                         | send-to-gw=true                               |
|                         | short-description=Link down due to admin down |
| Flapping information    | clear-interval=360000                         |
|                         | flapping-interval=150000                      |
|                         | flapping-threshold=5                          |
|                         | update-interval=200000                        |
|                         | update-threshold=20                           |

**Table 41-137** *Link Down Due to Card Event*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | link down                   |
| Subtype                 | link down due to card       |
| Correlation information | activate-flow=false         |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | weight=850                  |

**Table 41-137** *Link Down Due to Card Event (continued)*

| Event Setting        | Registry Parameter                            |
|----------------------|-----------------------------------------------|
| Northbound metadata  | alarm-type=1                                  |
|                      | auto-cleared=false                            |
|                      | auto-removed=true                             |
|                      | functionality-type=SERVICE                    |
|                      | severity=CRITICAL                             |
|                      | gw-correlation-timeout=1200000                |
|                      | is-ticketable=true                            |
|                      | send-to-gw=true                               |
|                      | short-description=Link down due to Card event |
| Flapping information | clear-interval=360000                         |
|                      | flapping-interval=150000                      |
|                      | flapping-threshold=5                          |
|                      | update-interval=200000                        |
|                      | update-threshold=20                           |

**Table 41-138** *Link Down Due to Oper Down*

| Event Setting           | Registry Parameter                           |
|-------------------------|----------------------------------------------|
| Type                    | link down                                    |
| Subtype                 | link down due to oper down                   |
| Correlation information | activate-flow=false                          |
|                         | correlate=true                               |
|                         | is-correlation-allowed=true                  |
|                         | weight=850                                   |
| Northbound metadata     | alarm-type=1                                 |
|                         | auto-cleared=false                           |
|                         | auto-removed=true                            |
|                         | functionality-type=SERVICE                   |
|                         | severity=CRITICAL                            |
|                         | gw-correlation-timeout=1200000               |
|                         | is-ticketable=true                           |
|                         | send-to-gw=true                              |
|                         | short-description=Link down due to oper down |

**Table 41-138** *Link Down Due to Oper Down (continued)*

| Event Setting        | Registry Parameter       |
|----------------------|--------------------------|
| Flapping information | clear-interval=360000    |
|                      | flapping-interval=150000 |
|                      | flapping-threshold=5     |
|                      | update-interval=200000   |
|                      | update-threshold=20      |

**Table 41-139** *Link Down on Unreachable*

| Event Setting           | Registry Parameter                         |
|-------------------------|--------------------------------------------|
| Type                    | link down                                  |
| Subtype                 | link down on unreachable                   |
| Correlation information | activate-flow=false                        |
|                         | correlate=true                             |
|                         | is-correlation-allowed=true                |
|                         | weight=850                                 |
| Northbound metadata     | alarm-type=1                               |
|                         | auto-cleared=false                         |
|                         | auto-removed=true                          |
|                         | functionality-type=SERVICE                 |
|                         | severity=CRITICAL                          |
|                         | gw-correlation-timeout=1200000             |
|                         | is-ticketable=true                         |
|                         | send-to-gw=true                            |
| Flapping information    | short-description=Link down on unreachable |
|                         | clear-interval=360000                      |
|                         | flapping-interval=150000                   |
|                         | flapping-threshold=5                       |
|                         | update-interval=200000                     |
|                         | update-threshold=20                        |

**Table 41-140** *Link Up*

| Event Setting | Registry Parameter |
|---------------|--------------------|
| Type          | link down          |
| Subtype       | link up            |

**Table 41-140** *Link Up (continued)*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=1                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Link up      |
| Flapping information    | clear-interval=360000          |
|                         | flapping-interval=150000       |
|                         | flapping-threshold=5           |
|                         | update-interval=200000         |
|                         | update-threshold=20            |

## Link Utilization

**Table 41-141** *Link Overutilized*

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | link utilization            |
| Subtype                 | link over Utilized          |
| Correlation information | activate-flow=false         |
|                         | correlate=true              |
|                         | is-correlation-allowed=true |
|                         | weight=0                    |



**Table 41-141** *Link Overutilized (continued)*

| Event Setting       | Registry Parameter                   |
|---------------------|--------------------------------------|
| Northbound metadata | alarm-type=642                       |
|                     | auto-cleared=false                   |
|                     | auto-removed=true                    |
|                     | functionality-type=SERVICE           |
|                     | severity=MINOR                       |
|                     | gw-correlation-timeout=1200000       |
|                     | is-ticketable=true                   |
|                     | send-to-gw=true                      |
|                     | short-description=Link over utilized |

**Table 41-142** *Link Utilization Normal*

| Event Setting           | Registry Parameter                        |
|-------------------------|-------------------------------------------|
| Type                    | link utilization                          |
| Subtype                 | link utilization normal                   |
| Correlation information | activate-flow=false                       |
|                         | correlate=false                           |
|                         | is-correlation-allowed=true               |
|                         | weight=0                                  |
| Northbound metadata     | alarm-type=642                            |
|                         | auto-cleared=false                        |
|                         | auto-removed=true                         |
|                         | functionality-type=SERVICE                |
|                         | severity=CLEARED                          |
|                         | gw-correlation-timeout=1200000            |
|                         | is-ticketable=false                       |
|                         | send-to-gw=true                           |
|                         | short-description=Link utilization normal |

## Logical Port Down

**Table 41-143** *Logical Port Down*

| Event Setting | Registry Parameter |
|---------------|--------------------|
| Type          | logical port down  |
| Subtype       | logical port down  |

**Table 41-143 Logical Port Down (continued)**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Correlation information | activate-flow=false                 |
|                         | correlate=true                      |
|                         | is-correlation-allowed=true         |
|                         | weight=0                            |
| Northbound metadata     | alarm-type=198                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=MAJOR                      |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=true                  |
|                         | send-to-gw=true                     |
|                         | short-description=Logical port down |

**Table 41-144 Logical Port Up**

| Event Setting           | Registry Parameter                |
|-------------------------|-----------------------------------|
| Type                    | logical port down                 |
| Subtype                 | logical port up                   |
| Correlation information | activate-flow=false               |
|                         | correlate=false                   |
|                         | is-correlation-allowed=false      |
|                         | weight=0                          |
| Northbound metadata     | alarm-type=198                    |
|                         | auto-cleared=false                |
|                         | auto-removed=true                 |
|                         | functionality-type=SERVICE        |
|                         | severity=CLEARED                  |
|                         | gw-correlation-timeout=1200000    |
|                         | is-ticketable=false               |
|                         | send-to-gw=true                   |
|                         | short-description=Logical port up |

## Memory Utilization

**Table 41-145**    *Memory OK*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | memory utilization             |
| Subtype                 | memory normal use              |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=18                  |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Memory OK    |

