Cisco ASR 901 and 901S Series Aggregation Services Router MIB Specifications Guide

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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Preface

Part Number: OL-27679-04
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This guide describes the implementation of the Simple Network Management Protocol (SNMP) for Cisco ASR 901 and ASR 901S Series Aggregation Services Routers.

SNMP provides a set of commands for setting and retrieving the values of operating parameters on the router. Router information is stored in a virtual storage area called a Management Information Base (MIB). The MIB contains objects that describe router components and provides information about the status of these components.

This preface provides an overview of this guide with the following sections:

- Document Revision History, page xi
- Audience, page xii
- Organization, page xii
- Obtaining Documentation and Submitting a Service Request, page xii

Document Revision History

The following Revision History tables record technical changes, additions, and corrections to this document.

Cisco IOS Release	Part Number	Publication Date	Change Summary
15.2(2)SNG	OL-27679-01	August 2012	Initial publication.
15.2(2)SNI	OL-27679-02	February 2013	Added information on CISCO-ENTITY-SENSOR-MIB.
15.3(2)S	OL-27679-03	March 2013	Added information on OSPFv3-MIB.
15.4(1)S	OL-27679-03	November 2013	Updated the Monitoring Notifications chapter.

Audience

This guide is intended for system and network administrators who must configure the router for operation and monitor its performance in the network.

This guide may also be useful for application developers who are developing management applications for the router.

Organization

This guide contains the following chapters:

Chapter	Description
Chapter 1, "Cisco ASR 901 and ASR 901S Router MIB Overview,"	Provides background information about SNMP and its implementation on Cisco ASR 901 and ASR 901S routers.
Chapter 2, "Configuring SNMP and MIB Support,"	Provides instructions for configuring SNMP management support on the router.
Chapter 3, "MIB Specifications,"	Describes each MIB included in the software image. Each description lists any constraints as to how the MIB is implemented on the router.
Chapter 4, "Using MIBs,"	Describes how to perform common tasks on the router.
Chapter 5, "Monitoring Notifications,"	Describes the notifications supported by the MIB enhancements feature.
Glossary	Provides a list of terms and the definitions.

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 an RSS feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service. Cisco currently supports RSS Version 2.0.

Cisco ASR 901 and ASR 901S Router MIB Overview

This chapter provides an overview of the Cisco ASR 901 and ASR 901S routers. This chapter contains the following topics:

- MIB Description, page 1-1
- Benefits of MIB Enhancements, page 1-2
- MIB Dependencies, page 1-2
- MIB Types, page 1-3
- Object Identifiers, page 1-3
- SNMP Overview, page 1-4
- Related Information and Useful Links, page 1-7

MIB Description

A Management Information Base (MIB) is a collection of information that can be managed by the Simple Network Management Protocol (SNMP) manager. The objects in a MIB are organized and identified by object identifiers (OID) that are defined by the IETF and other organizations. Cisco's implementation of SNMP uses MIBs that conform to the MIB II definition that is described in RFC 1213.

Objects can refer to a physical device (clock card), a software parameter (such as an IP address or operation mode), or a run-time statistic (such as number of packets passed or temperature). When the device contains multiple objects of the same type, it appends a unique instance number to the end of the OID, so that the SNMP manager and agent can distinguish between the different objects.

MIBs can contain two types of managed objects:

- Scalar objects—Define a single object instance (for example, ifNumber in the IF-MIB and bgpVersion in the BGP4-MIB).
- Tabular objects—Define multiple related object instances that are grouped together in MIB tables (for example, ifTable in the IF-MIB defines the interfaces on the router). Each row in a MIB table describes all of the parameters for a particular object (such as IP address, clock speed, number of ports, and so forth). SNMP managers can read or set all of the information in a row with one request.

  Typically, each row in a table is identified by a unique index number. Depending on the table, this index either could reflect a physical attribute (such as the slot number in a chassis or port number on a card) or it could be an arbitrary number (such as is used for tables that list error messages or packet statistics).

Each row also has a status object that shows whether the row is created, activated, deactivated, or deleted. When an SNMP manager creates a new row, it typically sets the row's status to create and then populates the row with the desired parameters. The SNMP agent does not use the objects in a row until the SNMP manager sets the row's status to activate. This ensures that the SNMP agent does not try to use a row's parameters until the SNMP manager has finished creating the row and entered all of the row's required parameters.

Benefits of MIB Enhancements

The Cisco ASR 901 and ASR 901S routers enhanced management feature allows the router to be managed through the SNMP. The feature also expands the number of MIBs included with the router.

Using the enhanced management feature, you can:

- Manage and monitor router resources through an SNMP-based network management system (NMS)
- Use SNMP **set** and **get** requests to access information in MIBs
- Reduce the amount of time and system resources required to perform functions such as inventory management

Other benefits include:

- A standards-based technology (SNMP) for monitoring faults and performance on the router
- Support for all SNMP versions (SNMPv1, SNMPv2c, and SNMPv3)
- Notification of faults, alarms, and conditions that might affect services
- A way to access router information other than through the command line interface (CLI)

MIB Dependencies

The SNMP specifications define MIBs in a highly structured hierarchical format, in which MIBs that are lower in the hierarchy use objects that are defined by MIBs higher up in the hierarchy. Each MIB includes a section titled "IMPORTS" that lists the objects it uses that are defined by other MIBs.

For example, the IF-MIB, which defines standard objects for router interfaces, uses the following IMPORT block:

```
IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Counter32, Gauge32, Counter64,
    Integer32, TimeTicks, mib-2,
    NOTIFICATION-TYPE                       FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, DisplayString,
    PhysAddress, TruthValue, RowStatus,
    TimeStamp, AutonomousType, TestAndIncr   FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP,
    NOTIFICATION-GROUP                      FROM SNMPv2-CONF
    snmpTraps                               FROM SNMPv2-MIB
    IANAifType                              FROM IANAifType-MIB;
```

This section shows that the IF-MIB uses objects that are defined by the SNMPv2-SMI, SNMPv2-TC, SNMPv2-CONF, SNMPv2-MIB, and IANAifType-MIB MIBs. To use the IF-MIB with your SNMP management software, you must load these other MIBs as well.

Typically, most SNMP managers use the IMPORT blocks in the MIBs to automatically determine the order in which the MIBs must be loaded. However, if you are manually loading MIBs, you must do so in the proper order.

To determine the dependencies among MIBs, you can use the "View and Download MIBs" tool, which is part of the SNMP Object Navigator on the Cisco IOS MIB Tools page. This URL takes you to the MIB Locator:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

MIB Types

MIBs on the Cisco ASR 901 and ASR 901S routers can be arranged in the following categories:

- SNMP standard MIBs—Part of the SNMPv1, SNMPv2c, and SNMPv3 specifications and must be supported by any agent supporting SNMP network management. These MIBs provide the framework for SNMP management, defining common objects and interfaces.
- Internet standard MIBs—Provide generic definitions for objects that provide information about commonly used protocols, such as IP, TCP, and Internet Control Message Protocol (ICMP). These MIBs are typically defined by the IETF as Internet-Drafts and Request for Comments (RFCs).
- Cisco platform and network-layer enterprise MIBs—Provide information that is specific to Cisco platforms. These MIBs can extend standard MIBs by providing additional related information, or they can provide information about features that are specific to Cisco platforms. Typically, the same Cisco-specific MIB is used on all Cisco platforms that implement the MIB's particular feature. These MIBs are also typically updated whenever the related feature is updated in the Cisco IOS software.
- ASR-specific MIBs—Provide information about the Cisco ASR 901 and ASR 901S routers interfaces and related information.
- Deprecated MIBs—Supported in earlier releases of Cisco IOS software but have been replaced by more standardized, scalable MIBs. Network management applications and scripts should convert to the replacement MIBs as soon as possible, because deprecated MIBs could be removed without notice.

Object Identifiers

An object identifier (OID) uniquely identifies a MIB object on a managed router or other network device. All OIDs are arranged in a hierarchical order, with top-level OIDs assigned by standards organizations such as IETF, ISO, and ITU. Lower-level OIDs are assigned by individual vendor organizations, such as Cisco Systems.

Each level in an OID is assigned both a number and a name. The hierarchical structure of the OIDs allow for easy translation between the number and name forms of an OID.

For example, SNMP standard MIBs that are intended for use by all vendors typically start with "1.3.6.1.2.1", which translates as follows:

iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1)

Typically, vendor-specific MIBs have OIDs that start with "1.3.6.1.4.1", which translates as follows:

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1)

Cisco Systems was assigned the next OID of "9", so most OIDs for items that are specific to Cisco platforms start with "1.3.6.1.4.1.9":

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).cisco(9)

For illustrative purposes, the OIDs above are shown with both number and name forms combined. Typically, only the name or number for a level is used. However, names and numbers can be mixed in the same OID. For example, the top-most Cisco-specific OID could also be given as either "1.3.6.1.4.1.cisco" or "iso.org.dod.internet.private.enterprises.9".

To translate OIDs between their name and number format, and to display the location of any OID in the OID tree, you can use the SNMP Object Navigator on the Cisco IOS MIB Tools page. This URL takes you to the MIB Locator:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

For a listing of all of the objects and OIDs that are included in any particular MIB, you can download the text files at the following URL:

ftp://ftp.cisco.com/pub/mibs/oid/

SNMP Overview

The Cisco ASR 901 and ASR 901S routers routers can be managed through SNMP, which is an application-layer protocol that provides a standardized framework and a common language for monitoring and managing devices in a network. The SNMP framework has the following main parts:

- An SNMP manager—A system used to control and monitor the activities of network hosts by using SNMP commands. The most common managing system is called a network management system (NMS), which can be either a standalone device that is dedicated to network management, or a workstation that is running network management applications. Many network management applications are available and range from simple, freely available command-line applications to feature-rich, commercial products with sophisticated graphical user interfaces.
- An SNMP agent—A software component in a managed device that maintains the SNMP data and communicates with the SNMP manager. Typically, the agent is configured to respond only to one or more specific SNMP managers, so that unauthorized parties do not have access to the device. On the Cisco ASR 901 and ASR 901S routers, the Cisco IOS software runs the SNMP agent software, but it does not become active until it is enabled using the command-line interface (CLI).
- Management Information Base (MIB)—Objects that can be managed by SNMP are defined in MIBs, which are ASCII text files in a structured format. MIBs that are standardized for use industry-wide among multiple vendors are created and maintained by organizations such as the Internet Engineering Task Force (IETF). Vendors, such as Cisco, also create vendor-specific MIBs to manage vendor-specific platforms and features. On the Cisco ASR 901 and ASR 901S routers, MIBs are part of the Cisco IOS software image. Typically, each new Cisco IOS software release includes MIBs that are new or have been modified.

The SNMP manager communicates with the SNMP agent in the following ways:

- GET requests—The SNMP manager obtains information from the device by sending GET requests to the agent. The manager can obtain this information one object at a time using single GET requests.
- SET requests—The SNMP manager configures the device by sending SET requests to the agent. The manager can configure one item at a time using single SET requests, or it can configure multiple parameters using a BULK-SET request.

- Notifications—The SNMP agent asynchronously informs the manager that specific events have occurred by using a trap or inform message (depending on the version of SNMP being used). The network administrator configures the agent for the types of traps and informs it should send. These can range from purely informational messages, such as traffic statistics, to important messages that warn of critical situations and errors, such as a card failure.

SNMP Notifications

An SNMP agent can notify the manager when important system events occur, such as the following:

- An interface starts or stops running
- Temperature thresholds are crossed
- Authentication failures occur

When an agent detects an alarm condition, the agent:

- Logs information about the time, type, and severity of the condition
- Generates a notification message, which it then sends to a designated IP host

SNMP notifications are sent as either:

- Traps—Unreliable messages, which do not require receipt acknowledgment from the SNMP manager.
- Informs—Reliable messages, which are stored in memory until the SNMP manager issues a response. Informs use more system resources than traps.

The Cisco implementation of SNMP uses the definitions of SNMP traps described in RFC 1215.

When an agent detects an alarm condition, it logs information about the time, type, and severity of the condition and generates a notification message, which it then sends to a designated IP host. SNMP notifications can be sent as either *traps* or *informs*. See the for instructions on how to enable traps on the Cisco ASR 901 and ASR 901S routers. Use the **snmp-server host** command to specify whether to send SNMP notifications as traps or informs.

SNMP Versions

Cisco IOS software supports the following versions of SNMP:

- SNMPv1—The Simple Network Management Protocol: A full Internet standard, defined in RFC 1157. Security is based on community strings.
- SNMPv2c—The community-string-based administrative framework for SNMPv2. SNMPv2c is an update of the protocol operations and data types of SNMPv2c (SNMPv2 classic), and uses the community-based security model of SNMPv1. In particular, SNMPv2c adds support for 64-bit counters.
- SNMPv3—Version 3 of SNMP. SNMPv3 uses the following security features to provide secure access to devices:
  - Message integrity—Ensuring that a packet has not been tampered with in transit.
  - Authentication—Determining that the message is from a valid source.
  - Encryption—Scrambling the contents of a packet to prevent it from being learned by an unauthorized source.

Tip We recommend using SNMPv3 wherever possible because of its superior security features.

SNMPv1 and SNMPv2c

Both SNMPv1 and SNMPv2c use a community-based form of security. The community of managers who are able to access the agent MIB is defined by an IP address access control list (ACL) and password.

SNMPv2c support includes a retrieval mechanism and more detailed error message reporting to management stations. The retrieval mechanism supports the retrieval of tables and large quantities of information, minimizing the number of round-trip transmissions required.

SNMPv2c improved error handling support. SNMPv1 reported all error conditions using a single error code, but SNMPv2c includes a number of expanded error codes that use different error types to distinguish between different kinds of error conditions.

SNMPv2 also reports three different types of exceptions:

- No such object exceptions
- No such instance exceptions
- End of MIB view exceptions

SNMPv3

SNMPv3 improves security for SNMP communications by using encryption and by defining security models and security levels:

- Encryption—SNMPv3 supports several industry-standard encryption standards, including the Data Encryption Standard (DES).
- Security Model—An authentication strategy for a user and for the group in which the user resides. Different users can be assigned a different security model, depending on the organization's security structure and needs.
- Security Level—Permitted level of security within a security model. SNMPv1 and SNMPv2c used only a two-stage security level: read-only and read-write. SNMPv3 provides a much greater ability to customize the permission levels for different users.

A combination of a security model and a security level determines which security mechanism is employed when handling an SNMP packet.

SNMP Security Models and Levels

Table 1-1 describes the security models and levels provided by the different SNMP versions.

Table 1-1 SNMP Security Models and Levels

Model	Level	Authentication	Encryption	Description
v1	noAuthNoPriv	Community string	No	Uses match on community string for authentication.
v2c	noAuthNoPriv	Community string	No	Uses match on community string for authentication.

Table 1-1 SNMP Security Models and Levels

Model	Level	Authentication	Encryption	Description
v3	noAuthNoPriv	User name	No	Uses match on user name for authentication.
	authNoPriv	MD5 or SHA	No	Provides authentication based on HMAC-MD5 or HMAC-SHA algorithm.
	authPriv	MD5 or SHA	DES	Provides authentication based on HMAC-MD5 or HMAC-SHA algorithm. Also provides DES 56-bit encryption based on CBC-DES (DES-56) standard.

You must configure the SNMP agent to use the version of SNMP supported by the management station. An agent can communicate with multiple managers; for this reason, you can configure the Cisco IOS software to support communications with one management station using the SNMPv1 protocol, one using the SNMPv2c protocol, and another using SNMPv3.

Note We recommend using SNMPv3 for all SNMP applications, because of its significant security improvements. In addition, SNMPv3 supports 64-bit counters, which are not supported in SNMPv1. If you use SNMPv1, you can not view any objects that are defined as 64-bit counters.

Requests for Comments

MIB modules are typically defined in Request for Comments (RFC) documents that have been submitted to the Internet Engineering Task Force (IETF) for formal discussion and approval. RFCs are written by individuals or groups for consideration by the Internet Society and the Internet community as a whole.

Before being given RFC status, recommendations are first published as Internet Draft (I-D) documents. RFCs that have become recommended standards are also labeled as standards (STD) documents. For more information, see the Internet Society and IETF websites (http://www.isoc.org and http://www.ietf.org).

We provide private MIB extensions with each Cisco system. Cisco enterprise MIBs comply with the guidelines described in the relevant RFCs unless otherwise noted in the documentation.

Related Information and Useful Links

The following URLs provide access to general information about Cisco MIBs. Use these links to access MIBs for download, and to access related information (such as application notes and OID listings).

- http://tools.cisco.com/ITDIT/MIBS/servlet/index
- http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

Cisco Technical Support Information and FAQs

The following URLs provide access to SNMP information developed by the Cisco Technical Assistance Center (TAC):

- Cisco Technical Support page for SNMP that provides links to general SNMP information and tips for using SNMP to gather data: http://www.cisco.com/en/US/tech/tk648/tk362/tk605/tsd_technology_support_sub-protocol_home.html.
- Frequently asked questions (FAQs) about Cisco MIBs: http://www.cisco.com/en/US/customer/tech/tk648/tk362/technologies_q_and_a_item09186a00800 94bc0.shtml.

SNMP Configuration Information

The Cisco IOS Configuration Fundamentals and Network Management Configuration Guide, Release 12.3 at http://www.cisco.com/en/US/docs/ios/12_3/featlist/cfun_vcg.html provides information about configuring SNMP support and SNMP commands.

Cisco ASR 901 and ASR 901S Documentation

The following documents describe information about configuring the specific parameters on the Cisco ASR 901 and ASR 901S routers:

- *Cisco ASR 901S Series Aggregation Services Router Command Reference Guide,* at: http://www.cisco.com/en/US/products/ps12890/prod_command_reference_list.html
- *Cisco ASR 901S Series Aggregation Services Router Software Configuration Guide*, at the following URL: http://www.cisco.com/en/US/products/ps12890/tsd_products_support_configure.html
- *Cisco ASR 901 Series Aggregation Services Router Command Reference Guide,* at: http://www.cisco.com/en/US/products/ps12077/prod_command_reference_list.html
- *Cisco ASR 901 Series Aggregation Services Router Software Configuration Guide*, at the following URL: http://www.cisco.com/en/US/products/ps12077/products_installation_and_configuration_guides_list.html

Configuring SNMP and MIB Support

This chapter describes how to configure Simple Network Management Protocol (SNMP) and Management Information Base (MIB) support for Cisco ASR routers. It includes the following sections:

- Determining MIB Support for Cisco IOS Releases, page 2-1
- Downloading and Compiling MIBs, page 2-1
- Enabling SNMP Support, page 2-3
- Using the Cisco MIB Locator, page 2-4

Determining MIB Support for Cisco IOS Releases

The Cisco MIBS Support page provides information on the SNMP capabilities that are contained in most Cisco IOS software images. To access this web site, use the following procedure:

Step 1 Go to the Cisco MIBs Support page:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

Step 2 Under Cisco Access Products, select your particular Cisco ASR platform to display a list of MIBs that are supported on the router.

Step 3 Scroll through the list to find the Cisco IOS software release you are interested in.

Downloading and Compiling MIBs

The following sections provide information about how to download and compile MIBs for the router:

- Considerations for Working with MIBs, page 2-2
- Downloading MIBs, page 2-3
- Compiling MIBs, page 2-3

Considerations for Working with MIBs

While working with MIBs, consider the following:

- Mismatches on datatype definitions might cause compiler errors or warning messages. For example, the OLD-CISCO-CPU-MIB, OLD-CISCO-MEMORY-MIB, and OLD-CISCO-SYSTEM-MIB each define the following OID differently:

```
OLD-CISCO-CPU-MIB.my
     1cpu    OBJECT IDENTIFIER ::= {local 1 }

OLD-CISCO-MEMORY-MIB.my
     1env    OBJECT IDENTIFIER ::= {local 1 }
```

  To eliminate MIB compiler errors or warning messages for mismatched definitions, edit one of the MIB definitions to match the other. Other types of mismatches include:

```
MIB A
Datatype1 ::= INTEGER(0...100)
Datatype2 ::= INTEGER(1...50)

MIB B
Datatype1 ::= DisplayString
Datatype2 ::= OCTET STRING (SIZE(0...255))
```

- Many MIBs import definitions from other MIBs. If your management application requires MIBs to be loaded, and you experience problems with undefined objects, try loading the following MIBs in this order:

  SNMPv2-SMI.my
  SNMPv2-TC.my
  SNMPv2-MIB.my
  RFC1213-MIB.my
  IF-MIB.my
  CISCO-SMI.my
  CISCO-PRODUCTS-MIB.my
  CISCO-TC.my

- To see a particular MIB's dependencies, use the "View and Download MIBs" tool, which is part of the SNMP Object Navigator on the Cisco IOS MIB Tools page, which is MIB Locator at the following URL:

  http://tools.cisco.com/ITDIT/MIBS/servlet/index

- For information about trap definitions, alternative size definitions, and null OIDs, follow the link:

  ftp://ftp.cisco.com/pub/mibs/app_notes/mib-compilers

  For listings of OIDs assigned to MIB objects, follow the link:

  ftp://ftp.cisco.com/pub/mibs/oid

Downloading MIBs

To download the MIBs onto your system, if they are not already there, use the following procedure:

Step 1 Go to the Cisco IOS MIB Tools page at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If the MIB you want to download is not there, try one of the following URLs; or go to one of the URLs in Step 4.

- ftp://ftp.cisco.com/pub/mibs/v2
- ftp://ftp.cisco.com/pub/mibs/v1

Step 2 Click the link for the MIB Locator tool.

Step 3 You can use the MIB Locator tool to show a particular MIB or to show all MIBs for a particular platform or for a particular software release.

Step 4 You can also download industry-standard MIBs from the following URLs:

- http://www.ietf.org
- http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

Compiling MIBs

If you plan to integrate the Cisco ASR 901 or ASR 901S router with an SNMP-based management application, you must also compile the MIBs for that platform. Some SNMP managers do this automatically when you place all of the MIBs in a specific location, while others require you to do this manually. For instructions, see the following section.

Enabling SNMP Support

This procedure summarizes how to configure the Cisco ASR 901 and ASR 901S for SNMP support.

Note These basic configuration commands are issued for SNMPv2c. For SNMPv3, you must also set up SNMP users and groups.

Step 1 Set up your basic SNMP configuration through the CLI. (For command and setup information, see the list of documents that follows this procedure.)

Step 2 Define SNMP read-only and read-write communities:

```
Router(config)# snmp-server community Read_Only_Community_Name ro
Router(config)# snmp-server community Read_Write_Community_Name rw
```

Step 3 Configure SNMP views (to limit the range of objects accessible to different SNMP user groups):

```
Router(config)# snmp-server view view_name oid-tree {included | excluded}
```

Step 4 If you plan to enable a number of traps, especially if you plan to enable traps for SYSLOG events and alarms, increase the trap queue size from its default of 10:

```
Router(config)# snmp-server queue-length queue-size
```

The value of *queue-size* can range from 1 to 1000 traps. We recommend a size of at least 100 for systems that are sending traps for SYSLOG events. The default is 10.

For detailed information about SNMP commands, see the following Cisco documents:

- "System Management" section of the *Cisco IOS Configuration Fundamentals Configuration Guide*, Release 12.3, available at : http://www.cisco.com/en/US/docs/ios/12_3/featlist/cfun_vcg.html
- "System Management" section of the *Cisco IOS Configuration Fundamentals Command Reference*, Release 12.2, available at: http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html

Using the Cisco MIB Locator

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use the Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

To access Cisco MIB Locator, you must have an account on Cisco.com. You can establish an account on Cisco.com by following the directions found at this URL:

https://tools.cisco.com/RPF/register/register.do

MIB Specifications

This chapter describes each Management Information Base (MIB) on the Cisco ASR 901 and ASR 901S routers. Each description lists any constraints on how the MIB or its object identifiers (OIDs) are implemented on the router.

Unless noted otherwise, the Cisco Cisco ASR 901 and ASR 901S implementation of a MIB follows the standard MIB that has been defined. Any MIB table or object not listed the tables is implemented as defined in the standard MIB definition.

Note Not all MIBs included in a Cisco IOS software release are fully supported by the router. Some MIBs are not supported at all. Other MIBs might work, but they have not been tested on the router. In addition, some MIBs are deprecated but cannot be removed from the software. When a MIB is included in the image, this does not necessarily mean it is supported by the Cisco ASR 901 or ASR 901S platforms.

Overview of MIB Support

Support for a particular MIB is included as part of the Cisco IOS software release. Each version of Cisco IOS software contains code that responds to SNMP requests for objects that are in the MIBs that are supported in that release for that particular software image.

Each new release of Cisco IOS software typically changes that support to some extent, usually involving one or more of the following:

- Fixing a caveat or software defect that is preventing the proper use of the MIB
- Updating the software to support the latest version of the MIB or to support optional objects that were not supported previously
- Adding support for new MIBs that are part of a new feature that is being introduced

The fact that a MIB might be included in a Cisco IOS software release does not imply that the MIB is fully supported on the router. Similarly, the fact that you can access a particular object in a MIB does not imply that the object is fully supported either.

Note As a general rule, deprecated objects and MIBs should not be used, because they have been replaced by other, more functional objects and MIBs. Also, deprecated objects and MIBs can be removed in a future release without notice.

Note The exact MIB support depends on both the Cisco IOS software image and the Cisco IOS software release being used. To determine which MIBs are included in other releases and software images, see the "Determining MIB Support for Cisco IOS Releases" section on page 2-1.

MIB Specifications

This section gives a short summary of each MIB, along with the MODULE-IDENTITY and top-level object identifier (OID) that can be used to access the MIB when using an SNMP manager.

MIB Version String Description

The MIB version string indicates the date and time that the module was most recently modified. The format is YYMMDDHHMMZ or YYYYMMDDHHMMZ, where:

- YY is the last two digits of the year (only years between 1900 and 1999).
- YYYY is all four digits of the year (any year).
- MM is the month (01 through 12).
- DD is the day of the month (01 through 31).
- HH is hours (00 through 23).
- MM is minutes (00 through 59).
- Z (the ASCII character Z) denotes Coordinated Universal Time (UTC, formerly Greenwich Mean Time, GMT). This datatype stores the date and time fields YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, TIMEZONE_HOUR, and TIMEZONE_MINUTE.

Note For example, 9502192015Z and 199509122015Z represent 8:15 GMT on 19 February 1995. Years after 1999 use the four-digit format. Years 1900-1999 may use the two or four digit format.

The following MIBs are supported on the Cisco ASR 901 and ASR 901S routers:

- BGP4-MIB
- BRIDGE-MIB
- CISCO-AAA-SERVER-MIB
- CISCO-ACCESS-ENVMON-MIB
- CISCO-CAR-MIB
- CISCO-CDP-MIB
- CISCO-CEF-MIB
- CISCO-CLASS-BASED-QOS-MIB
- CISCO-CONFIG-COPY-MIB
- CISCO-CONFIG-MAN-MIB
- CISCO-DATA-COLLECTION-MIB
- CISCO-DOT3-OAM-MIB
- CISCO-EIGRP-MIB

- CISCO-ENHANCED-MEMPOOL-MIB
- CISCO-ENTITY-ASSET-MIB
- CISCO-ENTITY-SENSOR-MIB
- CISCO-ENTITY-VENDORTYPE-OID-MIB
- CISCO-ENVMON-MIB
- CISCO-FLASH-MIB
- CISCO-IETF-BFD-MIB
- CISCO-IETF-PW-MIB
- CISCO-IETF-PW-TC-MIB
- CISCO-IF-EXTENSION-MIB
- CISCO-IMAGE-MIB
- CISCO-IPMROUTE-MIB
- CISCO-IPSLA-ETHERNET-MIB
- CISCO-MEMORY-POOL-MIB
- CISCO-NETSYNC-MIB
- CISCO-NTP-MIB
- CISCO-OSPF-MIB
- CISCO-PORT-STORM-CONTROL-MIB
- CISCO-PING-MIB
- CISCO-PROCESS-MIB
- CISCO-PRODUCTS-MIB
- CISCO-PTP-MIB
- CISCO-QUEUE-MIB
- CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB
- CISCO-RTTMON-MIB
- CISCO-SMI-MIB
- CISCO-SNAPSHOT-MIB
- CISCO-SNMP-TARGET-EXT-MIB
- CISCO-STP-EXTENSIONS-MIB
- CISCO-SYSLOG-MIB
- CISCO-TC-MIB
- ENTITY-MIB
- ETHERLIKE-MIB
- HCNUM-TC
- IANAIFTYPE-MIB
- IEEE8021-CFM-MIB
- IF-MIB
- IMA-MIB

- INT-SERV-MIB
- IP-FORWARD-MIB
- IP-MIB
- MPLS-LDP-MIB
- MPLS-LSR-MIB
- MPLS-VPN-MIB
- NOTIFICATION-LOG-MIB
- OLD-CISCO-CHASSIS-MIB
- OLD-CISCO-FLASH-MIB
- OLD-CISCO-INTERFACES-MIB
- OLD-CISCO-IP-MIB
- OLD-CISCO-SYS-MIB
- OLD-CISCO-TS-MIB
- OSPF-MIB
- OSPFv3-MIB
- PERFHIST-TC-MIB
- RFC1213-MIB
- RMON-MIB
- RMON2-MIB
- SNMP-FRAMEWORK-MIB
- SNMP-TARGET-MIB
- SNMPv2-MIB
- SNMPv2-SMI
- SNMPv2-TC-MIB
- TCP-MIB
- UDP-MIB

BGP4-MIB

The BGP4-MIB provides access to information related to the implementation of the Border Gateway Protocol (BGP), as defined in RFC 1657. The MIB provides:

- BGP configuration information
- Information about BGP peers and messages exchanged with them
- Information about advertised networks

The MODULE-IDENTITY for the BGP4-MIB is bgp, and its top-level OID is 1.3.6.1.2.1.15 (iso.org.dod.internet.mgmt.mib-2.bgp).

Version: 9405050000Z

BGP4-MIB Tables and Objects

Table 3-1 lists BGP4-MIB Tables and Objects.

Table 3-1 BGP4-MIB Tables and Objects

Object	Description
bgpPeerTable	Contains one entry per BGP peer, information about the connections with BGP peers.
bgpRcvdPathAttrTable	Contains information about paths to destination networks received from all peers running BGP version 3 or less.
bgp4PathAttrTable	Contains information about paths to destination networks received from all BGP4 peers.

MIB Constraints

There are no constraints on this MIB.

BRIDGE-MIB

The BRIDGE-MIB provides access to information related to Layer 2 bridging that is based on MAC addresses, as defined in RFC 1493.

The MODULE-IDENTITY for the BRIDGE-MIB is dot1dBridge, and its top-level OID is 1.3.6.1.2.1.17 (iso.org.dod.internet.mgmt.mib-2.dot1dBridge).

Version: 200509190000Z

BRIDGE-MIB Tables and Objects

Table 3-2 lists BRIDGE-MIB Tables and Objects. .

Table 3-2 BRIDGE-MIB Tables and Objects

Object	Description
dot1dBasePortTable	Contains information about every port that is associated with this bridge. Transparent, source-route, and srt ports are included.
dot1dStpPortTable	Contains port-specific information for the Spanning Tree Protocol.
dot1dTpFdbTable	Contains information about unicast entries for which the bridge has forwarding and/or filtering information. This information is used by the transparent bridging function in determining how to propagate a received frame.

Table 3-2 BRIDGE-MIB Tables and Objects (continued)

Object	Description
dot1dTpPortTable	Contains information about every port that is associated with this transparent bridge.
dot1dStaticTable	Contains filtering information configured into the bridge by local or network management specifying the set of ports to which frames received from specific ports and containing specific destination addresses are allowed to be forwarded. The value of zero in this table, as the port number from which frames with a specific destination address are received, is used to specify all ports for which there is no specific entry in this table for that particular destination address. Entries are valid for unicast and group/broadcast addresses.

MIB Constraints

There are no constraints on this MIB.

CISCO-AAA-SERVER-MIB

The CISCO-AAA-SERVER-MIB contains information about authentication, authorization, and accounting (AAA) servers within the router and external to the router. The MIB provides:

- Configuration information for AAA servers, including identities of external AAA servers
- Statistics for AAA functions
- Status (state) information for AAA servers.

The MODULE-IDENTITY for the CISCO-AAA-SERVER-MIB is ciscoAAAServerMIB, and its top-level OID is 1.3.6.1.4.1.9.10.56 (iso. org. dod. internet. private. enterprises. cisco. ciscoExperiment. ciscoAAAServerMIB).

MIB Constraints

Table 3-3 lists the constraints that the Cisco ASR 901 and ASR 901S routers place on objects in the CISCO-AAA-SERVER-MIB. For detailed definitions of MIB objects, see the MIB.