**Table 41-146**    *Memory Overutilized*

| Event Setting           | Registry Parameter                     |
|-------------------------|----------------------------------------|
| Type                    | memory utilization                     |
| Subtype                 | memory over utilized                   |
| Correlation information | activate-flow=-                        |
|                         | correlate=-                            |
|                         | is-correlation-allowed=-               |
|                         | weight=-                               |
| Northbound metadata     | alarm-type=18                          |
|                         | auto-cleared=false                     |
|                         | auto-removed=true                      |
|                         | functionality-type=SERVICE             |
|                         | severity=MAJOR                         |
|                         | gw-correlation-timeout=1200000         |
|                         | is-ticketable=true                     |
|                         | send-to-gw=true                        |
|                         | short-description=Memory over utilized |

## MLPPP Bundle

**Table 41-147 MLPPP Down Due To Flapping**

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Type                    | mlppp down                            |
| Subtype                 | mlppp down due to flapping            |
| Correlation information | activate-flow=false                   |
|                         | correlate=false                       |
|                         | is-correlation-allowed=true           |
|                         | weight=1000                           |
| Northbound metadata     | alarm-type=914                        |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | auto-removed-timeout=5000000          |
|                         | duplication-counter=1                 |
|                         | functionality-type=SERVICE            |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=true                    |
|                         | priority=0                            |
|                         | reduction-counter=1                   |
|                         | send-to-gw=true                       |
|                         | severity=MAJOR                        |
|                         | short-description=mlppp down flapping |

**Table 41-148 MLPPP Down Flapping Update**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | mlppp down                  |
| Subtype                 | mlppp down flapping update  |
| Correlation information | activate-flow=false         |
|                         | correlate=false             |
|                         | is-correlation-allowed=true |
|                         | weight=1000                 |

**Table 41-148 MLPPP Down Flapping Update (continued)**

| Event Setting       | Registry Parameter                           |
|---------------------|----------------------------------------------|
| Northbound metadata | alarm-type=914                               |
|                     | auto-cleared=false                           |
|                     | auto-removed=true                            |
|                     | auto-removed-timeout=5000000                 |
|                     | duplication-counter=1                        |
|                     | functionality-type=SERVICE                   |
|                     | gw-correlation-timeout=1200000               |
|                     | is-ticketable=true                           |
|                     | priority=0                                   |
|                     | reduction-counter=1                          |
|                     | send-to-gw=true                              |
|                     | severity=MAJOR                               |
|                     | short-description=mlppp down flapping update |

**Table 41-149 MLPPP Down Due To Admin Down**

| Event Setting           | Registry Parameter                            |
|-------------------------|-----------------------------------------------|
| Type                    | mlppp down                                    |
| Subtype                 | mlppp down due to admin down                  |
| Correlation information | activate-flow=false                           |
|                         | correlate=false                               |
|                         | is-correlation-allowed=true                   |
|                         | weight=1000                                   |
| Northbound metadata     | alarm-type=914                                |
|                         | auto-cleared=false                            |
|                         | auto-removed=true                             |
|                         | auto-removed-timeout=5000000                  |
|                         | duplication-counter=1                         |
|                         | functionality-type=SERVICE                    |
|                         | gw-correlation-timeout=1200000                |
|                         | is-ticketable=true                            |
|                         | priority=0                                    |
|                         | reduction-counter=1                           |
|                         | send-to-gw=true                               |
|                         | severity=CRITICAL                             |
|                         | short-description=mlppp administratively down |

**Table 41-150 MLPPP Down Flapping Proxy**

| Event Setting           | Registry Parameter                          |
|-------------------------|---------------------------------------------|
| Type                    | mlppp down                                  |
| Subtype                 | mlppp down flapping proxy                   |
| Correlation information | activate-flow=false                         |
|                         | correlate=false                             |
|                         | is-correlation-allowed=true                 |
|                         | weight=1000                                 |
| Northbound metadata     | alarm-type=914                              |
|                         | auto-cleared=false                          |
|                         | auto-removed=true                           |
|                         | auto-removed-timeout=5000000                |
|                         | duplication-counter=1                       |
|                         | functionality-type=SERVICE                  |
|                         | gw-correlation-timeout=1200000              |
|                         | is-ticketable=false                         |
|                         | priority=0                                  |
|                         | reduction-counter=1                         |
|                         | send-to-gw=false                            |
|                         | severity=INFO                               |
|                         | short-description=mlppp down flapping proxy |

**Table 41-151 MLPPP Down Due To Oper Down**

| Event Setting           | Registry Parameter          |
|-------------------------|-----------------------------|
| Type                    | mlppp down                  |
| Subtype                 | mlppp down due to oper down |
| Correlation information | activate-flow=false         |
|                         | correlate=false             |
|                         | is-correlation-allowed=true |
|                         | weight=1000                 |

**Table 41-151 MLPPP Down Due To Oper Down (continued) (continued)**

| Event Setting       | Registry Parameter                         |
|---------------------|--------------------------------------------|
| Northbound metadata | alarm-type=914                             |
|                     | auto-cleared=false                         |
|                     | auto-removed=true                          |
|                     | auto-removed-timeout=5000000               |
|                     | duplication-counter=1                      |
|                     | functionality-type=SERVICE                 |
|                     | gw-correlation-timeout=1200000             |
|                     | is-ticketable=true                         |
|                     | priority=0                                 |
|                     | reduction-counter=1                        |
|                     | send-to-gw=true                            |
|                     | severity=MAJOR                             |
|                     | short-description=mlppp operationally down |

**Table 41-152 MLPPP Up**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | mlppp down                     |
| Subtype                 | mlppp up                       |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=1000                    |
| Northbound metadata     | alarm-type=914                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | auto-removed-timeout=5000000   |
|                         | duplication-counter=1          |
|                         | functionality-type=SERVICE     |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | priority=0                     |
|                         | reduction-counter=1            |
|                         | send-to-gw=true                |
|                         | severity=CLEARED               |
|                         | short-description=mlppp up     |

# MPLS Black Hole Found

An MPLS black hole is defined as an abnormal termination of an MPLS path (LSP) inside an MPLS network. An MPLS black hole exists when on a specific interface there are untagged entries destined for a known PE router. It is assumed that a router functions as a PE router if services, such as L3 VPNs or pseudowire (L2 VPN) MPLS tunnels, are using the MPLS network. Note that the untagged interfaces may exist in the network in normal situations; for example, where the boundary of the MPLS cloud has untagged interfaces.

An MPLS black hole causes the loss of all MPLS labels on a packet, including the VPN information that lies in the inner MPLS label. If a packet goes through an untagged interface, the VPN information is lost. The VPN information loss causes VPN sites to lose connectivity.