Table 3-3 CISCO-AAA-SERVER-MIB Tables and Objects

Object	Notes
casConfigTable	
• casAddress	Read-only.
• casAuthenPort	Read-only. The default value is 1645.
• casAcctPort	Read-only. The default value is 1646.

Table 3-3 CISCO-AAA-SERVER-MIB Tables and Objects

Object	Notes
• casKey	Read-only. This value is always shown as " " (null string) for security reasons.
• casConfigRowStatus	Read-only.
casStatisticsTable	
• casAuthorRequests	For RADIUS servers, thevalues are always 0. (RADIUS does not make authorization requests.) Only TACACS+ servers can have non-zero values.

CISCO-ACCESS-ENVMON-MIB

The CISCO-ACCESS-ENVMON-MIB provides information about power supply failures. This MIB also defines new temperature and voltage notifications.

The MODULE-IDENTITY for the CISCO-ACCESS-ENVMON-MIB is ciscoAccessEnvMonMIB, and its top-level OID is 1.3.6.1.4.1.9.9.61 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoAccessEnvMonMIB).

Version: 9808050000Z

CISCO-ACCESS-ENVMON-MIB Tables and Objects

Table 3-4 lists CISCO-ACCESS-ENVMON-MIB Tables and Objects.

Table 3-4 CISCO-ACCESS-ENVMON-MIB Tables and Objects

Object	Description
caemSupplyStatusTable	Contains the additional power supply information that are not covered in the ciscoEnvMonSupplyStatusTable of CISCO-ENVMON-MIB.

MIB Constraints

There are no constraints on this MIB.

CISCO-CAR-MIB

The CISCO-CAR-MIB contains objects that provide information about the operation of packet filtering on the interfaces that use weighted rate-limiting, which is also known as the committed access rate (CAR).

The MODULE-IDENTITY for the CISCO-CAR-MIB is ciscoCarMIB, and its top-level OID is 1.3.6.1.4.1.9.9.113 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoCarMIB).

Version: 0002180000Z

CISCO-CAR-MIB Tables and Objects

Table 3-5 lists CISCO-CAR-MIB Tables and Objects.

Table 3-5 CISCO-CAR-MIB Tables and Objects

Object	Description
ccarConfigTable	Contains rate limit configuration entries. Rate Limit is a method of traffic control. It allows a set of rate limits to be configured and applied to packets flowing into/out of an interface to regulate network traffic.
ccarStatTable	Contains rate limit status entries.

MIB Constraints

There are no constraints on this MIB.

CISCO-CDP-MIB

The CISCO-CDP-MIB contains objects to manage the Cisco Discovery Protocol (CDP) on the router, and to display the contents of the CDP neighbor table.

The MODULE-IDENTITY for the CISCO-CDP-MIB is ciscoCdpMIB, and its top-level OID is 1.3.6.1.4.1.9.9.23 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoCdpMIB).

Version: 200503210000Z

CISCO-CDP-MIB Tables and Objects

Table 3-6 lists CISCO-CDP-MIB Tables and Objects.

Table 3-6 CISCO-CDP-MIB Tables and Objects

Object	Description
cdpInterfaceTable	The (conceptual) table containing the status of CDP on the device's interfaces.
cdpInterfaceExtTable	This table contains the additional CDP configuration on the device's interfaces.

Table 3-6 CISCO-CDP-MIB Tables and Objects (continued)

Object	Description
cdpCacheTable	The (conceptual) table containing the cached information obtained via receiving CDP messages.
cdpCtAddressTable	The (conceptual) table contains the list of network-layer addresses of a neighbor interface, as reported in the Address TLV of the most recently received CDP message. The first address included in the Address TLV is saved in cdpCacheAddress. This table contains the remainder of the addresses in the Address TLV.

MIB Constraints

There are no constraints on this MIB.

CISCO-CEF-MIB

The CISCO-CEF-MIB contains objects to configure and monitor CEF related objects.

Version: 200601300000Z

CISCO-CEF-MIB Objects and Tables

Table 3-7 lists CISCO-CEF-MIB Tables and Objects.

Table 3-7 CISCO-CEF-MIB Tables and Objects

Object	Description
cefFIBSummaryTable	This table contains the summary information for the cefPrefixTable.
cefPrefixTable	A list of CEF forwarding prefixes.
cefLMPrefixTable	A table of Longest Match Prefix Query requests. Generator application should utilize the cefLMPrefixSpinLock to try to avoid collisions. See DESCRIPTION clause of cefLMPrefixSpinLock.
cefPathTable	CEF prefix path is a valid route to reach to a destination IP prefix. Multiple paths may exist out of a router to the same destination prefix. This table specify lists of CEF paths.
cefAdjSummaryTable	This table contains the summary information for the cefAdjTable.
cefAdjTable	A list of CEF adjacencies.
cefFESelectionTable	A list of forwarding element selection entries.

Table 3-7 CISCO-CEF-MIB Tables and Objects (continued)

Object	Description
cefCfgTable	This table contains global config parameter of CEF on the Managed device.
cefResourceTable	This table contains global resource information of CEF on the Managed device.
cefIntTable	This Table contains interface specific information of CEF on the Managed device.
cefPeerTable	Entity acting as RP (Routing Processor) keeps the CEF states for the entities and communicates with the entities using XDR. This Table contains the CEF information related to peer entities on the managed device.
cefPeerFIBTable	Entity acting as RP (Routing Processor) keep the CEF FIB states for the entities and communicate with the entities using XDR. This Table contains the CEF FIB State related to peer entities on the managed device.
cefStatsPrefixLenTable	This table specifies the CEF stats based on the Prefix Length.
cefSwitchingStatsTable	This table specifies the CEF switch stats.
cefCCGlobalTable	This table contains CEF consistency checker (CC) global parameters for the managed device.
cefCCTypeTable	This table contains CEF consistency checker types specific parameters on the managed device. All detected inconsistency are signaled to the Management Station via cefInconsistencyDetection notification.
cefInconsistencyRecordTable	This table contains CEF inconsistency records.

MIB Constraints

There are no constraints on this MIB.

CISCO-CLASS-BASED-QOS-MIB

The CISCO-CLASS-BASED-QOS-MIB provides access to quality of service (QoS) configuration information and statistics. The MIB uses several indexes to identify QoS features and distinguish among instances of those features:

- cbQosPolicyIndex—Identifies a service policy attached to a logical interface.
- cbQosObjectsIndex—Identifies each QoS feature on the Cisco ASR 901 and ASR 901S routers.
- cbQosConfigIndex—Identifies a type of QoS configuration. This index is shared by QoS objects that have identical configurations.

The indexes cbQosPolicyIndex and cbQosObjectsIndex are assigned by the system to uniquely identify each instance of a QoS feature.

Note Do not reuse these indexes between router reboots, even if the QoS configuration changes.

QoS information is stored in:

- Configuration objects—Might have multiple identical instances. Multiple instances of the same QoS feature share a single configuration object, which is identified by cbQosConfigIndex.
- Statistics objects—Each has a unique run-time instance. Multiple instances of a QoS feature have a separate statistics object. Run-time instances of QoS objects are each assigned a unique identifier (cbQosObjectsIndex) to distinguish among multiple objects with matching configurations.

The MODULE-IDENTITY for the CISCO-CLASS-BASED-QOS-MIB is ciscoCBQosMIB, and its top-level OID is 1.3.6.1.4.1.9.9.166 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoCBQosMIB).

Version: 200904240000Z

CISCO-CLASS-BASED-QOS-MIB Tables and Objects

Table 3-8 lists CISCO-CLASS-BASED-QOS-MIB Tables and Objects.

Table 3-8 CISCO-CLASS-BASED-QOS-MIB Tables and Objects

Object	Description
cbQosQueueingClassCfgTable	Specifies the configuration information for weighted queue limit action per IP precedence basis.
cbQosMeasureIPSLACfgTable	Specifies configuration information for measure type IPSLA action. The measure action relates the policy class to a specific IPSLAs auto group. Configuration of measure action of type IPSLA results in automatic generation of IPSLAs synthetic test operations when the policy is attached to interface. The operations are created according to the characteristics specified and to the destinations specified in IPSLA auto group. The IPSLAs sythentic test operations measure network statistics such as latency, packet loss and jitter. This table is to be used only for retrieving the measure action configuration information.
cbQosServicePolicyTable	Describes the logical interfaces/media types and the policymap that are attached to it.
cbQosInterfacePolicyTable	Describes the service polices that are attached to main and sub interfaces.
cbQosFrameRelayPolicyTable	Describes the service polices that are attached to Frame Relay DLCIs.
cbQosATMPVCPolicyTable	Describes the policies that are attached to a ATM PVC.

Table 3-8 CISCO-CLASS-BASED-QOS-MIB Tables and Objects (continued)

Object	Description
cbQosObjectsTable	Specifies QoS objects (classmap, policymap, match statements, and actions) hierarchy. It also provide relationship between each PolicyIndex/ObjectsIndex pair and the ConfigIndex. ConfigIndex is essential for querying any configuration tables.
cbQosPolicyMapCfgTable	Specifies Policymap configuration information
cbQosCMCfgTable	Specifies ClassMap configuration information
cbQosMatchStmtCfgTable	Specifies ClassMap configuration information
cbQosQueueingCfgTable	Specifies Queueing Action configuration information
cbQosREDCfgTable	Specifies WRED Action configuration information
cbQosREDClassCfgTable	Specifies WRED Action configuration information on a per IP precedence basis.
cbQosPoliceCfgTable	Specifies Police Action configuration information.
cbQosPoliceActionCfgTable	Specifies Police Action configuration information.
cbQosTSCfgTable	Specifies traffic-shaping Action configuration information.
cbQosSetCfgTable	Specifies Packet Marking Action configuration information.
cbQosCMStatsTable	Specifies ClassMap related Statistical information.
cbQosMatchStmtStatsTable	This table specifies Match Statement related statistical information.
cbQosPoliceStatsTable	Specifies Police Action related Statistical information.
cbQosQueueingStatsTable	Specifies Queueing Action related Statistical information.
cbQosTSStatsTable	Specifies traffic-shaping Action related Statistical information.
cbQosREDClassStatsTable	Specifies per Precedence WRED Action related Statistical information.
cbQosIPHCCfgTable	Specifies IP Header Compression configuration information.
cbQosIPHCStatsTable	Specifies IP Header Compression statistical information.
cbQosSetStatsTable	Specifies packet marking statistical information.
cbQosPoliceColorStatsTable	Specifies Police Action related Statistical information for two rate color aware marker.
cbQosTableMapCfgTable	Specifies Table Map basic configuration information.
cbQosTableMapValueCfgTable	Specifies Specifies the from-value to to-value conversion pairs for a tablemap.
cbQosTableMapSetCfgTable	Specifies enhanced packet marking configuration using a pre-defined tablemap.
cbQosEBCfgTable	Specifies Estimate Bandwidth related configuration information.

Table 3-8 CISCO-CLASS-BASED-QOS-MIB Tables and Objects (continued)

Object	Description
cbQosEBStatsTable	Specifies Estimate Bandwidth related statistical information.
cbQosC3plAccountCfgTable	Specifies C3pl Account Action configuration information
cbQosC3plAccountStatsTable	Specifies C3pl Account Action related statistics information.

MIB Constraints

There are no constraints on this MIB.

CISCO-CONFIG-COPY-MIB

The CISCO-CONFIG-COPY-MIB contains objects to copy configuration files on the router. For example, the MIB enables the SNMP agent to:

- Copy configuration files to and from the network
- Copy the running configuration to the startup config and startup to running
- Copy the startup or running configuration files to and from a local Cisco IOS file system

The MODULE-IDENTITY for the CISCO-CONFIG-COPY-MIB is ciscoConfigCopyMIB, and its top-level OID is 1.3.6.1.4.1.9.9.96 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoConfigCopyMIB).

Version: 200504060000Z

CISCO-CONFIG-COPY-MIB Tables and Objects

Table 3-9 lists CISCO-CONFIG-COPY-MIB Tables and Objects.

Table 3-9 CISCO-CONFIG-COPY-MIB Tables and Objects

Object	Description
ccCopyTable	Contains config-copy requests.
ccCopyErrorTable	Contains information about the failure cause of the config copy operation. An entry is created only when the value of ccCopyState changes to 'failed' for a config copy operation. Not all combinations of ccCopySourceFileType and ccCopyDestFileType need to be supported. For example, an implementation may choose to support only the following combination: ccCopySourceFileType = 'runningConfig' ccCopyDestFileType = 'fabricStartupConfig'. In the case where a fabric wide config copy operation is being performed, for example by selecting ccCopyDestFileType value to be 'fabricStartupConfig', it is possible that the fabric could have more than one device. In such cases this table would have one entry for each device in the fabric. In this case even if the operation succeeded in one device and failed in another, the operation as such has failed, so the global state represented by ccCopyState 'failed', but for the device on which it was success, ccCopyErrorDescription would have the distinguished value, 'success'. Once the config copy operation completes and if an entry gets instantiated, the management station should retrieve the values of the status objects of interest. Once an entry in ccCopyTable is deleted by management station, all the corresponding entries with the same ccCopyIndex in this table are also deleted. In order to prevent old entries from clogging the table, entries age out at the same time as the corresponding entry with same ccCopyIndex in ccCopyTable ages out.

MIB Constraints

There are no constraints on this MIB.

CISCO-CONFIG-MAN-MIB

The CISCO-CONFIG-MAN-MIB contains objects to track and save changes to the router configuration. The MIB represents a model of the configuration data that exists elsewhere in the router and in peripheral devices. Its main purpose is to report changes to the running configuration through the SNMP notification ciscoConfigManEvent.

The MODULE-IDENTITY for the CISCO-CONFIG-MAN-MIB is ciscoConfigManMIB, and its top-level OID is 1.3.6.1.4.1.9.9.43 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoConfigManMIB).

Version: 200704270000Z

CISCO-CONFIG-MAN-MIB Tables and Objects

Table 3-10 lists CISCO-CONFIG-MAN-MIB Tables and Objects.

Table 3-10 CISCO-CONFIG-MAN-MIB Tables and Objects

Object	Description
ccmCLIHistoryCommandTable	Contains CLI commands that took effect during configuration events.

MIB Constraints

There are no constraints on this MIB.

CISCO-DATA-COLLECTION-MIB

The CISCO-DATA-COLLECTION-MIB retrieves data periodically when the data displays as a set of discontinuous rows spread across multiple tables. This MIB facilitates data retrieval of tabular objects. This MIB can be used for performance and accounting purposes, where several row instances of a set of objects are polled over a period of time.

MIB Constraints

There are no constraints on this MIB.

CISCO-DOT3-OAM-MIB

The CISCO-DOT3-OAM-MIB provides functionality to detect and recover from network failures. Operations, Administration and Maintenance (OAM) are set of management functions for network performance monitoring, fault notification, and troubleshooting OAM-enabled links. The MIB contains managed object definition for 802.3ah Ethernet OAM.

Version: 200605310000Z

CISCO-DOT3-OAM-MIB Objects and Tables

Table 3-11 lists CISCO-DOT3-OAM-MIB Tables and Objects.

Table 3-11 CISCO-DOT3-OAM-MIB Tables and Objects

Object	Description
cdot3OamTable	This table contains the primary controls and status for the OAM capabilities of an Ethernet like interface. There will be one row in this table for each Ethernet like interface in the system that supports the OAM functions defined in [802.3ah].
cdot3OamPeerTable	This table contains information about the OAM peer for a particular Ethernet like interface. OAM entities communicate with a single OAM peer entity on Ethernet links on which OAM is enabled and operating properly. There is one entry in this table for each entry in the cdot3OamTable for which information on the peer OAM entity is available.
cdot3OamLoopbackTable	This table contains controls for the loopback state of the local link as well as indicating the status of the loopback function. There is one entry in this table for each entry in cdot3OamTable that supports loopback functionality (where cdot3OamFunctionsSupported includes the loopbackSupport bit set). Loopback can be used to place the remote OAM entity in a state where every received frame (except OAMPDUs) is echoed back over the same interface on which they were received. In this state, at the remote entity, 'normal' traffic is disabled as only the looped back frames are transmitted on the interface. Loopback is thus an intrusive operation that prohibits normal data flow and should be used accordingly.
cdot3OamStatsTable	This table contains statistics for the OAM function on a particular Ethernet like interface. There is an entry in the table for every entry in the cdot3OamTable. The counters in this table are defined as 32-bit entries to match the counter size as defined in [802.3ah]. Given the OAM protocol is a slow protocol, the counters increment at a slow rate.