MPLS Black Hole Found alarms are actively detected. Service alarms are generated whenever Cisco ANA discovers an MPLS interface with at least one untagged LSP leading to a known PE router.

Black hole alarms are detected either:

- When the system is loaded for the first time and performs the initial discovery of the network.
- Through the ongoing discovery process, which identifies changes in the network.



## Note

MPLS black hole discovery is supported only when the PEs are managed by Cisco ANA.

**Table 41-153**    *MPLS Black Hole Cleared*

| Event Setting           | Registry Parameter                        |
|-------------------------|-------------------------------------------|
| Type                    | MPLS Black hole found                     |
| Subtype                 | MPLS Black hole cleared                   |
| Correlation information | activate-flow=false                       |
|                         | correlate=false                           |
|                         | is-correlation-allowed=false              |
|                         | weight=0                                  |
| Northbound metadata     | alarm-type=128                            |
|                         | auto-cleared=false                        |
|                         | auto-removed=true                         |
|                         | functionality-type=SERVICE                |
|                         | severity=CLEARED                          |
|                         | gw-correlation-timeout=1200000            |
|                         | is-ticketable=false                       |
|                         | send-to-gw=true                           |
|                         | short-description=MPLS Black hole cleared |



**Table 41-154 MPLS Black Hole Found**

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | MPLS Black hole found                   |
| Subtype                 | MPLS Black hole found                   |
| Correlation information | activate-flow=true                      |
|                         | correlate=true                          |
|                         | is-correlation-allowed=true             |
|                         | weight=650                              |
| Northbound metadata     | alarm-type=128                          |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=WARNING                        |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=true                      |
|                         | send-to-gw=true                         |
|                         | short-description=MPLS Black hole found |

## MPLS Interface Removed

**Table 41-155 MPLS Interface Added**

| Event Setting           | Registry Parameter                     |
|-------------------------|----------------------------------------|
| Type                    | MPLS interface removed                 |
| Subtype                 | MPLS interface added                   |
| Correlation information | activate-flow=false                    |
|                         | correlate=false                        |
|                         | is-correlation-allowed=false           |
|                         | weight=0                               |
| Northbound metadata     | alarm-type=972                         |
|                         | auto-cleared=false                     |
|                         | auto-removed=true                      |
|                         | functionality-type=SERVICE             |
|                         | severity=CLEARED                       |
|                         | gw-correlation-timeout=1200000         |
|                         | is-ticketable=false                    |
|                         | send-to-gw=true                        |
|                         | short-description=MPLS interface added |

**Table 41-156 MPLS Interface Removed**

| Event Setting           | Registry Parameter                       |
|-------------------------|------------------------------------------|
| Type                    | MPLS interface removed                   |
| Subtype                 | MPLS interface removed                   |
| Correlation information | activate-flow=true                       |
|                         | correlate=true                           |
|                         | is-correlation-allowed=true              |
|                         | weight=700                               |
| Northbound metadata     | alarm-type=972                           |
|                         | auto-cleared=false                       |
|                         | auto-removed=true                        |
|                         | functionality-type=SERVICE               |
|                         | severity=MAJOR                           |
|                         | gw-correlation-timeout=1200000           |
|                         | is-ticketable=true                       |
|                         | send-to-gw=true                          |
|                         | short-description=MPLS interface removed |

## MPLS TE FRR State Changed

**Table 41-157 MPLS TE FRR State Changed to Active**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | mpls te frr state changed           |
| Subtype                 | mpls te frr state changed to active |
| Correlation information | activate-flow=true                  |
|                         | correlate=true                      |
|                         | is-correlation-allowed=true         |
|                         | root-cause-timeout=420000           |
|                         | weight=700                          |

**Table 41-157 MPLS TE FRR State Changed to Active (continued)**

| Event Setting       | Registry Parameter                                    |
|---------------------|-------------------------------------------------------|
| Northbound metadata | alarm-type=1322                                       |
|                     | auto-cleared=false                                    |
|                     | auto-removed=true                                     |
|                     | auto-removed-timeout=5000000                          |
|                     | duplication-counter=1                                 |
|                     | functionality-type=SERVICE                            |
|                     | gw-correlation-timeout=1200000                        |
|                     | is-ticketable=true                                    |
|                     | priority=0                                            |
|                     | reduction-counter=1                                   |
|                     | send-to-gw=true                                       |
|                     | severity=MAJOR                                        |
|                     | short-description=MPLS TE FRR State Changed to Active |

**Table 41-158 MPLS TE FRR State Changed to Ready**

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Type                    | mpls te frr state changed          |
| Subtype                 | mpls te frr state changed to ready |
| Correlation information | activate-flow=false                |
|                         | correlate=false                    |
|                         | is-correlation-allowed=false       |
|                         | root-cause-timeout=420000          |
|                         | weight=0                           |

**Table 41-158 MPLS TE FRR State Changed to Ready (continued)**

| Event Setting       | Registry Parameter                                   |
|---------------------|------------------------------------------------------|
| Northbound metadata | alarm-type=1322                                      |
|                     | auto-cleared=false                                   |
|                     | auto-removed=true                                    |
|                     | auto-removed-timeout=5000000                         |
|                     | duplication-counter=1                                |
|                     | functionality-type=SERVICE                           |
|                     | gw-correlation-timeout=1200000                       |
|                     | is-ticketable=false                                  |
|                     | priority=0                                           |
|                     | reduction-counter=1                                  |
|                     | send-to-gw=true                                      |
|                     | severity=CLEARED                                     |
|                     | short-description=MPLS TE FRR State Changed to Ready |

## MPLS TE Tunnel Down

MPLS TE tunnel alarms include:

- MPLS TE Tunnel Down
- MPLS TE Tunnel Flapping
- Tunnel Reoptimized

If a TE tunnel operational status changes to down, an MPLS TE Tunnel Down alarm is generated. The Cisco ANA correlation engine identifies the faults that affect the TE tunnel status and identifies the root cause for the MPLS TE Tunnel Down alarm. For example, a Link Down will cause a TE tunnel to go down. Multiple up and down alarms that are generated during a short time interval are suppressed and displayed as an MPLS TE Tunnel Flapping alarm (according to the specific flapping configuration).

MPLS TE Tunnel Down and MPLS TE Tunnel Flapping alarms are actively detected and service alarms are generated. The system also supports MPLS TE Tunnel Down syslogs, which are correlated to the service alarm.

For Cisco CRS-1 routers running Cisco IOS XR 3.6 software and using PBTS in MPLS or MPLS VPN networks, Cisco ANA supports the following subalarms for the MPLS TE Tunnel Down alarm:

- High Priority MPLS TE Tunnel Down
- Medium Priority MPLS TE Tunnel Down
- Low Priority MPLS TE Tunnel Down

The specific subalarm that is generated depends on the EXP bit specified for the traffic. Cisco ANA maps the specified EXP bit to tunnel priority and uses that mapping to generate the resultant subalarm. The alarm description includes information about the EXP bit.