Table 3-11 CISCO-DOT3-OAM-MIB Tables and Objects (continued)

Object	Description
cdot3OamEventConfigTable	Ethernet OAM includes the ability to generate and receive Event Notification OAMPDUs to indicate various link problems. This table contains the mechanisms to enable Event Notifications and configure the thresholds to generate the standard Ethernet OAM events. There is one entry in the table for every entry in cdot3OamTable that supports OAM events (where cdot3OamFunctionsSupported includes the eventSupport bit set). The values in the table are maintained across changes to cdot3OamOperStatus. The standard threshold crossing events are: - Errored Symbol Period Event. Generated when the number of symbol errors exceeds a threshold within a given window defined by a number of symbols (for example, 1,000 symbols out of 1,000,000 had errors). - Errored Frame Period Event. Generated when the number of frame errors exceeds a threshold within a given window defined by a number of frames (for example, 10 frames out of 1000 had errors). - Errored Frame Event. Generated when the number of frame errors exceeds a threshold within a given window defined by a period of time (for example, 10 frames in 1 second had errors). - Errored Frame Seconds Summary Event. Generated when the number of errored frame seconds exceeds a threshold within a given time period (for example, 10 errored frame seconds within the last 100 seconds). An errored frame second is defined as a 1 second interval which had 0 frame errors. There are other events (dying gasp, critical events) that are not threshold crossing events but which can be enabled/disabled via this table.

Table 3-11 CISCO-DOT3-OAM-MIB Tables and Objects (continued)

Object	Description
cdot3OamErrFrameSecsSummaryThreshold	MAX-ACCESS not-accessible STATUS current "This table records a history of the events that have occurred at the Ethernet OAM level. These events can include locally detected events, which may result in locally generated OAMPDUs, and remotely detected events, which are detected by the OAM peer entity and signaled to the local entity via Ethernet OAM. Ethernet OAM events can be signaled by Event Notification OAMPDUs or by the flags field in any OAMPDU. This table contains both threshold crossing events and non-threshold crossing events. The parameters for the threshold window, threshold value, and actual value (cdot3OamEventLogWindowXX, cdot3OamEventLogThresholdXX, cdot3OamEventLogValue) are only applicable to threshold crossing events, and are returned as all F's (2^32 - 1) for non-threshold crossing events. Entries in the table are automatically created when such events are detected. The size of the table is implementation dependent. When the table reaches its maximum size, older entries are automatically deleted to make room for newer entries.

MIB Constraints

There are no constraints on this MIB.

CISCO-EIGRP-MIB

The CISCO-EIGRP-MIB contains objects to manage Enhanced Interior Gateway Protocol (EIGRP). EIGRP is a Cisco proprietary distance vector routing protocol, based on the Diffusing Update Algorithm (DUAL). DUAL defines the method to identify loop-free paths through a network.

Version: 200411160000Z

CISCO-EIGRP-MIB Objects

Table 3-12 lists CISCO-EIGRP-MIB Tables and Objects.

Table 3-12 CISCO-EIGRP-MIB Tables and Objects

Object	Description
cEigrpVpnTable	This table contains information on those VPN's configured to run EIGRP. The VPN creation on a router is independent of the routing protocol to be used over it. A VPN is given a name and has a dedicated routing table associated with it. This routing table is identified internally by a unique integer value.
cEigrpTraffStatsTable	Table of EIGRP traffic statistics and information associated with all EIGRP autonomous systems.
cEigrpTopoTable	The table of EIGRP routes and their associated attributes for an Autonomous System (AS) configured in a VPN is called a topology table. All route entries in the topology table will be indexed by IP network type, IP network number and network mask (prefix) size.
cEigrpPeerTable	The table of established EIGRP peers (neighbors) in the selected autonomous system. Peers are indexed by their unique internal handle id, as well as the AS number and VPN id. The peer entry is removed from the table if the peer is declared down.
cEigrpInterfaceTable	The table of interfaces over which EIGRP is running, and their associated statistics. This table is independent of whether any peer adjacencies have been formed over the interfaces or not. Interfaces running EIGRP are determined by whether their assigned IP addresses fall within configured EIGRP network statements.

MIB Constraints

There are no constraints on this MIB.

CISCO-ENHANCED-MEMPOOL-MIB

The CISCO-ENHANCED-MEMPOOL-MIB contains objects to monitor the status of memory pools ofall physical entities in a system that contain their own onboard processors and memory.

The MODULE-IDENTITY for the CISCO-ENHANCED-MEMPOOL-MIB isciscoEnhancedMemPoolMIB, and its top-level OID is 1.3.6.1.4.1.9.9.221(iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoEnhancedMemPoolMIB).

Version: 200812050000Z

CISCO-ENHANCED-MEMPOOL-MIB Tables and Objects

Table 3-13 lists CISCO-ENHANCED-MEMPOOL-MIB Tables and Objects.

Table 3-13 CISCO-ENHANCED-MEMPOOL-MIB Tables and Objects

Object	Description
cempMemPoolTable	Contains memory pool monitoring entries for all physical entities on a managed system.
cempMemBufferPoolTable	Contains entries in this table define entities (buffer pools in this case) which are contained in an entity (memory pool) defined by an entry from cempMemPoolTable. -- Basic Pool Architecture -- 1)Pools are classified as being either Static or Dynamic. Static pools make no attempt to increase the number of buffers contained within them if the number of free buffers (cempMemBufferFree) are less than the number of minimum buffers (cempMemBufferMin). With Dynamic pools, the pool attempts to meet the demands of its users. 2)Buffers in a pool are classified as being either Permanent or Temporary. Permanent buffers, as their name suggests, are always in the pool and are never destroyed unless the number of permanent buffers (cempMemBufferPermanent) is changed. Temporary buffers are transient buffers that are created in dynamic pools whenever the free count (cempMemBufferFree) of buffers in the pool drops below the minimum (cempMemBufferMin). 3)Buffers pools are classified as either Public or Private. Public pools are available for all users to allocate buffers from. Private pools are primarily used by interface drivers.
cempMemBufferCachePoolTable	Lists the cache buffer pools configured on a managed system. 1)To provide a noticeable performance boost, Cache Pool can be used. A Cache Pool is effectively a lookaside list of free buffers that can be accessed quickly. Cache Pool is tied to Buffer Pool. 2)Cache pools can optionally have a threshold value on the number of cache buffers used in a pool. This can provide flow control management by having a implementation specific approach such as invoking a vector when pool cache rises above the optional threshold set for it on creation.

MIB Constraint

There are no constraints on this MIB.

CISCO-ENTITY-ASSET-MIB

The CISCO-ENTITY-ASSET-MIB provides asset tracking information for the physical components in the ENTITY-MIB (RFC2737) entPhysicalTable.

The ceAssetTable contains an entry (ceAssetEntry) for each physical component on the router. Each entry provides information about the component, such as its orderable part number, serial number, hardware revision, manufacturing assembly number, and manufacturing revision.

Most physical components are programmed with a standard Cisco generic ID PROM value that specifies asset information for the component. If possible, the MIB accesses the component's ID PROM information.

The MODULE-IDENTITY for the CISCO-ENTITY-ASSET-MIB is ciscoEntityAssetMIB, and its top-level OID is 1.3.6.1.4.1.9.9.92 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoEntityAssetMIB).

Version: 200309180000Z

CISCO-ENTITY-ASSET-MIB Tables and Objects

Table 3-14 lists CISCO-ENTITY-ASSET-MIB Tables and Objects.

Table 3-14 CISCO-ENTITY-ASSET-MIB Tables and Objects

Object	Description
ceAssetTable	Lists the orderable part number, serial number, hardware revision, manufacturing assembly number and revision, firmwareID and revision if any, and softwareID and revision if any, of relevant entities listed in the ENTITY-MIB entPhysicalTable. Entities for which none of this data is available are not listed in this table. This is a sparse table so some of these variables may not exist for a particular entity at a particular time. For example, a powered-off module does not have softwareID and revision; a power-supply would probably never have firmware or software information. Although the data may have other items encoded in it (for example manufacturing-date in the serial number) please treat all data items as monolithic. Do not decompose them or parse them. Use only string equals and unequals operations on them.

MIB Constraint

There are no constraints on this MIB.

CISCO-ENTITY-SENSOR-MIB

The CISCO-ENTITY-SENSOR-MIB is used to monitor the values of sensors in the Entity-MIB (RFC 2037) entPhysicalTable.

The MODULE-IDENTITY for the CISCO-ENTITY-SENSOR-MIB is ciscoEntitySensorMIB, and its top-level OID is 1.3.6.1.4.1.9.9.91 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoEntitySensorMIB).

Version: 200711120000Z

CISCO-ENTITY-SENSOR-MIB Tables and Objects

Table 3-15 lists CISCO-ENTITY-SENSOR-MIB Tables and Objects.

Table 3-15 CISCO-ENTITY-SENSOR-MIB Tables and Objects

Object	Description
entSensorValueTable	Contains the type, scale, and present value of a sensor listed in the Entity-MIB entPhysicalTable.

MIB Constraint

There are no constraints on this MIB.

CISCO-ENTITY-VENDORTYPE-OID-MIB

The CISCO-ENTITY-VENDORTYPE-OID-MIB defines the object identifiers (OIDs) assigned to components in the Cisco ASR 901 and ASR 901S routers. The OIDs in this MIB are used in the ENTITY-MIB as values for the entPhysicalVendorType field in entPhysicalTable. Each OID uniquely identifies a type of physical entity.

Note This MIB is regularly updated with OIDs for new components in the Cisco IOS software release that introduced support for those components.

The MODULE-IDENTITY for the CISCO-ENTITY-VENDORTYPE-OID-MIB is ciscoEntityVendortypeOIDMIB, and its top-level OID is 1.3.6.1.4.1.9.12.3 (iso.org.dod.internet.private.enterprises.cisco.ciscoModules.ciscoEntityVendortypeOIDMIB).

Version: 201110050000Z

MIB Constraints

There are no constraints on this MIB.

CISCO-ENVMON-MIB

The CISCO-ENVMON-MIB contains information about the status of environmental sensors (for voltage, temperature, fans, and power supplies). It also contains MIB objects to enable and disable notifications for changes to the status of these sensors.

The MODULE-IDENTITY for the CISCO-ENVMON-MIB is ciscoEnvMonMIB, and its top-level OID is 1.3.6.1.4.1.9.9.13 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoEnvMonMIB).

Version: 200312010000Z

CISCO-ENVMON-MIB Tables and Objects

Table 3-16 lists CISCO-ENVMON-MIB Tables and Objects.

Table 3-16 CISCO-ENVMON-MIB Tables and Objects

Object	Description
ciscoEnvMonVoltageStatusTable	Contains voltage status maintained by the environmental monitor.
ciscoEnvMonTemperatureStatusTable	Contains ambient temperature status maintained by the environmental monitor.
ciscoEnvMonFanStatusTable	Contains fan status maintained by the environmental monitor.
ciscoEnvMonSupplyStatusTable	Contains power supply status maintained by the environmental monitor card.

MIB Constraints

There are no constraints on this MIB.

CISCO-FLASH-MIB

The CISCO-FLASH-MIB contains objects to manage flash cards and flash-card operations.

The MODULE-IDENTITY for the CISCO-FLASH-MIB is ciscoFlashMIB, and its top-level OID is 1.3.6.1.4.1.9.9.10 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoFlashMIB).

Version: 201103160000Z

CISCO-FLASH-MIB Tables and Objects

Table 3-17 lists CISCO-FLASH-MIB Tables and Objects.

Table 3-17 CISCO-FLASH-MIB Tables and Objects

Object	Description
ciscoFlashDeviceTable	Contains Flash device properties for each initialized Flash device. Each Flash device installed in a system is detected, sized, and initialized when the system image boots up. For removable Flash devices, the device properties will be dynamically deleted and recreated as the device is removed and inserted. Note that in this case, the newly inserted device may not be the same as the earlier removed one. The ciscoFlashDeviceInitTime object is available for a management station to determine the time at which a device was initialized, and thereby detect the change of a removable device. A removable device that has not been installed will also have an entry in this table. This is to let a management station know about a removable device that has been removed. Since a removed device obviously cannot be sized and initialized, the table entry for such a device will have ciscoFlashDeviceSize equal to zero, and the following objects will have an indeterminate value: ciscoFlashDeviceMinPartitionSize, ciscoFlashDeviceMaxPartitions, ciscoFlashDevicePartitions, and ciscoFlashDeviceChipCount. ciscoFlashDeviceRemovable will be true to indicate it is removable.
ciscoFlashChipTable	Contains Flash device chip properties for each initialized Flash device. This table is meant primarily for aiding error diagnosis.
ciscoFlashPartitionTable	Contains flash device partition properties for each initialized flash partition. Whenever there is no explicit partitioning done, a single partition spanning the entire device will be assumed to exist. There will therefore always be atleast one partition on a device.
ciscoFlashFileTable	Contains information for files in a Flash partition.
ciscoFlashFileByTypeTable	Contains information for files on the manageable flash devices sorted by File Types.
ciscoFlashCopyTable	Contains Flash copy operation entries. Each entry represents a Flash copy operation (to or from Flash) that has been initiated.
ciscoFlashPartitioningTable	Contains Flash partitioning operation entries. Each entry represents a Flash partitioning operation that has been initiated.
ciscoFlashMiscOpTable	Contains misc Flash operation entries. Each entry represents a Flash operation that has been initiated.

MIB Constraints

There are no constraints on this MIB.

CISCO-IETF-BFD-MIB

The CISCO-IETF-BFD-MIB contains objects to manage Bidirectional Forwarding Detection (BFD) Protocol. BFD is a protocol to detect faults in the bidirectional path between two forwarding engines, including interfaces, and data links with very low latency. This protocol operates independently of media, data protocols, and routing protocols.

Version: 201104160000Z

CISCO-IETF-BFD-MIB Tables and Objects

Table 3-18 lists CISCO-IETF-BFD-MIB Tables and Objects.

Table 3-18 CISCO-IETF-BFD-MIB Tables and Objects

Object	Description
ciscoBfdSessTable	The BFD Session Table describes the BFD sessions.
ciscoBfdSessPerfTable	This table specifies BFD Session performance counters.
ciscoBfdSessMapTable	The BFD Session Mapping Table maps the complex indexing of the BFD sessions to the flat CiscoBfdSessIndexTC used in the ciscoBfdSessTable.
ciscoBfdSessDiscMapTable	The BFD Session Discriminator Mapping Table maps a local discriminator value to associated BFD sessions' CiscoBfdSessIndexTC used in the ciscoBfdSessTable.
ciscoBfdSessIpMapTable	The BFD Session IP Mapping Table maps given ciscoBfdSessInterface, ciscoBfdSessAddrType, and ciscoBbfdSessAddr to an associated BFD sessions' CiscoBfdSessIndexTC used in the ciscoBfdSessTable. This table SHOULD contains those BFD sessions are of IP type: singleHop(1) and multiHop(2).
ciscoBfdNotifications	This object enables the emission of ciscoBfdSessUp and ciscoBfdSessDown notifications; otherwise these notifications are not emitted.
ciscoBfdConformance	This object shows the compliance statement for agents that provide full support for CISCO-IETF-BFD-MIB. Such devices can then be monitored and also be configured using this MIB module.

MIB Constraints

There are no constraints on this MIB.

CISCO-IETF-PW-MIB

The CISCO-IETF-PW-MIB contains managed object definitions for pseudowire operation.

Version: 200403171200Z

CISCO-IETF-PW-MIB Tables and Objects

Table 3-19 lists CISCO-IETF-PW-MIB Tables and Objects.

Table 3-19 CISCO-IETF-PW-MIB Tables and Objects

Object	Description
cpwVcTable	Contains information for connecting various emulated services to various tunnel type.
cpwVcPerfCurrentTable	Contains per-VC performance information for the current interval.
cpwVcPerfIntervalTable	Contains per-VC performance information for each interval.
cpwVcPerfTotalTable	Contains per-VC Performance information from VC start time.
cpwVcIdMappingTable	Contains reverse mapping of the existing VCs based on vc type and VC ID ordering. This table is typically useful for EMS ordered query of existing VCs.
cpwVcPeerMappingTable	Contains reverse mapping of the existing VCs based on vc type and VC ID ordering. This table is typically useful for EMS ordered query of existing VCs.

MIB Constraints

There are no constraints on this MIB.

CISCO-IETF-PW-TC-MIB

The CISCO-IETF-PW-TC-MIB provides Textual Conventions and OBJECT-IDENTITY Objects to be used pseudowire services.

Version: 200607211200Z

MIB Constraints

There are no constraints on this MIB.