Tunnel reoptimization occurs when a tunnel is up and its route changes but the tunnel continues to remain up. When a TE tunnel is reoptimized to take a different path, the system parses the tunnel reoptimized syslog, if such a syslog is available, and displays it as a ticket.

The Tunnel Reoptimized alarm is generated from a syslog message sent by the router.

**Table 41-159 MPLS TE Tunnel Down**

| Event Setting           | Registry Parameter                    |
|-------------------------|---------------------------------------|
| Type                    | mpls te tunnel down                   |
| Subtype                 | mpls te tunnel down                   |
| Correlation information | activate-flow=true                    |
|                         | correlate=true                        |
|                         | is-correlation-allowed=true           |
|                         | weight=800                            |
| Northbound metadata     | alarm-type=555                        |
|                         | auto-cleared=false                    |
|                         | auto-removed=true                     |
|                         | functionality-type=SERVICE            |
|                         | severity=MAJOR                        |
|                         | gw-correlation-timeout=1200000        |
|                         | is-ticketable=true                    |
|                         | send-to-gw=true                       |
|                         | short-description=MPLS TE tunnel down |
| Flapping information    | clear-interval=240000                 |
|                         | flapping-interval=60000               |
|                         | flapping-threshold=5                  |
|                         | update-interval=200000                |
|                         | update-threshold=20                   |

**Table 41-160 MPLS TE Tunnel Up**

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | mpls te tunnel down          |
| Subtype                 | mpls te tunnel up            |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | weight=0                     |

**Table 41-160 MPLS TE Tunnel Up (continued)**

| Event Setting        | Registry Parameter                  |
|----------------------|-------------------------------------|
| Northbound metadata  | alarm-type=555                      |
|                      | auto-cleared=false                  |
|                      | auto-removed=true                   |
|                      | functionality-type=SERVICE          |
|                      | severity=CLEARED                    |
|                      | gw-correlation-timeout=1200000      |
|                      | is-ticketable=false                 |
|                      | send-to-gw=true                     |
|                      | short-description=MPLS TE tunnel up |
| Flapping information | clear-interval=240000               |
|                      | flapping-interval=60000             |
|                      | flapping-threshold=5                |
|                      | update-interval=200000              |
|                      | update-threshold=20                 |

## Port Down

**Table 41-161 Port Down**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | port down                      |
| Subtype                 | port down                      |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=100000                  |
| Northbound metadata     | alarm-type=2                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=Port down    |

**Table 41-161 Port Down (continued)**

| Event Setting        | Registry Parameter       |
|----------------------|--------------------------|
| Flapping information | clear-interval=360000    |
|                      | flapping-interval=150000 |
|                      | flapping-threshold=5     |
|                      | update-interval=200000   |
|                      | update-threshold=20      |

**Table 41-162 Port Down Due to Card Event**

| Event Setting           | Registry Parameter                            |
|-------------------------|-----------------------------------------------|
| Type                    | port down                                     |
| Subtype                 | port down due to card                         |
| Correlation information | activate-flow=false                           |
|                         | correlate=true                                |
|                         | is-correlation-allowed=true                   |
|                         | weight=900                                    |
| Northbound metadata     | alarm-type=2                                  |
|                         | auto-cleared=false                            |
|                         | auto-removed=true                             |
|                         | functionality-type=SERVICE                    |
|                         | severity=MAJOR                                |
|                         | gw-correlation-timeout=1200000                |
|                         | is-ticketable=true                            |
|                         | send-to-gw=true                               |
| Flapping information    | short-description=Port down due to Card event |
|                         | clear-interval=360000                         |
|                         | flapping-interval=150000                      |
|                         | flapping-threshold=5                          |
|                         | update-interval=200000                        |
|                         | update-threshold=20                           |

**Table 41-163 Port Up**

| Event Setting | Registry Parameter |
|---------------|--------------------|
| Type          | port down          |
| Subtype       | port up            |

**Table 41-163** *Port Up (continued)*

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=2                   |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Port up      |
| Flapping information    | clear-interval=360000          |
|                         | flapping-interval=150000       |
|                         | flapping-threshold=5           |
|                         | update-interval=200000         |
|                         | update-threshold=20            |

## Rx Dormant

**Table 41-164** *Rx Dormant*

| Event Setting           | Registry Parameter           |
|-------------------------|------------------------------|
| Type                    | rx dormant                   |
| Subtype                 | rx dormant                   |
| Correlation information | activate-flow=false          |
|                         | correlate=false              |
|                         | is-correlation-allowed=false |
|                         | weight=0                     |



**Table 41-164 Rx Dormant (continued)**

| Event Setting       | Registry Parameter             |
|---------------------|--------------------------------|
| Northbound metadata | alarm-type=378                 |
|                     | auto-cleared=false             |
|                     | auto-removed=true              |
|                     | functionality-type=SERVICE     |
|                     | severity=MINOR                 |
|                     | gw-correlation-timeout=1200000 |
|                     | is-ticketable=true             |
|                     | send-to-gw=true                |
|                     | short-description=rx dormant   |

**Table 41-165 Rx Dormant Normal**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | rx dormant                          |
| Subtype                 | rx dormant normal                   |
| Correlation information | activate-flow=false                 |
|                         | correlate=false                     |
|                         | is-correlation-allowed=false        |
|                         | weight=0                            |
| Northbound metadata     | alarm-type=378                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=CLEARED                    |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=false                 |
|                         | send-to-gw=true                     |
|                         | short-description=rx dormant normal |

## Rx Utilization

**Table 41-166 Rx Overutilized**

| Event Setting | Registry Parameter |
|---------------|--------------------|
| Type          | rx utilization     |
| Subtype       | rx over Utilized   |

**Table 41-166** *Rx Overutilized (continued)*

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Correlation information | activate-flow=false                |
|                         | correlate=true                     |
|                         | is-correlation-allowed=false       |
|                         | weight=0                           |
| Northbound metadata     | alarm-type=8                       |
|                         | auto-cleared=false                 |
|                         | auto-removed=true                  |
|                         | functionality-type=SERVICE         |
|                         | severity=MINOR                     |
|                         | gw-correlation-timeout=1200000     |
|                         | is-ticketable=true                 |
|                         | send-to-gw=true                    |
|                         | short-description=RX over utilized |

**Table 41-167** *Rx Utilization Normal*

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | rx utilization                          |
| Subtype                 | rx utilization normal                   |
| Correlation information | activate-flow=false                     |
|                         | correlate=false                         |
|                         | is-correlation-allowed=false            |
|                         | weight=0                                |
| Northbound metadata     | alarm-type=8                            |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=CLEARED                        |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=false                     |
|                         | send-to-gw=true                         |
|                         | short-description=RX utilization normal |