CISCO-IF-EXTENSION-MIB

The CISCO-IF-EXTENSION-MIB contains objects that provide additional interface-related information that is not available in the IF-MIB (RFC 2863).

Version: 201106270000Z

CISCO-IF-EXTENSION-MIB Tables and Objects

Table 3-20 lists CISCO-IF-EXTENSION-MIB Tables and Objects

Table 3-20 CISCO-IF-EXTENSION-MIB Tables and Objects

Object	Decription
cieIfPacketStatsTable	This table contains interface packet statistics which are not available in IF-MIB(RFC2863). As an example, some interfaces to which objects in this table are applicable are as follows : o Ethernet o FastEthernet o ATM o BRI o Sonet o GigabitEthernet Some objects defined in this table may be applicable to physical interfaces only. As a result, this table may be sparse for some logical interfaces.
cieIfInterfaceTable	This table contains objects which provide more information about interface properties not available in IF-MIB (RFC 2863). Some objects defined in this table may be applicable to physical interfaces only. As a result, this table may be sparse for logical interfaces.
cieIfStatusListTable	This table contains objects for providing the 'ifIndex', interface operational mode and interface operational cause for all the interfaces in the modules. This table contains one entry for each 64 interfaces in an module. This table provides efficient way of encoding 'ifIndex', interface operational mode and interface operational cause, from the point of retrieval, by combining the values a set of 64 interfaces in a single MIB object.
cieIfVlStatsTable	This table contains VL (Virtual Link) statistics for a capable interface. Objects defined in this table may be applicable to physical interfaces only.
cieIfIndexPersistenceTable	This table lists configuration data relating to ifIndex persistence. This table has a sparse dependent relationship on the ifTable, containing a row for each ifEntry corresponding to an interface for which ifIndex persistence is supported.

Table 3-20 CISCO-IF-EXTENSION-MIB Tables and Objects (continued)

Object	Decription
cieIfDot1qCustomEtherTypeTable	A list of the interfaces that support the 802.1q custom Ethertype feature.
cieIfUtilTable	This table contains the interface utilization rates for inbound and outbound traffic on an interface.
cieIfDot1dBaseMappingTable	This table contains the mappings of the ifIndex of an interface to its corresponding dot1dBasePort value.
cieIfNameMappingTable	This table contains objects for providing the 'ifName' to 'ifIndex' mapping. This table contains one entry for each valid 'ifName' available in the system. Upon the first request, the implementation of this table will get all the available ifNames, and it will populate the entries in this table, it maintains this ifNames in a cache.

MIB Constraint

There are no constraints on this MIB.

CISCO-IMAGE-MIB

The CISCO-IMAGE-MIB identifies the characteristics and capabilities of the Cisco IOS software image running on the router.

The MODULE-IDENTITY for the CISCO-IMAGE-MIB is ciscoImageMIB, and its top-level OID is 1.3.6.1.4.1.9.9.25 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoImageMIB).

Version: 9508150000Z

CISCO-IMAGE-MIB Tables and Objects

Table 3-21 lists CISCO-IMAGE-MIB Tables and Objects.

Table 3-21 CISCO-IMAGE-MIB Tables and Objects

Object	Description
ciscoImageTable	Provides content describing the executing IOS image.

MIB Constraints

There are no constraints on this MIB.

CISCO-IPMROUTE-MIB

The CISCO-IPMROUTE-MIB contains objects to manage IP multicast routing on the router.

The MODULE-IDENTITY for the for the CISCO-IPMROUTE-MIB is ciscoIpMRoute, and its top-level OID is 1.3.6.1.4.1.9.10.2 (iso. org. dod. internet. private. enterprises. cisco. ciscoExperiment. ciscoIpMRouteMIB).

MIB Constraints

The ciscoIpMRouteInLimit object is obsolete.

CISCO-IPSLA-ETHERNET-MIB

The CISCO-IPSLA-ETHERNET-MIB contains objects to manage IP SLA Auto-Ethernet-CFM operations and EthernetJitter statistics. IP SLA is a capability which utilizes active monitoring for network performance. It can be used for network troubleshooting, network assessment, and health monitoring. EthernetJitter is used to measure metrics such as RTT, Jitter, frame loss, and one-way latency by sending multiple enhanced CFM frames at specified interval to a particular MEP.

Version: 200801020000Z

CISCO-IPSLA-ETHERNET-MIB Tables and Objects

Table 3-22 lists CISCO-IPSLA-ETHERNET-MIB Tables and Objects.

Table 3-22 CISCO-IPSLA-ETHERNET-MIB Tables and Objects

Object	Description
ipslaEthernetGrpCtrlTable	This table contains Auto-Ethernet-CFM control data. When a row transition to the 'active' state, the IP SLA agent will discover all the MEPs inside the specified VLAN and maintenance domain and create IP SLA ethernet operations based on the value of ipslaEthernetGrpCtrlRttType for each MEP. All the values in this table will be passed to the corresponding objects in the rttMonCtrlAdminTable and rttMonEchoAdminTable of CISCO-RTTMON-MIB so that each IP SLA Ethernet operation will have the same configuration as specified for Auto-Ethernet-CFM.

Table 3-22 CISCO-IPSLA-ETHERNET-MIB Tables and Objects (continued)

Object	Description
ipslaEthernetGrpReactTable	A table that contains the reaction configurations for Auto-Ethernet-CFM operation. The reaction configuration specifies the network perfomance parameter needs to be monitored, the threshold for the parameter, the type of threshold violation that will trigger a reaction, and how to react upon a threshold being violated. This allows for proactive monitoring in an environment where user can be alerted to potential network problems, rather than having to manually examine data. Each conceptual row in ipslaEthernetGrpReactTable corresponds to a reaction configured for a corresponding Auto-Ethernet-CFM operation. Each Auto-Ethernet-CFM operation can have multiple parameters monitored and hence there can be multiple reaction configuration rows for a particular Auto-Ethernet-CFM operation. The reaction configurations in this table for a particular Auto-Ethernet-CFM operation will be passed to the corresponding objects in rttMonReactTable of CISCO-RTTMON-MIB for all the IP SLA operations created by this Auto-Ethernet-CFM. This makes the IP SLA operation capable of reacting to certain measured network condition such as long round trip delay, big jitter, etc., by generating a notification to a network management application based on defined thresholds. This table is coupled with ipslaEthernetGrpCtrlTable. When an entry in the ipslaEthernetGrpCtrlTable is destroyed, the corresponding entries in this table will be destroyed too.
ipslaEtherJitterLatestStatsTable	The 'ethernetJitter' operation sends out frames at the frequency specified by rttMonCtrlAdminFrequency. This table contains the statistics calculated for the latest sent frames. Each conceptual row in this table corresponds to an 'ethernetJitter' operation defined in rttMonCtrlAdminTable and has same index as rttMonCtrlAdminTable.

Table 3-22 CISCO-IPSLA-ETHERNET-MIB Tables and Objects (continued)

Object	Description
ipslaEtherJitterAggStatsTable	The 'ethernetJitter' statistics table contains summarized information of the results for a conceptual control row. A rolling accumulated history of this information is maintained in a series of hourly 'group(s)'. When ipslaEtherJAggStatsStartTimeId groups exceeds the rttMonStatisticsAdminNumHourGroups value, the oldest corresponding hourly group will be deleted and will be replaced with the new ipslaEtherJAggStatsStartTimeId hourly group.

MIB Constraints

There are no constraints on this MIB.

CISCO-MEMORY-POOL-MIB

The CISCO-MEMORY-POOL-MIB contains objects to monitor memory pools on the router.

The MODULE-IDENTITY for the CISCO-MEMORY-POOL-MIB is ciscoMemoryPoolMIB, and its top-level OID is 1.3.6.1.4.1.9.9.48 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoMemoryPoolMIB).

Version: 200107310000Z

CISCO-MEMORY-POOL-MIB Tables and Objects

Table 3-23 lists CISCO-MEMORY-POOL-MIB Tables and Objects.

Table 3-23 CISCO-MEMORY-POOL-MIB Tables and Objects

Object	Description
ciscoMemoryPoolTable	Contains memory pool monitoring entries.
ciscoMemoryPoolUtilizationTable	Contains memory pool utilization entries. Each of the objects provides a general idea of how much of the memory pool has been used over a given period of time. It is determined as a weighted decaying average.

MIB Constraints

There are no constraints on this MIB.

CISCO-NETSYNC-MIB

The CISCO-NETSYNC-MIB contains objects to monitor network synchronization based on ITU-T G.781 clock selection.

Version: 201010150000Z

CISCO-NETSYNC-MIB Tables and Objects

Table 3-24 lists CISCO-NETSYNC-MIB Tables and Objects.

Table 3-24 CISCO-NETSYNC-MIB Tables and Objects

Object	Description
cnsClkSelGlobalTable	G.781 clock selection process table. This table contains the global parameters for the G.781 clock selection process.
cnsSelectedInputSourceTable	T0 selected clock source table. This table contains the selected clock source for the input T0 clock.
cnsInputSourceTable	T0 clock source table. This table contains a list of input sources for input T0 clock selection.
cnsExtOutputTable	T4 external output table. This table contains a list of T4 external outputs. Each T4 external output is associated with clock source(s) to be found in cnsT4ClockSourceTable. The clock selection process considers all the available clock sources and select the T4 clock source based on the G.781 clock selection algorithm.
cnsT4ClockSourceTable	T4 clock source table. This table contains a list of input sources for a specific T4 external output. An entry shall be added to cnsExtOutputTable first. Then clock sources shall be added in this table for the selection process to select the appropriate T4 clock source.

MIB Constraints

There are no constraints on this MIB.

CISCO-NTP-MIB

The CISCO-NTP-MIB contains objects to monitor the Network Time Protocol (NTP) clients and servers that are operating on the router.

The MODULE-IDENTITY for the CISCO-NTP-MIB is ciscoNtpMIB, and its top-level OID is 1.3.6.1.4.1.9.9.168 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoNtpMIB).

Version: 200607310000Z

CISCO-NTP-MIB Tables and Objects

Table 3-25 lists CISCO-NTP-MIB Tables and Objects.

Table 3-25 CISCO-NTP-MIB Tables and Objects

Object	Description
cntpPeersVarTable	Provides information on the peers with which the local NTP server has associations. The peers are also NTP servers but running on different hosts.
cntpFilterRegisterTable	Contains NTP state variables used by the NTP clock filter and selection algorithms. This table depicts a shift register. Each stage in the shift register is a 3-tuple consisting of the measured clock offset, measured clock delay and measured clock dispersion associated with a single observation. An important factor affecting the accuracy and reliability of time distribution is the complex of algorithms used to reduce the effect of statistical errors and falsetickers due to failure of various subnet components, reference sources or propagation media. The NTP clock-filter and selection algorithms are designed to do exactly this. The objects in the filter register table below are used by these algorthims to minimize the error in the calculated time.

MIB Constraints

There are no constraints on this MIB.

CISCO-OSPF-MIB

The CISCO-OSPF-MIB contains objects for managing OSPF implementation. The MIB definitions are based on the IETF draft (draft-ietf-ospf-mib-update-05.txt) and include support for the OSPF Sham link. The CISCO-OSPF-MIB is an extension to the OSPF-MIB defined in RFC 1850.

Version: 200307180000Z

CISCO-OSPF-MIB Tables and Objects

Table 3-26 lists CISCO-OSPF-MIB Tables and Objects.

Table 3-26 CISCO-OSPF-MIB Tables and Objects

Object	Description
cospfAreaTable	Information describing the configured parameters and cumulative statistics of the router's attached areas.
cospfLsdbTable	The OSPF Process's Link State Database. This table is meant for Opaque LSA's

Table 3-26 CISCO-OSPF-MIB Tables and Objects (continued)

Object	Description
cospfIfTable	The OSPF Interface Table describes the interfaces from the viewpoint of OSPF.
cospfVirtIfTable	Information about this router's virtual interfaces.
cospfShamLinkTable	Information about this router's sham links
cospfShamLinksTable	Information about this router's sham links.
cospfShamLinkNbrTable	A table of sham link neighbor information.
cospfLocalLsdbTable	The OSPF Process's Link-Local Link State Database for non-virtual links.
cospfVirtLocalLsdbTable	The OSPF Process's Link-Local Link State Database for virtual links.

MIB Constraints

There are no constraints on this MIB.

CISCO-PORT-STORM-CONTROL-MIB

The CISCO-PORT-STORM-CONTROL-MIB is used for managing Cisco Port Storm Control.

The MODULE-IDENTITY for the CISCO-PORT-STORM-CONTROL-MIB is ciscoPortStormControlMIB, and its top-level OID is 1.3.6.1.4.1.9.9.362 (iso. org. dod. internet. private. enterprises. cisco. ciscoMgmt. ciscoPortStormControlMIB)

CISCO-PORT-STORM-CONTROL-MIB Tables and Objects

Table 3-27 lists CISCO-PORT-STORM-CONTROL-MIB Tables and Objects.

Table 3-27 CISCO-PORT-STORM-CONTROL-MIB Tables and Objects

Object	Description
cpscThresholdTable	Lists the storm control threshold configuration entries.
cpscActionTable	Lists the storm control action entries.
cpscStatusTable	Lists the storm control status entries.
cpscHistoryTable	Represents the history of storm events on an interface.

MIB Constraints

Table 3-28 lists the constraints that the router places on objects in the CISCO-PORT-STORM-CONTROL-MIB.

Table 3-28 CISCO-PORT-STORM-CONTROL-MIB Constraints

Object	Notes
cpscStatusTable	
• cpscStatus	Not implemented.
• cpscCurrentLevel	Not implemented.
cpscHistoryTable	Not implemented.

CISCO-PING-MIB

The CISCO-PING-MIB contains objects to manage ICMP echo (ping) requests on the router.

The MODULE-IDENTITY for the CISCO-PING-MIB is ciscoPingMIB, and its top-level OID is 1.3.6.1.4.1.9.9.16 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoPingMIB).

Version: 200108280000Z

CISCO-PING-MIB Tables and Objects

Table 3-29 lists CISCO-PING-MIB Tables and Objects.

Table 3-29 CISCO-PING-MIB Tables and Objects

Object	Description
ciscoPingTable	Contains ping request entries.

MIB Constraints

There are no constraints on this MIB.

CISCO-PROCESS-MIB

The CISCO-PROCESS-MIB displays memory and CPU usage on the router and describes active system processes. CPU utilization presents a status of how busy the system is. The numbers are a ratio of the current idle time over the longest idle time (this information should be used as an estimate only).

The MODULE-IDENTITY for the CISCO-PROCESS-MIB is ciscoProcessMIB, and its top-level OID is 1.3.6.1.4.1.9.9.109 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoProcessMIB).

Version: 201005060000Z

CISCO-PROCESS-MIB Tables and Objects

Table 3-30 lists CISCO-PROCESS-MIB Tables and Objects.

Table 3-30 CISCO-PROCESS-MIB Tables and Objects

Object	Description
cpmCPUTotalTable	Contains overall CPU statistics.
cpmProcessTable	Contains generic information on all active processes on this device.
cpmProcessExtTable	Contains information that may or may not be available on all cisco devices. It contains additional objects for the more general cpmProcessTable. This object is deprecated by cpmProcessExtRevTable.
cpmProcessExtRevTable	Contains information that may or may not be available on all cisco devices. It contains additional objects for the more general cpmProcessTable. This object deprecates cpmProcessExtTable.
cpmCPUThresholdTable	Contains the information about the thresholding values for CPU , configured by the user.
cpmCPUHistoryTable	A list of CPU utilization history entries.
cpmThreadTable	Contains generic information about POSIX threads in the device.
cpmVirtualProcessTable	Contains information about virtual processes in a virtual machine.
cpmCPUProcessHistoryTable	Contains CPU utilization of processes which crossed the cpmCPUHistoryThreshold.

MIB Constraints

There are no constraints on this MIB.

CISCO-PRODUCTS-MIB

The CISCO-PRODUCTS-MIB lists the object identifiers (OIDs) assigned to Cisco hardware platforms.