# Shelf Out

**Table 41-168 Shelf In**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | shelf out                      |
| Subtype                 | shelf in                       |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=33                  |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=Shelf in     |

**Table 41-169 Shelf Out**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | shelf out                      |
| Subtype                 | shelf out                      |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=110000                  |
| Northbound metadata     | alarm-type=33                  |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=Shelf out    |

## Subinterface Down

**Table 41-170 Subinterface Down**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | subinterface down                   |
| Subtype                 | subinterface oper down              |
| Correlation information | activate-flow=true                  |
|                         | correlate=true                      |
|                         | is-correlation-allowed=true         |
|                         | weight=849                          |
| Northbound metadata     | alarm-type=917                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=MAJOR                      |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=true                  |
|                         | send-to-gw=true                     |
|                         | short-description=Subinterface down |

**Table 41-171 Subinterface Admin Down**

| Event Setting           | Registry Parameter                   |
|-------------------------|--------------------------------------|
| Type                    | sub-interface down                   |
| Subtype                 | sub-interface admin down             |
| Correlation information | activate-flow=true                   |
|                         | correlate=true                       |
|                         | is-correlation-allowed=true          |
|                         | weight=849                           |
| Northbound metadata     | alarm-type=917                       |
|                         | auto-cleared=false                   |
|                         | auto-removed=true                    |
|                         | functionality-type=SERVICE           |
|                         | severity=MAJOR                       |
|                         | gw-correlation-timeout=1200000       |
|                         | is-ticketable=true                   |
|                         | send-to-gw=true                      |
|                         | short-description=Sub-Interface down |

**Table 41-172 Subinterface Up**

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Type                    | sub-interface down                 |
| Subtype                 | sub-interface up                   |
| Correlation information | activate-flow=false                |
|                         | correlate=false                    |
|                         | is-correlation-allowed=false       |
|                         | weight=0                           |
| Northbound metadata     | alarm-type=917                     |
|                         | auto-cleared=false                 |
|                         | auto-removed=true                  |
|                         | functionality-type=SERVICE         |
|                         | severity=CLEARED                   |
|                         | gw-correlation-timeout=1200000     |
|                         | is-ticketable=false                |
|                         | send-to-gw=true                    |
|                         | short-description=Sub-Interface up |

## Tx Dormant

**Table 41-173 Tx Dormant**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | tx dormant                     |
| Subtype                 | tx dormant                     |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=377                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MINOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=tx dormant   |

**Table 41-174 Tx Dormant Normal**

| Event Setting           | Registry Parameter                  |
|-------------------------|-------------------------------------|
| Type                    | tx dormant                          |
| Subtype                 | tx dormant normal                   |
| Correlation information | activate-flow=false                 |
|                         | correlate=false                     |
|                         | is-correlation-allowed=false        |
|                         | weight=0                            |
| Northbound metadata     | alarm-type=377                      |
|                         | auto-cleared=false                  |
|                         | auto-removed=true                   |
|                         | functionality-type=SERVICE          |
|                         | severity=CLEARED                    |
|                         | gw-correlation-timeout=1200000      |
|                         | is-ticketable=false                 |
|                         | send-to-gw=true                     |
|                         | short-description=tx dormant normal |

## Tx Utilization

**Table 41-175 Tx Overutilized**

| Event Setting           | Registry Parameter                 |
|-------------------------|------------------------------------|
| Type                    | tx utilization                     |
| Subtype                 | tx over Utilized                   |
| Correlation information | activate-flow=false                |
|                         | correlate=true                     |
|                         | is-correlation-allowed=false       |
|                         | weight=0                           |
| Northbound metadata     | alarm-type=7                       |
|                         | auto-cleared=false                 |
|                         | auto-removed=true                  |
|                         | functionality-type=SERVICE         |
|                         | severity=MINOR                     |
|                         | gw-correlation-timeout=1200000     |
|                         | is-ticketable=true                 |
|                         | send-to-gw=true                    |
|                         | short-description=TX over utilized |

**Table 41-176 Tx Utilization Normal**

| Event Setting           | Registry Parameter                      |
|-------------------------|-----------------------------------------|
| Type                    | tx utilization                          |
| Subtype                 | tx utilization normal                   |
| Correlation information | activate-flow=false                     |
|                         | correlate=false                         |
|                         | is-correlation-allowed=false            |
|                         | weight=0                                |
| Northbound metadata     | alarm-type=7                            |
|                         | auto-cleared=false                      |
|                         | auto-removed=true                       |
|                         | functionality-type=SERVICE              |
|                         | severity=CLEARED                        |
|                         | gw-correlation-timeout=1200000          |
|                         | is-ticketable=false                     |
|                         | send-to-gw=true                         |
|                         | short-description=TX utilization normal |

## VSI Down

**Table 41-177 VSI Down**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | vsi down                       |
| Subtype                 | vsi oper down                  |
| Correlation information | activate-flow=true             |
|                         | correlate=true                 |
|                         | is-correlation-allowed=true    |
|                         | weight=845                     |
| Northbound metadata     | alarm-type=916                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=VSI down     |

**Table 41-178 VSI Admin Down**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | vsi down                       |
| Subtype                 | vsi admin down                 |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=true    |
|                         | weight=101                     |
| Northbound metadata     | alarm-type=916                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=MAJOR                 |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=true             |
|                         | send-to-gw=true                |
|                         | short-description=VSI down     |

**Table 41-179 VSI Up**

| Event Setting           | Registry Parameter             |
|-------------------------|--------------------------------|
| Type                    | vsi down                       |
| Subtype                 | vsi up                         |
| Correlation information | activate-flow=false            |
|                         | correlate=false                |
|                         | is-correlation-allowed=false   |
|                         | weight=0                       |
| Northbound metadata     | alarm-type=916                 |
|                         | auto-cleared=false             |
|                         | auto-removed=true              |
|                         | functionality-type=SERVICE     |
|                         | severity=CLEARED               |
|                         | gw-correlation-timeout=1200000 |
|                         | is-ticketable=false            |
|                         | send-to-gw=true                |
|                         | short-description=VSI up       |









## **PART 5**

### **Commands**





## CHAPTER 42

# Using Connectivity Fault Management Commands

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Ethernet Connectivity Fault Management (CFM) is an end-to-end, per-service-instance Ethernet layer operations, administration, and maintenance (OAM) protocol. CFM includes proactive connectivity monitoring, fault verification, and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.

End-to-end can be premises equipment (PE)-to-PE or customer equipment (CE)-to-CE. A service can be a service provider VLAN (S-VLAN) or an Ethernet virtual connection (EVC).