The MODULE-IDENTITY for the CISCO-PRODUCTS-MIB is ciscoProductsMIB. The following OIDs are assigned for the CISCO ASR 901 Router:

- ciscoASR901 = 1.3.6.1.4.1.9.1.1521 OID
- ciscoASR901E = 1.3.6.1.4.1.9.1.1522 OID

- ciscoASR901TenGigDCE = 1.3.6.1.4.1.9.1.1724 OID
- ciscoASR901TenGigACE = 1.3.6.1.4.1.9.1.1725 OID
- ciscoASR901TenGigDC = 1.3.6.1.4.1.9.1.1726 OID
- ciscoASR901TenGigAC = 1.3.6.1.4.1.9.1.1727 OID

The following OIDs are assigned for the CISCO ASR 901S router:

- ciscoA901S4SGFD (1.3.6.1.4.1.9.1.1818)
- ciscoA901S3SGFD (1.3.6.1.4.1.9.1.1819)
- ciscoA901S2SGFD (1.3.6.1.4.1.9.1.1820)
- ciscoA901S3SGFAH (1.3.6.1.4.1.9.1.1821)
- ciscoA901S2SGFAH (1.3.6.1.4.1.9.1.1822)

Version: 201105100000Z

MIB Constraints

There are no constraints on this MIB.

CISCO-PTP-MIB

The CISCO-PTP-MIB supports the Precision Timing Protocol (PTP) feature on Cisco devices. The protocol enables heterogeneous systems that include clocks of various inherent precision, resolution, and stability to synchronize to a grandmaster clock.

Version: 201101280000Z

CISCO-PTP-MIB Tables and Objects

Table 3-31 lists CISCO-PTP-MIB Tables and Objects.

Table 3-31 CISCO-PTP-MIB Tables and Objects

Object	Description
cPtpSystemTable	Table of count information about the PTP system for all domains.
cPtpSystemDomainTable	Table of information about the PTP system for all clock modes -- ordinary, boundary or transparent.
cPtpClockNodeTable	Table of information about the PTP system for a given domain.
cPtpClockCurrentDSTable	Table of information about the PTP clock Current Datasets for all domains.
cPtpClockParentDSTable	Table of information about the PTP clock Parent Datasets for all domains.

Table 3-31 CISCO-PTP-MIB Tables and Objects (continued)

Object	Description
cPtpClockDefaultDSTable	Table of information about the PTP clock Default Datasets for all domains.
cPtpClockRunningTable	Table of information about the PTP clock Running Datasets for all domains.
cPtpClockTimePropertiesDSTable	Table of information about the PTP clock Timeproperties Datasets for all domains.
cPtpClockTransDefaultDSTable	Table of information about the PTP Transparent clock Default Datasets for all domains.
cPtpClockPortTable	Table of information about the clock ports for a particular domain.
cPtpClockPortDSTable	Table of information about the clock ports dataset for a particular domain.
cPtpClockPortRunningTable	Table of information about the clock ports running dataset for a particular domain.
cPtpClockPortTransDSTable	Table of information about the Transparent clock ports running dataset for a particular domain.
cPtpClockPortAssociateTable	Table of information about a given port's associated ports. For a master port - multiple slave ports which have established sessions with the current master port. For a slave port - the list of masters available for a given slave port. Session information (pkts, errors) to be displayed based on availability and scenario.

MIB Constraints

There are no constraints on this MIB.

CISCO-QUEUE-MIB

The CISCO-QUEUE-MIB contains objects to manage interface queues on the router.

The MODULE-IDENTITY for the CISCO-QUEUE-MIB is ciscoQueueMIB, and its top-level OID is 1.3.6.1.4.1.9.9.37 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoQueueMIB).

Version: 9505310000Z

CISCO-QUEUE-MIB Tables and Objects

Table 3-32 lists CISCO-QUEUE-MIB Tables and Objects.

Table 3-32 CISCO-QUEUE-MIB Tables and Objects

Object	Description
cQIfTable	Contains objects that describe the queues on a Cisco Interface. An interface queue is modeled as a collection of one or more secondary queues that feed into a device's hardware queue. The hardware queue has a maximum depth set by the MCI tx-queue-limit command or equivalent. The secondary queues (also known as the 'hold queue') have maximum depths set by the hold-queue command or equivalent. This table parallels the ifTable, and indicates the type of queuing in use on the interface, number of queues, and similar parameters.
cQStatsTable	Contains statistical objects that for the sub-queues of a Cisco Interface.
cQRotationTable	Describes the rotation of Custom Queuing on an Interface.

MIB Constraints

There are no constraints on this MIB.

CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB

The CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB defines objects required for managing Resilient Ethernet Protocol (REP). Resilient Ethernet Protocol (REP) is a Cisco proprietary protocol that provides an alternative to Spanning Tree Protocol (STP). REP provides functionality to control network loops, handle link failures, and improve convergence time.

Version: 200705220000Z

CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB Tables and Objects

Table 3-33 lists CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB Tables and Objects.

Table 3-33 CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB Tables and Objects

Object	Description
crepSegmentTable	This table specifies REP segments configured on the device.
crepInterfaceConfigTable	This table provides REP configuration for interfaces in the device. This table contains one entry for each interface running REP.
crepInterfaceStatsTable	A table for REP interfaces statistics. This table augments the crepInterfaceConfigTable.

MIB Constraints

There are no constraints on this MIB.

CISCO-RTTMON-MIB

The CISCO-RTTMON-MIB contains objects to monitor network performance. The MIB provides information about the response times of network resources and applications. Each conceptual round-trip time (RTT) control row in the MIB represents a single probe, which is used to determine an entity response time. The probe defines an RTT operation to perform (for example, an FTP or HTTP GET request), and the results indicate whether the operation succeeded or failed, and how long it took to complete.

The MODULE-IDENTITY for the CISCO-RTTMON-MIB is ciscoRttMonMIB, and its top-level OID is 1.3.6.1.4.1.9.9.42 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoRttMonMIB).

Version: 201102210000Z

Note An rttMonCtrlOperConnectionLostOccurred trap is generated when an RTT connection cannot be established to the destination router because the router responder application is not running. However, the trap is not generated if the physical connection to the router is lost.

CISCO-RTTMON-MIB Tables and Objects

Table 3-34 lists CISCO-RTTMON-MIB Tables and Objects.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects

Object	Description
rttMonApplSupportedRttTypesTable	Contains the supported Rtt Monitor Types. See the RttMonRttType textual convention for the definition of each type.
rttMonApplSupportedProtocolsTable	Contains the supported Rtt Monitor Protocols. See the RttMonProtocol textual convention for the definition of each protocol.
rttMonApplPreConfigedTable	Contains the previously configured Script Names and File IO targets. These Script Names and File IO targets are installed via a different mechanism than this application, and are specific to each platform.
rttMonApplAuthTable	Contains the definitions for key-strings that will be used in authenticating RTR Control Protocol.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonCtrlAdminTable	The RTT administration control is in multiple tables. This first table, is used to create a conceptual RTT control row. The following tables contain objects which configure scheduling, information gathering, and notification/trigger generation. All of these tables will create the same conceptual RTT control row as this table using this tables' index as their own index. This table is limited in size by the agent implementation. The object rttMonApplNumCtrlAdminEntry will reflect this tables maximum number of entries.
rttMonEchoAdminTable	Contains Round Trip Time (RTT) specific definitions. This table is controlled via the rttMonCtrlAdminTable. Entries in this table are created via the rttMonCtrlAdminStatus object.
rttMonFileIOAdminTable	Contains Round Trip Time (RTT) monitoring 'fileIO' specific definitions. When the RttMonRttType is not 'fileIO' this table is not valid. This table is controlled via the rttMonCtrlAdminTable. Entries in this table are created via the rttMonCtrlAdminStatus object.
rttMonScriptAdminTable	Contains Round Trip Time (RTT) monitoring 'script' specific definitions. When the RttMonRttType is not 'script' this table is not valid. This table is controlled via the rttMonCtrlAdminTable. Entries in this table are created via the rttMonCtrlAdminStatus object.
rttMonScheduleAdminTable	Contains Round Trip Time (RTT) monitoring scheduling specific definitions. This table is controlled via the rttMonCtrlAdminTable. Entries in this table are created via the rttMonCtrlAdminStatus object.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonReactAdminTable	Contains Round Trip Time (RTT) monitoring Notification and Trigger definitions. All Notification/Reactions are applied to all RTT End-to-End operations. Thus, they do not apply to hops along a path to the target, when RttMonRttType is 'pathEcho'. The format and content of SNA NMVT's are not defined within this module. It can be noted, however, that there are Alert NMVT's, and traps which are sent when an abnormal condition occurs, i.e. when one of rttMonCtrlOperConnectionLostOccurred, rttMonCtrlOperTimeoutOccurred or rttMonCtrlOperOverThresholdOccurred are changed to true, and Resolution NMVT's, and Resolution traps which are sent when that condition clears, i.e. when one of rttMonCtrlOperConnectionLostOccurred, rttMonCtrlOperTimeoutOccurred or rttMonCtrlOperOverThresholdOccurred is changed back to false. When rttMonReactAdminActionType is set to one of the following: - triggerOnly - trapAndTrigger - nmvtAndTrigger - trapNmvtAndTrigger The corresponding rows in the rttMonReactTriggerAdminTable defined via the rttMonCtrlAdminIndex will become active. This table augments the rttMonCtrlAdminTable.
rttMonStatisticsAdminTable	Contains Round Trip Time (RTT) monitoring statistics definitions. The definitions in this table control what and how many entries will be placed into the rttMonStatsCaptureTable. The statistics capture table is a rollover table. When the rttMonStatisticsAdminNumHourGroups index value exceeds its value defined in this table, the oldest corresponding group will be deleted and will be replaced with the new group. All other indices will only fill to there maximum size. NOTE: The maximum size of this table is defined to be the product of the rttMonCtrlAdminIndex times rttMonStatisticsAdminNumHourGroups times rttMonStatisticsAdminNumPaths times rttMonStatisticsAdminNumHops times rttMonStatisticsAdminNumDistBuckets. NOTE WELL: Each of the 'Num' objects values in this have a special behavior. When one of the objects is set to a value larger than the Rtt application can support the set will succeed, but the resultant value will be set to the applications maximum value. The setting management station must reread this object to verify the actual value. This table augments the rttMonCtrlAdminTable.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonHistoryAdminTable	Contains Round Trip Time (RTT) monitoring history definitions. The definitions in this table control what and how many entries will be placed into the rttMonHistoryCollectionTable. The history collection table is a rollover table. When the rttMonHistoryAdminNumLives index value exceeds its value defined in this table, the oldest corresponding 'lives' group will be deleted and will be replaced with the new 'lives' group. All other indices will only fill to their maximum size. NOTE: The maximum size of this table is defined to be the product of the rttMonCtrlAdminIndex times rttMonHistoryAdminNumLives times rttMonHistoryAdminNumBuckets times rttMonHistoryAdminNumSamples. NOTE WELL: Each of the 'Num' objects values in this have a special behavior. When one of the objects is set to a value larger than the Rtt application can support the set will succeed, but the resultant value will be set to the applications maximum value. The setting management station must reread this object to verify the actual value. NOTE: this table is not applicable to http and jitter probes
rttMonCtrlOperTable	Contains the Operational values for the probe, and the conceptual RTT control row. This table augments the rttMonCtrlAdminTable.
rttMonLatestRttOperTable	Contains the status of latest RTT operation. When the RttMonRttType is 'pathEcho', operations performed to the hops along the path will be recorded in this table. This table augments the RTT definition table, rttMonCtrlAdminTable.
rttMonLatestHTTPOperTable	Contains the status of latest HTTP RTT operation.
rttMonLatestJitterOperTable	Containsthe status of latest Jitter operation.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonReactTriggerAdminTable	Contains the list of conceptual RTT control rows that will start to collect data when a reaction condition is violated and when rttMonReactAdminActionType is set to one of the following: - triggerOnly - trapAndTrigger - nmvtAndTrigger - trapNmvtAndTrigger or when a reaction condition is violated and when any of the row in rttMonReactTable has rttMonReactActionType as one of the following: - triggerOnly - trapAndTrigger The goal of this table is to define one or more additional conceptual RTT control rows that will become active and start to collect additional history and statistics (depending on the rows configuration values), when a problem has been detected. If the conceptual RTT control row is undefined, and a trigger occurs, no action will take place. If the conceptual RTT control row is scheduled to start at a later time, triggering that row will have no effect. If the conceptual RTT control row is currently active, triggering that row will have no effect on that row, but the rttMonReactTriggerOperState object will transition to 'active'. An entry in this table can only be triggered when it is not currently in a triggered state. The object rttMonReactTriggerOperState will reflect the state of each entry in this table.
rttMonReactTriggerOperTable	Contains the operational state of each entry in the rttMonReactTriggerAdminTable. This table augments the RTT trigger definition table, rttMonReactTriggerAdminTable.
rttMonEchoPathAdminTable	Contains the hop addresses in a Loose Source Routing path. Response times are computed along the specified path using ping. This maximum table size is limited by the size of the maximum number of hop addresses that can fit in an IP header, which is 8. The object rttMonEchoPathAdminEntry will reflect this tables maximum number of entries. This table is coupled with rttMonCtrlAdminStatus.
rttMonGrpScheduleAdminTable	Contains Round Trip Time (RTT) monitoring group scheduling specific definitions. This table is used to create a conceptual group scheduling control row. The entries in this control row contain objects used to define group schedule configuration parameters. The objects of this table will be used to schedule a group of probes identified by the conceptual rows of the rttMonCtrlAdminTable.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMplsVpnMonCtrlTable	Contains auto SAA L3 MPLS VPN definitions. The Auto SAA L3 MPLS VPN administration control is in multiple tables. This first table, is used to create a conceptual Auto SAA L3 MPLS VPN control row. The following tables contain objects which used in type specific configurations, scheduling and reaction configurations. All of these tables will create the same conceptual control row as this table using this table's index as their own index. In order to a row in this table to become active the following objects must be defined. rttMplsVpnMonCtrlRttType, rttMplsVpnMonCtrlVrfName and rttMplsVpnMonSchedulePeriod.
rttMplsVpnMonTypeTable	Contains Auto SAA L3 MPLS VPN configured RTT operation specific definitions. This table is controlled via the rttMplsVpnMonCtrlTable. Entries in this table are created via the rttMplsVpnMonCtrlStatus object.
rttMplsVpnMonScheduleTable	Contains auto SAA L3 MPLS VPN monitoring scheduling specific definitions. This table is controlled via the rttMplsVpnMonCtrlTable. Entries in this table are created via the rttMplsVpnMonCtrlStatus object.
rttMplsVpnMonReactTable	Contains auto SAA L3 MPLS VPN Notification definitions. This table augments the rttMplsVpnMonCtrlTable.
rttMonReactTable	Contains the reaction configurations. Each conceptual row in rttMonReactTable corresponds to a reaction configured for the probe defined in rttMonCtrlAdminTable. For each reaction configured for a probe there is an entry in the table. Each Probe can have multiple reactions and hence there can be multiple rows for a particular probe. This table is coupled with rttMonCtrlAdminTable.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonStatsCaptureTable	Contains summarized information of the results for a conceptual RTT control row. A rolling accumulated history of this information is maintained in a series of hourly 'group(s)'. Each 'group' contains a series of 'path(s)', each 'path' contains a series of 'hop(s)', each 'hop' contains a series of 'statistics distribution bucket(s)'. Each conceptual statistics row has a current hourly group, into which RTT results are accumulated. At the end of each hour a new hourly group is created which then becomes current. The counters and accumulators in the new group are initialized to zero. The previous group(s) is kept in the table until the table contains rttMonStatisticsAdminNumHourGroups groups for the conceptual statistics row; at this point, the oldest group is discarded and is replaced by the newly created one. The hourly group is uniquely identified by the rttMonStatsCaptureStartTimeIndex object. If the activity for a conceptual RTT control row ceases because the rttMonCtrlOperState object transitions to 'inactive', the corresponding current hourly group in this table is 'frozen', and a new hourly group is created when activity is resumed. If the activity for a conceptual RTT control row ceases because the rttMonCtrlOperState object transitions to 'pending' this whole table will be cleared and reset to its initial state. When the RttMonRttType is 'pathEcho', the path exploration RTT requests' statistics will not be accumulated in this table. NOTE: When the RttMonRttType is 'pathEcho', a source to target rttMonStatsCapturePathIndex path will be created for each rttMonStatsCaptureStartTimeIndex to hold all errors that occur when a specific path had not been found or connection has not be setup. Using this rttMonStatsCaptureTable, a managing application can retrieve summarized data from accurately measured periods, which is synchronized across multiple conceptual RTT control rows. With the new hourly group creation being performed on a 60 minute period, the managing station has plenty of time to collect the data, and need not be concerned with the vagaries of network delays and lost PDU's when trying to get matching data. Also, the managing station can spread the data gathering over a longer period, which removes the need for a flood of get requests in a short period which otherwise would occur.
rttMonStatsCollectTable	Contains the exact behavior as the rttMonStatsCaptureTable, except it does not keep statistical distribution information. For a complete table description see the rttMonStatsCaptureTable object.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonStatsTotalsTable	Contains the exact same behavior as the rttMonStatsCaptureTable, except it only keeps 60 minute group values. For a complete table description see the rttMonStatsCaptureTable object.
rttMonHTTPStatsTable	Contains summarized information of the results for a conceptual RTT control row. A rolling accumulated history of this information is maintained in a series of hourly 'group(s)'. The operation of this table is same as that of rttMonStatsCaptureTable, except that this table can only store a maximum of 2 hours of data.
rttMonJitterStatsTable	Contains summarized information of the results for a conceptual RTT control row. A rolling accumulated history of this information is maintained in a series of hourly 'group(s)'. The operation of this table is same as that of rttMonStatsCaptureTable, except that this table will store 2 hours of data.