Cisco ANA discovers and represents device configurations for CFM 802.1ag (draft 8.1) and Cisco draft mode, including:

- Maintenance domains
- Maintenance endpoints (up-facing, down-facing)
- Maintenance intermediate points (up-facing, down-facing)
- Continuity check message status

For each CFM domain, Cisco ANA discovers and represents the following CFM domain attributes within the logical inventory:

- Domain name
- Maintenance level (a value from 0 to 7)
- Maintenance associations (802.1ag D8.1)
- VLAN IDs specified for a maintenance association

Cisco ANA discovers and represents CFM maintenance endpoints (MEPs) that are configured under:

- Switch port
- Port channel (that is, link aggregation group [LAG])
- Subinterface
- Service instance or bridge domain

You can navigate from the MEP logical inventory to the interface or port channel on which the MEP is configured.

CFM uses standard Ethernet frames. CFM frames are distinguishable by EtherType and, for multicast messages, by MAC address. CFM frames are sourced, terminated, processed, and relayed by bridges. Routers support only limited CFM functions.

Bridges that cannot interpret CFM messages forward them as normal data frames. All CFM messages are confined to a maintenance domain and to an S-VLAN (PE-VLAN or Provider-VLAN). CFM supports three types of messages:

- **Continuity check**—Multicast heartbeat messages exchanged periodically among MEPs. They allow MEPs to discover other MEPs within a domain and allow maintenance intermediate points (MIPs) to discover MEPs. Continuity check messages (CCMs) are confined to a domain and S-VLAN.
- **Loopback**—Unicast frames that a MEP transmits, at the request of an administrator, to verify connectivity to a particular maintenance point. A reply to a loopback message indicates whether a destination is reachable but does not allow hop-by-hop discovery of the path. A loopback message is similar in concept to an Internet Control Message Protocol (ICMP) Echo (ping) message.
- **Traceroute**—Multicast frames that a MEP transmits, at the request of an administrator, to track the path (hop-by-hop) to a destination MEP. They allow the transmitting node to discover vital connectivity data about the path, and allow the discovery of all MIPs along the path that belong to the same maintenance domain. For each visible MIP, traceroute messages indicate ingress action, relay action, and egress action. Traceroute messages are similar in concept to User Datagram Protocol (UDP) traceroute messages.

From the Logical Inventory tree, you can launch the following troubleshooting commands for a MEP:

- CFM ping
- CFM traceroute
- CFM MEP status
- CFM MEP cross-check status

Cisco ANA associates alarms with the corresponding MEP or global CFM logical inventory objects.

Cisco ANA correlates MEP down, MEP missing, ETH-AIS, and ETH-RDI events with root cause alarms and corresponding tickets that exist along the path between the MEP on the reporting network element and the network element hosting the remote MEP.

## Supported Network Elements

You can run the CFM commands on the following network elements:

- Cisco 7600 Series Routers
- Cisco ME 3400 Series Ethernet Access Switches
- Cisco Catalyst 3750 Series Switches
- Cisco ASR 9000 Series Aggregation Services Routers
- Cisco Mobile Wireless Router 2941 (Supported only for the Cisco CFM commands.)
- Cisco Catalyst 6500 Series (IOS) Switches

See Part 1—Cisco VNEs for details on the software versions Cisco ANA supports for these network elements. To run the CFM commands, the software on the network element must support the CFM technology.

# Configuring CFM Components

The following commands facilitate the configuration of CFM components.

**Note**

In the GUI, parameters that are displayed in bold text are mandatory.

## Configure CFM Maintenance Domain

Use the **Configure CFM Maintenance Domain** command to configure the CFM domain on a device.

A maintenance domain is a management space for the purpose of managing and administering a network. A domain is owned and operated by a single entity and defined by the set of ports internal to it and at its boundary.

Each maintenance domain can contain any number of maintenance associations. Each maintenance association identifies a service that can be uniquely identified within the maintenance domain. The CFM protocol runs within a particular maintenance association.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > Maintenance Domain**. The Maintenance Domain dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Domain Name           | Name of the domain.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maintenance Level     | Maintenance level number. The range is from 0 to 7.<br><br>A network administrator assigns a unique maintenance level to each domain. Levels and domain names are useful for defining the hierarchical relationship that exists among domains. The hierarchical relationship of domains parallels the structure of customer, service provider, and operator. The larger the domain, the higher the level value. For example, a customer domain would be larger than an operator domain. The customer domain may have a maintenance level of 7 and the operator domain may have a maintenance level of 0. Typically, operators have the smallest domains and customers the largest domains, with service provider domains between them in size. All levels of the hierarchy must operate together. |
| MEP Archive Hold Time | Maintenance endpoint archived hold time.<br><br>A maintenance point is a demarcation point on an interface (port) that participates in CFM within a maintenance domain. Maintenance points on device ports act as filters that confine CFM frames within the bounds of a domain by dropping frames that do not belong to the correct level. Maintenance points must be explicitly configured on Cisco devices. Two classes of maintenance points exist: MEPs and maintenance intermediate points (MIPs).                                                                                                                                                                                                                                                                                          |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.

Any errors are displayed in the Result tab.

**Step 6** To close the dialog box, click **Close**.

---

## Configure CFM Global Parameters

Use the **Configure CFM Global Parameters** command to enable CFM globally for a network element.

---

**Step 1** In the inventory window, expand the Logical Inventory tree.

**Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > Global Parameters**. The Global Parameters dialog box opens.

**Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter             | Description                                                                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trace Route Cache Size      | Number of cached lines. The range is from 1 to 4095.<br><br>Using CFM, you can configure the device to transmit traceroute and loopback messages. This parameter sets the CFM traceroute cache size used by the CFM service. |
| Trace Route Cache Hold Time | Hold time. The range is from 1 to 65535 minutes.<br><br>A CFM service is configurable with a hold-time value to indicate to the receiver the validity of the message. The default is 2.5 times the transmit interval.        |

**Step 4** To see the commands that will be applied on the device, click **Preview**.

You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.

**Step 5** To run the commands, click **Execute**.

Any errors are displayed in the Result tab.

**Step 6** To close the dialog box, click **Close**.

---

## Configure CFM MIP

Use the **Configure CFM MIP** command to configure an operator-level maintenance intermediate point (MIP) for the domain-level ID. MIPs have the following characteristics:

- Per-maintenance domain (level) for all S-VLANs enabled or allowed on a port.
- Internal to a domain, not at the boundary.
- CFM frames received from MEPs and other MIPs are cataloged and forwarded, using both the wire and the relay function.
- All CFM frames at a lower level are stopped and dropped, independent of whether they originate from the wire or relay function.



- All CFM frames at a higher level are forwarded, independent of whether they arrive from the wire or relay function.
- Passive points respond only when triggered by CFM traceroute and loopback messages.
- Bridge-brain MAC addresses are used.

If the port on which a MIP is configured is blocked by Spanning-Tree Protocol (STP), the MIP cannot receive CFM messages or relay them toward the relay function side. The MIP can, however, receive and respond to CFM messages from the wire.

A MIP has only one level associated with it, and the command-line interface (CLI) does not allow you to configure a MIP for a domain that does not exist.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > MIP**. The MIP dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter   | Description                                                                         |
|-------------------|-------------------------------------------------------------------------------------|
| Interface Name    | Name of the interface. Specify a physical interface or a port channel to configure. |
| Maintenance Level | Maintenance level number. The range is from 0 to 7.                                 |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.
- 

## Configure CFM Continuity Check

Use the **Configure CFM Continuity Check** command to configure the per-domain continuity check messages (CCMs).

CFM CCMs have the following characteristics:

- Transmitted at a configurable periodic interval by MEPs. The interval range is from 10 to 65535 seconds; the default is 30.
- Contain a configurable hold-time value to indicate to the receiver the validity of the message.
- Cataloged by MIPs at the same maintenance level.
- Terminated by remote MEPs at the same maintenance level.
- Unidirectional and do not solicit a response.
- Carry the status of the port on which the MEP is configured.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > Continuity Check**. The Continuity Check dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter                     | Description                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Level                   | Maintenance level number. The range is from 0 to 7. Alternatively, you can choose <i>any</i> to specify all maintenance levels.                                                                                                                                                                                                            |
| VLANs for Cross-Check               | VLAN ID on which to apply the cross check. The VLAN ID range is from 1 to 4094. You can choose: <ul style="list-style-type: none"> <li>A single VLAN ID from 1 to 4094</li> <li>A range of VLAN IDs separated by a hyphen (-)</li> <li>A series of VLAN IDs separated by commas (,)</li> <li><i>any</i> to specify all VLAN IDs</li> </ul> |
| Interval for CC Messages            | Interval, in seconds, for continuity check messages. The default value is 30 seconds.                                                                                                                                                                                                                                                      |
| Loss Threshold Level for CC Packets | Loss threshold level for continuity check packets. The default value is 2 seconds.                                                                                                                                                                                                                                                         |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Configure CFM Service ID

Use the **Configure CFM Service ID** command to configure the CFM service ID.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > Service ID**. The Service ID dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter | Description         |
|-----------------|---------------------|
| Domain Name     | Name of the domain. |

| Input Parameter   | Description                                                                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Level | Maintenance level number. The range is from 0 to 7.                                                                                                                                            |
| Service VLAN ID   | Service VLAN ID. A customer service instance is an Ethernet virtual connection, which is identified by an S-VLAN within an Ethernet island, and is identified by a globally unique service ID. |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Configure CFM MEP

Use the **Configure CFM MEP** command to configure maintenance endpoints (MEPs), which have the following characteristics:

- Per-maintenance domain (level) and service (S-VLAN or EVC)
- At the edge of a domain, define the boundary
- Within the bounds of a maintenance domain, confine CFM messages
- When configured to do so, proactively transmit CFM continuity check messages (CCMs)
- At the request of an administrator, transmit traceroute and loopback messages

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Configure > Cisco > MEP**. The MEP dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter   | Description                                                                         |
|-------------------|-------------------------------------------------------------------------------------|
| Domain Name       | Name of the domain.                                                                 |
| Interface Name    | Name of the interface. Specify a physical interface or a port channel to configure. |
| Maintenance Level | Maintenance level number. The range is from 0 to 7.                                 |

| Input Parameter                  | Description                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance End Point Identifier | Maintenance endpoint identifier, which must be unique for each VLAN (service instance).<br><br>The MEP ID is a CFM identifier used to identify a MEP in CFM communications. It is also used to catalog CFM frames in the local CFM database. The MEP ID is significant throughout the CFM domain and the maintenance association. The range is from 1 to 8191. |
| VLANs                            | VLAN ID on which to apply the maintenance endpoint. The VLAN ID range is from 1 to 4094. Alternatively, you can choose <i>any</i> to specify all VLAN IDs.                                                                                                                                                                                                     |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Enable CFM Continuity Check

Use the **Enable CFM Continuity Check** command to enable continuity check parameters.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Enable > Cisco > Continuity Check**. The Continuity Check dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter       | Description                                                                                                                                            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Level     | Maintenance level number. The range is from 0 to 7. Alternatively, you can choose <i>any</i> to specify all maintenance levels.                        |
| VLANs for Cross-Check | VLAN ID on which to apply the continuity check. The VLAN ID range is from 1 to 4094. Alternatively, you can choose <i>any</i> to specify all VLAN IDs. |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Enable CFM SNMP Server Traps

Use the **Enable CFM SNMP Server Traps** command to enable Ethernet CFM continuity check traps and Ethernet CFM cross-check traps.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Enable > Cisco > SNMP Server Traps**. The SNMP Server Traps dialog box opens.
- The command enables SNMP server traps and does not require any input parameters.
- Step 3** To run the command, click **Execute**.
- Any errors are displayed in the Result tab.
- Step 4** To close the dialog box, click **Close**.
- 

## Diagnose CFM with Show MEP Status

Use the **Diagnose CFM with Show MEP Status** command to show the MEP status of CFM diagnostics.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > Cisco > Show MEP Status**. The Show MEP Status dialog box opens.
- The command checks the MEP status and does not require any input parameters.
- Step 3** To run the command, click **Execute**.
- Any errors are displayed in the Result tab.
- Step 4** To close the dialog box, click **Close**.
- 

## Diagnose CFM with Show MEP Crosscheck Status

Use the **Diagnose CFM with Show MEP Crosscheck Status** command to show the cross-check status of CFM MEP diagnostics.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > Cisco > Show MEP Crosscheck Status**. The Show MEP Crosscheck Status dialog box opens.
- The command checks the MEP crosscheck status and does not require any input parameters.
- Step 3** To run the command, click **Execute**.
- Any errors are displayed in the Result tab.
- Step 4** To close the dialog box, click **Close**.
-

## Diagnose CFM with Ping Remote MEP with MAC

Use the **Diagnose CFM with Ping Remote MEP with MAC** command to ping the remote maintenance endpoint that supplies the MAC address.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > IEEE > Ping Remote MEP with MAC**. The Ping Remote MEP with MAC dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter    | Description                                                                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remote MAC Address | MAC address of the remote interface on which the remote MEP is configured. The MAC address has the format <i>aaaa.bbbb.cccc</i> ; the default is 0000.0000.0000.<br><br>CFM frames are distinguishable by EtherType and, for multicast messages, by MAC address. |
| Domain Name        | Domain name for the remote MEP.                                                                                                                                                                                                                                  |
| VLAN ID            | VLAN ID on which to apply the remote MAC address. The VLAN ID range is from 1 to 4094.                                                                                                                                                                           |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.
- 

## Diagnose CFM with Ping Remote MEP with MPID

Use the **Diagnose CFM with Ping Remote MEP with MPID** command to ping the remote maintenance endpoint that supplies the maintenance point ID (MPID).