Table 3-34 CISCO-RTTMON-MIB Tables and Objects (continued)

Object	Description
rttMonLpdGrpStatsTable	The Auto SAA L3 MPLS VPN LPD Group Database. The LPD Group statistics table contains summarized performance statistics for the LPD group. LPD Group - The set of 'single probes' which are subset of the 'lspGroup' probe traversing set of paths between two PE end points are grouped together and called as the LPD group. The LPD group will be uniquely referenced by the LPD Group ID. A rolling accumulated history of this information is maintained in a series of hourly 'group(s)'. Each conceptual statistics row has a current hourly group, into which RTT results are accumulated. At the end of each hour a new hourly group is created which then becomes current. The counters and accumulators in the new group are initialized to zero. The previous group(s) is kept in the table until the table contains rttMplsVpnMonTypeLpdStatHours groups for the conceptual statistics row; at this point, the oldest group is discarded and is replaced by the newly created one. The hourly group is uniquely identified by the rttMonLpdGrpStatsStartTimeIndex object.
rttMonHistoryCollectionTable	Contains a point by point rolling history of the most recent RTT operations for each conceptual RTT control row. The rolling history of this information is maintained in a series of 'live(s)', each containing a series of 'bucket(s)', each 'bucket' contains a series of 'sample(s)'. Each conceptual history row can have lives. A life is defined by the rttMonCtrlOperRttLife object. A new life will be created when rttMonCtrlOperState transitions 'active'. When the number of lives become greater than rttMonHistoryAdminNumLives the oldest life will be discarded and a new life will be created by incrementing the index. The path exploration RTT operation will be kept as an entry in this table.

MIB Constraints

There are no constraints on this MIB.

CISCO-SMI-MIB

The CISCO-SMI-MIB defines the structure of management information for Cisco enterprise MIBs.

MIB Constraints

There are no constraints on this MIB.

CISCO-SNAPSHOT-MIB

The CISCO-SNAPSHOT-MIB contains objects to manage snapshot routing, which helps improve the use of system resources for static routing and routing for dedicated serial lines.

The MODULE-IDENTITY for the CISCO-SNAPSHOT-MIB is ciscoSnapshotMIB, and its top-level OID is 1.3.6.1.4.1.9.9.19 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoSnapshotMIB).

Version: 9508150000Z

CISCO-SNAPSHOT-MIB Tables and Objects

Table 3-35 lists CISCO-SNAPSHOT-MIB Tables and Objects.

Table 3-35 CISCO-SNAPSHOT-MIB Tables and Objects

Object	Description
ciscoSnapshotInterfaceTable	Contains list of Snapshot Routing configuration entries.
ciscoSnapshotActivityTable	Contains list of snapshot routing activity entries.

MIB Constraints

There are no constraints on this MIB.

CISCO-SNMP-TARGET-EXT-MIB

The CISCO-SNMP-TARGET-EXT-MIB is an extension of the SNMP-TARGET-MIB specified in RFC2273.

MIB Constraints

There are no constraints on this MIB.

CISCO-STP-EXTENSIONS-MIB

The CISCO-STP-EXTENSIONS-MIB contains objects to manage Cisco extensions to the Spanning-Tree Protocol (STP), which is defined by IEEE Std 802.1D.

Version: 200512200000Z

CISCO-STP-EXTENSIONS-MIB Tables and Objects

Table 3-36 lists CISCO-STP-EXTENSIONS-MIB Tables and Objects.

Table 3-36 CISCO-STP-EXTENSIONS-MIB Tables and Objects

Object	Description
stpxPreferredVlansTable	The table containing indications of which VLANs are preferred on which VLAN trunk ports. The preferred VLANs on a trunk port have a lower Path Cost value compared with the VLANs on the trunk not in the preferred list. If the value of stpxSpanningTreeType is neither pvstPlus(1) nor rapidPvstPlus(5), the configuration in this table has no effect.
stpxInconsistencyTable	A table containing a list of the ports for which a particular VLAN's Spanning Tree has been found to have an inconsistency. Two types of inconsistency are discovered: 1) an inconsistency where two different port types have been plugged together; and 2) an inconsistency where different switches have different PVIDs for the same link.
stpxRootGuardConfigTable	A table containing a list of the bridge ports for which Spanning Tree RootGuard capability can be configured.
stpxRootInconsistencyTable	A table containing a list of the bridge ports for which a particular Spanning Tree instance has been found to have an root-inconsistency. The agent creates a new entry in this table whenever it detects a new root-inconsistency, and deletes entries when/soon after the inconsistency is no longer present.
stpxLongStpPortPathCostTable	A table containing the spanning tree port path cost configuration when stpxSpanningTreePathCostOperMode is long(2). If the value of stpxSpanningTreePathCostOperMode is short(1), this table is not instantiated.
stpxMISTPInstanceTable	This table contains one entry for each instance of MISTP and it contains stpxMISTPInstanceNumber entries, numbered from 1 to stpxMISTPInstanceNumber. This table is only instantiated when the value of stpxSpanningTreeType is mistp(2) or mistpPvstPlus(3).
stpxVlanMISTPInstMapTable	A table containing the MISTP Instance Index of the VLANs for a particular management domain. This table is only instantiated when the value of stpxSpanningTreeType is mistp(2) or mistpPvstPlus(3).

Table 3-36 CISCO-STP-EXTENSIONS-MIB Tables and Objects (continued)

Object	Description
stpxVlanMISTPInstMapEditTable	A table containing the MISTP related information for the VLANs in the Edit Buffers for a particular management domain. This table is only instantiated when when the value of stpxSpanningTreeType is mistp(2) or mistpPvstPlus(3).
stpxPreferredMISTPInstancesTable	The table containing indications of which MISTP instances are preferred on which trunk ports. The preferred MISTP instances on a trunk port have a lower Path Cost value compared with the MISTP instances on the trunk not in the preferred list. This table is only instantiated when the value of stpxSpanningTreeType is mistp(2) or mistpPvstPlus(3).
stpxLoopGuardConfigTable	A table containing a list of the bridge ports for which Spanning Tree LoopGuard capability can be configured.
stpxLoopInconsistencyTable	A table containing a list of the bridge ports for which a particular Spanning Tree instance has been found to have a loop-inconsistency. The agent creates a new entry in this table whenever it detects a new loop-inconsistency, and deletes entries when/soon after the inconsistency is no longer present.
stpxFastStartPortTable	A table containing a list of the bridge ports for which Spanning Tree Port Fast Start can be configured.
stpxFastStartOperModeTable	A table containing a list of the bridge ports for a particular Spanning Tree Instance.
stpxBpduSkewingTable	A table containing a list of the bridge ports for which a particular Spanning Tree instance has been detected to have BPDU skewing occurred since the object value of stpxBpduSkewingDetectionEnable was last changed to true(1). The agent creates a new entry in this table whenever a port in a particular Spanning Tree instance is detected to be BPDU skewed since the object value of stpxBpduSkewingDetectionEnable object is changed to true(1). The agent deletes all the entries in this table when the object value of stpxBpduSkewingDetectionEnable is changed to false(2) or the object value of stpxSpanningTreeType is changed.

Table 3-36 CISCO-STP-EXTENSIONS-MIB Tables and Objects (continued)

Object	Description
stpxMSTInstanceTable	This table contains MST instance information with one entry for an MST instance within the range of 0 to the object value of stpxMSTMaxInstanceNumber. This table is deprecated and replaced by stpxSMSTInstanceTable.
stpxMSTInstanceEditTable	This table contains MST instance information in the Edit Buffer with one entry for each MST instance numbered from 0 to stpxMSTMaxInstanceNumber. This table is only instantiated when the stpxMSTRegionEditBufferStatus has the value of acquiredBySnmp(2). This table is deprecated and replaced by stpxSMSTInstanceEditTable.
stpxPreferredMSTInstancesTable	The table containing indications of which MST instances are preferred on which trunk ports. The preferred MST instances on a trunk port have a lower Path Cost value compared with the MST instances on the trunk not in the preferred list.
stpxMSTPortTable	A table containing port information for the MST Protocol on all the bridge ports existing on the system.
stpxMSTPortRoleTable	A table containing a list of the bridge ports for a particular MST instance. This table is only instantiated when the stpxSpanningTreeType is mst(4). This table is deprecated and replaced with stpxRSTPPortRoleTable.
stpxRSTPPortTable	A table containing port information for the RSTP Protocol on all the bridge ports existing in the system.
stpxRSTPPortRoleTable	A table containing a list of the bridge ports for a particular Spanning Tree instance. This table is only instantiated when the stpxSpanningTreeType is mst(4) or rapidPvstPlus(5).
stpxRPVSTPortTable	A table containing a list of the bridge ports for a particular Spanning Tree Instance. This table is only instantiated when the object value of stpxSpanningTreeType is rapidPvstPlus(5).
stpxSMSTInstanceTable	This table contains MST instance information for IEEE MST.

Table 3-36 CISCO-STP-EXTENSIONS-MIB Tables and Objects (continued)

Object	Description
stpxSMSTInstanceEditTable	This table contains MST instance information in the Edit Buffer. This table is only instantiated when the object value of stpxMSTRegionEditBufferStatus has the value of acquiredBySnmp(2).
stpxSMSTPortTable	A table containing port information for the MST Protocol on all the bridge ports existing on the system. This table is only instantiated when the object value of stpxSpanningTreeType is mst(4).

MIB Constraints

There are no constraints on this MIB.

CISCO-SYSLOG-MIB

The CISCO-SYSLOG-MIB contains all system log messages generated by the Cisco IOS software. The MIB provides a way to access these SYSLOG messages through Simple Network Management Protocol (SNMP). All Cisco IOS SYSLOG messages contain the message name and its severity, message text, the name of the entity generating the message, and an optional time stamp. The MIB also contains a history of SYSLOG messages and counts related to SYSLOG messages.

The MODULE-IDENTITY for the CISCO-SYSLOG-MIB is ciscoSyslogMIB, and its top-level OID is 1.3.6.1.4.1.9.9.41 (iso.org.dod.internet.private.enterprises.cisco.ciscoMgmt.ciscoSyslogMIB).

Version: 200512030000Z

CISCO-SYSLOG-MIB Tables and Objects

Table 3-37 lists CISCO-SYSLOG-MIB Tables and Objects.

Table 3-37 CISCO-SYSLOG-MIB Tables and Objects

Object	Description
clogHistoryTable	Contains syslog messages generated by this device. All 'interesting' syslog messages (i.e. severity).

MIB Constraints

This MIB does not track messages generated by **debug** commands that are entered through the CLI.

CISCO-TC-MIB

The CISCO-TC-MIB defines the textual conventions used in Cisco enterprise MIBs.

MIB Constraint

There are no constraints on this MIB.

ENTITY-MIB

The ENTITY-MIB represents physical and logical entities (components) in the router and allow SNMP management of those entities. This MIB was released as RFC 2737, *Entity MIB (Version 2)*.

The MIB table entPhysicalTable identifies the physical entities in the router. The entPhysicalTable contains a single row for the chassis and a row for each entity in the chassis. A physical entity may contain other entities (for example, a fan-tray bay may contain a fan-tray module, which may contain one or more fans). The physical hierarchy of system components is determined at run time, based on the actual router configuration.

The ENTITY-MIB shows information only about hardware devices, not virtual devices.

The MODULE-IDENTITY for the ENTITY-MIB is entityMIB, and its top-level OID is 1.3.6.1.2.1.47 (iso.org.dod.internet.mgmt.mib-2.entityMIB).

Version: 200309180000Z

ENTITY-MIB Tables and Objects

Table 3-38 lists ENTITY-MIB Tables and Objects.

Table 3-38 ENTITY-MIB Tables and Objects

MIB Object	Notes
entPhysicalTable	Contains one row per physical entity. There is always at least one row for an “overall” physical entity.
entLogicalTable	Contains one row per logical entity.
entLPMappingTable	Contains zero or more rows of logical entity to physical equipment associations. For each logical entity known by this agent, there are zero or more mappings to the physical resources, which are used to realize that logical entity.

Table 3-38 ENTITY-MIB Tables and Objects (continued)

MIB Object	Notes
entAliasMappingTable	Contains zero or more rows, representing mappings of logical entity and physical component to external MIB identifiers. Each physical port in the system may be associated with a mapping to an external identifier, which itself is associated with a particular logical entity's naming scope. A "wildcard" mechanism is provided to indicate that an identifier is associated with more than one logical entity.
entPhysicalContainsTable	Exposes the "container/containee" relationships between physical entities. This table provides all the information found by constructing the virtual containment tree for a given entPhysicalTable, but in a more direct format.

MIB Constraints

There are no constraints on this MIB.

ETHERLIKE-MIB

The ETHERLIKE-MIB contains objects to manage Ethernet-like interfaces on the router. This MIB was released as RFC 2665, *Definitions of Managed Objects for the Ethernet-like Interface Types*.

The MODULE-IDENTITY for the ETHERLIKE-MIB is etherMIB, and its top-level OID is 1.3.6.1.2.1.35 (iso.org.dod.internet.mgmt.mib-2.etherMIB).

ETHERLIKE-MIB Tables and Objects

Table 3-39 lists ETHERLIKE-MIB Tables and Objects.

Table 3-39 ETHERLIKE-MIB Tables and Objects

Object	Description
dot3StatsTable	Contains statistics for a collection of ethernet-like interfaces attached to a particular system.
dot3StatsEntry	Statistics for a particular interface to an ethernet-like medium.
dot3StatsIndex	Contains an index value that uniquely identifies an interface to an ethernet-like medium.
dot3StatsAlignmentErrors	Contains a count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check.

Table 3-39 ETHERLIKE-MIB Tables and Objects (continued)

Object	Description
dot3StatsFCSErrors	Contains a count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3StatsSingleCollisionFrames	Contains a count of frames that are involved in a single collision, and are subsequently transmitted successfully.
dot3StatsMultipleCollisionFrames	Contains a count of frames that are involved in more than one collision and are subsequently transmitted successfully.
dot3StatsSQETestErrors	Contains a count of times that the SQE TEST ERROR is received on a particular interface.
dot3StatsDeferredTransmissions	Contains a count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy.
dot3StatsLateCollisions	The number of times that a collision is detected on a particular interface later than one slotTime into the transmission of a packet.
dot3StatsExcessiveCollisions	Contains a count of frames for which transmission on a particular interface fails due to excessive collisions.
dot3StatsInternalMacTransmitErrors	Contains a count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error.
dot3StatsCarrierSenseErrors	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.
dot3StatsFrameTooLongs	Contains a count of frames received on a particular interface that exceed the maximum permitted frame size.
dot3StatsInternalMacReceiveErrors	Contains a count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error.
dot3StatsEtherChipSet	Contains an OBJECT IDENTIFIER which identifies the chipset used to realize the interface.
dot3StatsSymbolErrors	For an interface operating at 100 Mb/s, the number of times there was an invalid data symbol when a valid carrier was present.
dot3StatsDuplexStatus	The current mode of operation of the MAC entity. 'unknown' indicates that the current duplex mode could not be determined.
dot3StatsRateControlAbility	"'true' for interfaces operating at speeds above 1000 Mb/s that support Rate Control through lowering the average data rate of the MAC sublayer, with frame granularity, and 'false' otherwise."
dot3StatsRateControlStatus	Contains the current Rate Control mode of operation of the MAC sublayer of this interface.