- 
- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > IEEE > Ping Remote MEP with MPID**. The Ping Remote MEP with MPID dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter     | Description                                 |
|---------------------|---------------------------------------------|
| Remote MPID Address | Address of the remote maintenance point ID. |

| Input Parameter | Description                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------|
| Domain Name     | Name of the domain.                                                                             |
| VLAN ID         | VLAN ID on which to apply the remote maintenance point ID. The VLAN ID range is from 1 to 4094. |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Diagnose CFM with Ping Remote MEP with Multicast

Use the **Diagnose CFM with Ping Remote MEP with Multicast** command to ping the remote maintenance endpoint that supplies the multicast.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > IEEE > Ping Remote MEP with Multicast**. The Ping Remote MEP with Multicast dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter | Description                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------|
| Domain Name     | Name of the domain.                                                                                            |
| VLAN ID         | VLAN ID on which to apply the remote maintenance endpoint with multicast. The VLAN ID range is from 1 to 4094. |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Diagnose CFM with Traceroute Remote MEP with MAC

Use the **Diagnose CFM with Traceroute Remote MEP with MAC** command to traceroute the remote maintenance endpoint that supplies the MAC address.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > IEEE > Traceroute Remote MEP with MAC**. The Traceroute Remote MEP with MAC dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter    | Description                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------|
| Remote MAC Address | Remote MAC address, in the format <i>aaaa.bbbb.cccc</i> . The default MAC address is 0000.0000.0000. |
| Domain Name        | Name of the domain.                                                                                  |
| VLAN ID            | VLAN ID on which to apply the remote MAC address. The VLAN ID range is from 1 to 4094.               |

- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.

## Diagnose CFM with Traceroute Remote MEP with MPID

Use the **Diagnose CFM with Traceroute Remote MEP with MPID** command to traceroute the remote maintenance endpoint that supplies the maintenance point ID.

- Step 1** In the inventory window, expand the Logical Inventory tree.
- Step 2** Right-click the CFM node and choose **Commands > Diagnose > IEEE > Traceroute Remote MEP with MPID**. The Traceroute Remote MEP with MPID dialog box opens.
- Step 3** By default, the General tab is selected. Enter values for the following parameters.

| Input Parameter     | Description                                                                             |
|---------------------|-----------------------------------------------------------------------------------------|
| Remote MPID Address | Address of the remote maintenance endpoint identifier.                                  |
| Domain Name         | Name of the domain.                                                                     |
| VLAN ID             | VLAN ID on which to apply the remote MPID address. The VLAN ID range is from 1 to 4094. |



- Step 4** To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab. You can go back and make any required changes to the input parameters.
- Step 5** To run the commands, click **Execute**.  
Any errors are displayed in the Result tab.
- Step 6** To close the dialog box, click **Close**.
-





## CHAPTER 43

# Using Resilient Ethernet Protocol Commands

---

Resilient Ethernet Protocol (REP) is a key part of the Carrier Ethernet and Mobile Transport over Packet (MToP) access network for fast and predictable convergence of Ethernet transport. REP is used primarily among access and aggregation devices that are connected in the Ethernet ring topologies.

Cisco ANA discovers and displays the following REP attributes in the Logical Inventory tree of the Cisco ANA NetworkVision application:

- REP Segments. All of these segments are identified by a REP segment ID that is locally configured on the network element. These segments, discovered on a switch, include the following attributes:
  - REP segment port 1 (interface name, port channel, or link aggregation group [LAG]).
  - REP segment port 2 (interface name, port channel, or LAG).
  - REP segment complete. This indicates whether the segment is complete so that no port is in the failed state.
- Global REP configuration details:
  - REP version used on the device.
  - REP administrative VLAN.
  - REP notification enabled.
  - Process and its status.

The following REP port attributes are modeled in Cisco ANA:

- REP segment ID.
- REP port ID.
- REP port state.
- REP port type (regular REP segment port, REP edge port, and primary REP edge port).
- REP port role (Open, Alternate, and Failed).
- Operational link state of the REP port (none, initDown, noNeighbour, oneWay, twoWay, flapping, wait, and unknown).
- Link status layer age-out timer (time, in milliseconds, for which the REP interface remains up without receiving a hello from a neighbor). REP must be configured on Layer 2 trunk ports (Network Node Interface (NNI) ports on access switches).

- VLAN load balancing configurations on REP primary edge ports. This includes:
  - REP alternate port (the port to be blocked for VLAN load balancing).
  - Blocked VLAN list.
  - Preempt timer.
- Remote device name, MAC and port interface.

REP details (port or interface) are not displayed in the Physical Inventory tree of the Cisco ANA NetworkVision application.

You can view the REP port roles (open, alternate, and failed) in the Cisco ANA NetworkVision map. The REP port role is displayed as a tool-tip between the REP enabled trunk ports in the Ethernet links. Using the Cisco ANA NetworkVision map, you can identify if the segment is open or closed.

The map displays the forwarding direction (REP port roles) along the Physical links within VLAN overlays. It also displays the forwarding direction along the VLAN links among the switching elements within the VLAN logical domain topology.

## Supported Network Elements

You can run the REP commands on the following network elements:

- Cisco 7600 Series Routers
- All Cisco Catalyst Switches
- Cisco Catalyst 3750 Series Switches
- Cisco ME 6524 Ethernet Switches
- Cisco Mobile Wireless Router 2941

See Part 1—Cisco VNEs for details on the software versions Cisco ANA supports for these network elements. To run the REP commands, the software on the network element must support the REP technology.

# Displaying REP Segment Data

Use the **Show REP Segment Information** command to get the REP topology information for the specified segment.

- 
- Step 1** In the inventory window, expand the Logical Inventory tree and Resilient Ethernet Protocol node.
- Step 2** Choose SegmentId and right-click **Commands > REP > Show REP Segment Information**. The Show REP Segment Information dialog box opens.
- Step 3** By default, the General tab is selected. To see the commands that will be applied on the device, click **Preview**.  
You can view the commands in the Result tab.
- Step 4** To run the commands, click **Execute**.  
The result contains information about all ports in the segment, including which one was configured and selected as the primary edge port.  
Any errors are displayed in the Result tab.
- Step 5** To close the dialog box, click **Close**.
-





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