Table 3-39 ETHERLIKE-MIB Tables and Objects (continued)

Object	Description
dot3CollTable	Contains a collection of collision histograms for a particular set of interfaces.
dot3CollEntry	Contains a cell in the histogram of per-frame collisions for a particular interface.
dot3CollCount	Contains number of per-frame media collisions for which a particular collision histogram cell represents the frequency on a particular interface.
dot3CollFrequencies	Contains a count of individual MAC frames for which the transmission (successful or otherwise) on a particular interface occurs after the frame has experienced exactly the number of collisions in the associated dot3CollCount object.
dot3ControlTable	Contains descriptive and status information about the MAC Control sublayer on the ethernet-like interfaces attached to a particular system.
dot3ControlEntry	Contains information about the MAC Control sublayer on a single ethernet-like interface.
dot3ControlInUnknownOpcodes	Contains a count of MAC Control frames received on this interface that contain an opcode that is not supported by this device.
dot3HCControlInUnknownOpcodes	Contains a count of MAC Control frames received on this interface that contain an opcode that is not supported by this device.
dot3PauseTable	Contains descriptive and status information about the MAC Control PAUSE function on the ethernet-like interfaces attached to a particular system.
dot3PauseEntry	Containing information about the MAC Control PAUSE function on a single ethernet-like interface.
dot3PauseAdminMode	Used to configure the default administrative PAUSE mode for this interface.
dot3PauseOperMode	Reflects the PAUSE mode currently in use on this interface.
dot3InPauseFrames	Contains a count of MAC Control frames received on this interface with an opcode indicating the PAUSE operation.
dot3OutPauseFrames	Contains a count of MAC Control frames transmitted on this interface with an opcode indicating the PAUSE operation.
dot3HCInPauseFrames	Contains a count of MAC Control frames received on this interface with an opcode indicating the PAUSE operation.
dot3HCOutPauseFrames	Contains a count of MAC Control frames transmitted on this interface with an opcode indicating the PAUSE operation.
dot3HCStatsTable	Contains 64-bit versions of error counters from the dot3StatsTable.

Table 3-39 ETHERLIKE-MIB Tables and Objects (continued)

Object	Description
dot3HCStatsEntry	An entry containing 64-bit statistics for a single ethernet-like interface.
dot3HCStatsAlignmentErrors	Contains a count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check.
dot3HCStatsFCSErrors	Contains a count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3HCStatsInternalMacTransmitErrors	Contains a count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error.
dot3HCStatsFrameTooLongs	Contains a count of frames received on a particular interface that exceed the maximum permitted frame size.
dot3HCStatsInternalMacReceiveErrors	Contains a count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error.
dot3HCStatsSymbolErrors	For an interface operating at 100 Mb/s, the number of times there was an invalid data symbol when a valid carrier was present.

MIB Constraints

There are no constraints on this MIB.

HCNUM-TC

The HCNUM-TC contains textual conventions for high capacity data types.

Version: 200006080000Z

MIB Constraints

There are no constraints on this MIB.

IANAIFTYPE-MIB

The IANAIFTYPE-MIB defines the IANAifType Textual Convention, and thus the enumerated values of the ifType object defined in MIB-II's ifTable.

Version: 200603310000Z

MIB Constraints

There are no constraints on this MIB.

IEEE8021-CFM-MIB

The IEEE8021-CFM-MIB is a Connectivity Fault Management (CFM) module for managing IEEE 802.1ag.

MIB Constraints

These are no constraints on this MIB.

IF-MIB

The IF-MIB describes the attributes of physical and logical interfaces. The router supports the ifGeneralGroup of MIB objects for all layers (ifIndex, ifDescr, ifType, ifSpeed, ifPhysAddress, ifAdminStatus, ifOperStatus, ifLastChange, ifName, ifLinkUpDownTrapEnable, ifHighSpeed, and ifConnectorPresent). This MIB was released as RFC 2233, *The Interfaces Group MIB Using SMIv2*.

The MODULE-IDENTITY for the IF-MIB is ifMIB, and its top-level OID is 1.3.6.1.2.1.31 (iso.org.dod.internet.mgmt.mib-2.ifMIB).

Version: 201106270000Z

IF-MIB Tables and Objects

Table 3-40 lists IF-MIB Tables and Objects.

Table 3-40 IF-MIB Tables and Objects

Object	Description
ifTable	Lists the interface entries. The number of entries is given by the value of ifNumber.
ifXTable	Contains a list of interface entries and provides additional objects for the interface table.
ifStackTable	Contains information on the relationships between the multiple sub-layers of network interfaces.
ifRcvAddressTable	Contains entries for each address (broadcast, multicast, or uni-cast) for packets or frames the system receive on a particular interface.
ifTestTable	Contains one entry per interface. It defines objects which allow a network manager to instruct an agent to test an interface for various faults.

MIB Constraints

These are no constraints on this MIB.

IMA-MIB

The IMA-MIB manages ATM Forum Inverse Multiplexing for ATM (IMA) interfaces. The MODULE-IDENTITY for the IMA-MIB is atmfImaMib, and its top-level OID is 1.3.6.1.4.1.353.5.7.1.

Note The IMA-MIB is not supported on ASR 901S routers.

IMA-MIB Tables and Objects

Table 3-42 lists IMA-MIB Tables and Objects.

Table 3-41 IMA-MIB Tables and Objects

Object	Description
imaGroupNumber	The number of IMA groups configured on this system.
imaGroupTable	The IMA Group Configuration table.
imaGroupMappingTable	A table mapping the 'ifIndex' values of 'imaGroupIfIndex' to the 'imaGroupIndex' values of the corresponding IMA group.
imaLinkTable	The IMA group Link Status and Configuration table.
imaAlarmStatus	Status of the IMA alarm.
imaAlarmType	The Type of IMA alarm declared or cleared. The value of ImaAlarmType identifies the type of alarm according to the definitions in the IMA specification.
imaGroupCurrentTable	The IMA Group Current table.
imaGroupIntervalTable	The IMA Group Interval table.
imaGroupTotalTable	An entry in the IMA Group Total table.
imaLinkCurrentTable	The IMA Link Current table.
imaLinkIntervalTable	The IMA Link Interval table.
imaLinkTotalTable	The IMA Link Total table.

MIB Constraints

There are no constraints on this MIB.

INT-SERV-MIB

The INT-SERV-MIB describes the Integrated Services Protocol (ISP).

The MODULE-IDENTITY for the INT-SERV-MIB is intSrv, and its top-level OID is 1.3.6.1.2.1.52 (iso.org.dod.internet.mgmt.mib-2.intSrv).

INT-SERV-MIB Tables and Objects

Table 3-42 lists INT-SERV-MIB Tables and Objects.

Table 3-42 INT-SERV-MIB Tables and Objects

Object	Description
intSrvIfAttribTable	The reservable attributes of the system's in- terfaces.
intSrvFlowTable	Information describing the reserved flows us- ing the system's interfaces.

MIB Constraints

There are no constraints on this MIB.

IP-FORWARD-MIB

The IP-FORWARD-MIB contains objects to control the display of classless interdomain routing (CIDR) multipath IP Routes. The top-level OID is 1.3.6.1.2.1.4.24.

IP-FORWARD-MIB Tables and Objects

Table 3-42 lists IP-FORWARD-MIB Tables and Objects.

Table 3-43 IP-FORWARD-MIB Tables and Objects

Object	Description
ipForwardNumber	The number of current ipForwardTable entries that are not invalid.
ipForwardTable	The IP Routing table.
ipCidrRouteNumber	The number of current ipCidrRouteTable entries that are not invalid.
ipCidrRouteTable	The IP Routing table.
ipForwardConformance	The number of current ipCidrRouteTable entries that are not invalid.
inetCidrRouteNumber	The number of current inetCidrRouteTable entries that are not invalid.

Table 3-43 IP-FORWARD-MIB Tables and Objects (continued)

Object	Description
inetCidrRouteTable	The IP Routing table.
inetCidrRouteDiscards	The number of valid route entries discarded from inetCidrRouteTable.

MIB Constraints

There are no constraints on this MIB.

IP-MIB

The IP-MIB contains objects to display CIDR multipath IP routes. This MIB was initially defined as part of RFC1213-MIB and then later released as RFC 2011, *SNMPv2 Management Information Base for the Internet Protocol Using SMIv2*.

In RFC1213-MIB, the MODULE-IDENTITY for the IP-MIB is ipMIB, and its top-level OID is 1.3.6.1.2.1.4 (iso.org.dod.internet.mgmt.mib-2.ipMIB). In RFC 2011, its top-level OID is 1.3.6.1.2.1.48 (iso.org.dod.internet.mgmt.mib-2.ipMIB).

IP-MIB Tables and Objects

Table 3-44 lists IP-MIB Tables and Objects.

Table 3-44 IP-MIB Tables and Objects

Object	Description
ipv4InterfaceTable	Contains per-interface IPv4-specific information.
ipv6InterfaceTable	Contains per-interface IPv6-specific information.
ipSystemStatsTable	Contains system wide, IP version specific traffic statistics. This table and the ipIfStatsTable contain similar objects whose difference is in their granularity. Where this table contains system wide traffic statistics, the ipIfStatsTable contains the same statistics but counted on a per-interface basis.
ipIfStatsTable	Contains per-interface traffic statistics. This table and the ipSystemStatsTable contain similar objects whose difference is in their granularity. Where this table contains per-interface statistics, the ipSystemStatsTable contains the same statistics, but counted on a system wide basis.

Table 3-44 IP-MIB Tables and Objects (continued)

Object	Description
ipAddressPrefixTable	Allows the user to determine the source of an IP address or set of IP addresses, and allows other tables to share the information via pointer rather than by copying. For example, when the node configures both a unicast and anycast address for a prefix, the ipAddressPrefix objects for those addresses will point to a single row in this table. This table primarily provides support for IPv6 prefixes, and several of the objects are less meaningful for IPv4. The table continues to allow IPv4 addresses to allow future flexibility. In order to promote a common configuration, this document includes suggestions for default values for IPv4 prefixes. Each of these values may be overridden if an object is meaningful to the node. All prefixes used by this entity should be included in this table independent of how the entity learned the prefix. (This table isn't limited to prefixes learned from router advertisements.)
ipAddressTable	Contains addressing information relevant to the entity's interfaces. This table does not contain multicast address information. Tables for such information should be contained in multicast specific MIBs, such as RFC 3019. While this table is writable, the user will note that several objects, such as ipAddressOrigin, are not. The intention in allowing a user to write to this table is to allow them to add or remove any entry that isn't permanent. The user should be allowed to modify objects and entries when that would not cause inconsistencies within the table. Allowing write access to objects, such as ipAddressOrigin, could allow a user to insert an entry and then label it incorrectly. Note well: When including IPv6 link-local addresses in this table, the entry must use an InetAddressType of 'ipv6z' in order to differentiate between the possible interfaces.
ipNetToPhysicalTable	The IP Address Translation table used for mapping from IP addresses to physical addresses. The Address Translation tables contain the IP address to 'physical' address equivalences. Some interfaces do not use translation tables for determining address equivalences (e.g., DDN-X.25 has an algorithmic method); if all interfaces are of this type, then the Address Translation table is empty, i.e., has zero entries. While many protocols may be used to populate this table, ARP and Neighbor Discovery are the most likely options.
ipv6ScopeZoneIndexTable	Describes IPv6 unicast and multicast scope zones. For those objects that have names rather than numbers, the names were chosen to coincide with the names used in the IPv6 address architecture document.
ipDefaultRouterTable	Describes the default routers known to this entity.
ipv6RouterAdvertTable	Contains information used to construct router advertisements.

Table 3-44 IP-MIB Tables and Objects (continued)

Object	Description
icmpStatsTable	Contains generic system-wide ICMP counters.
icmpMsgStatsTable	Contains system-wide per-version, per-message type ICMP counters.
ipAddrTable	Contains addressing information relevant to this entity's IPv4 addresses. This table has been deprecated, as a new IP version-neutral table has been added. It is loosely replaced by the ipAddressTable although several objects that weren't deemed useful weren't carried forward while another (ipAdEntReasmMaxSize) was moved to the ipv4InterfaceTable.
ipNetToMediaTable	The IPv4 Address Translation table used for mapping from IPv4 addresses to physical addresses. This table has been deprecated, as a new IP version-neutral table has been added. It is loosely replaced by the ipNetToPhysicalTable.

MIB Constraint

There are no constraints on this MIB.

MPLS-LDP-MIB

The MPLS-LDP-MIB provides management information for the Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP), which is used by label switching routers (LSRs) to communicate the definitions of labels that each router is using. The MPLS-LDP-MIB provides objects that perform the following actions:

- Configures LDP sessions on a specific LSR.
- Records information that is learned through discovery or from the session initialization message.
- Shows the actual sessions that are established or are being established.

MPLS-LDP-MIB Tables and Objects

Table 3-45 lists MPLS-LDP-MIB Tables and Objects.

Table 3-45 MPLS-LDP-MIB Tables and Objects

Object	Description
mplsLdpEntityTable	Contains information about the MPLS Label Distribution Protocol Entities which exist on this Label Switch Router (LSR).
mplsLdpEntityConfGenericTable	Provides a way to configure Generic Labels associated with LDP entities on the LSR.

Table 3-45 MPLS-LDP-MIB Tables and Objects (continued)

Object	Description
mplsLdpEntityAtmParmsTable	Contains information about the ATM specific information which could be used in the 'Optional Parameters' and other ATM specific information.
mplsLdpEntityConfAtmLabelRangeTable	The MPLS LDP Entity Configurable ATM Label Range Table. The purpose of this table is to provide a mechanism for specifying a contiguous range of vpi's with a contiguous range of vci's, or a 'label range' for LDP Entities. LDP Entities which use ATM must have at least one entry in this table.
mplsLdpEntityFrameRelayParmsTable	Contains information about the Optional Parameters to specify what this Entity is going to specify for Frame Relay specific LDP Intialization Messages.
mplsLdpEntityConfFrLabelRangeTable	Contains information about the Optional Parameters to specify what this Entity is going to specify for Frame Relay specific LDP Intialization Messages..
mplsLdpEntityStatsTable	This table is a read-only table which augments the mplsLdpEntityTable. The purpose of this table is to keep statistical information about the LDP Entities on the LSR.
mplsLdpEntityPeerTable	Information about LDP peers known by Entities in the mplsLdpEntityTable. The information in this table is based on information from the Entity-Peer interaction but is not appropriate for the mplsLdpSessionTable.
mplsLdpHelloAdjacencyTable	ContainsHello Adjacencies for Sessions.
mplsLdpSessionTable	Contains Sessions between the LDP Entities and LDP Peers. Each row represents a single session.
mplsLdpAtmSessionTable	A table which relates Sessions in the 'mplsLdpSessionTable' and their label range intersections. There could be one or more label range intersections between an LDP Entity and LDP Peer using ATM as the underlying media. Each row represents a single label range intersection. NOTE: this table cannot use the 'AUGMENTS' clause because there is not necessarily a one-to-one mapping between this table and the mplsLdpSessionTable.
mplsLdpFrameRelaySessionTable	Contains Frame Relay label range intersections between the LDP Entities and LDP Peers. Each row represents a single label range intersection. NOTE: this table cannot use the 'AUGMENTS' clause because there is not necessarily a one-to-one mapping between this table and the mplsLdpSessionTable.
mplsLdpSessionStatsTable	Contains statistics for Sessions between LDP Entities and LDP Peers.

Table 3-45 MPLS-LDP-MIB Tables and Objects (continued)

Object	Description
mplsLdpSessionPeerAddressTable	This table 'extends' the mplsLdpSessionTable. This table is used to store Label Address Information from Label Address Messages received by this LSR from Peers. This table is read-only and should be updated when Label Withdraw Address Messages are received, i.e. Rows should be deleted as apropriate. NOTE: since more than one address may be contained in a Label Address Message, this table 'extends', rather than 'AUGMENTS' the mplsLdpSessionTable's information.
mplsLdpLibTable	Represents LIB (Label Information Base) Information. The table is read-only.
mplsLdpFecTable	Represents the FEC (Forwarding Equivalence Class) Information associated with an LSP. The table is read-only.

MIB Constraint

MPLS LDP over ATM/IMA interfaces is not supported.

MPLS-LSR-MIB

The MPLS-LSR-MIB provides configuration and remote performance monitoring information to manage label switched paths (LSPs) through a label switching router (LSR) that is using the Multiprotocol Label Switching (MPLS) technology.

MPLS-LSR-MIB Tables and Objects

Table 3-45 lists MPLS-LSR-MIB Tables and Objects.

Table 3-46 MPLS-LSR-MIB Tables and Objects

Object	Description
mplsInterfaceConfTable	Specifies per-interface MPLS capability and associated information.
mplsInterfacePerfTable	Provides MPLS performance information on a per-interface basis.
mplsInSegmentTable	Contains a collection of incoming segments to an LSR.
mplsInSegmentPerfTable	Contains statistical information for incoming MPLS segments to an LSR.
mplsOutSegmentTable	Contains a representation of the outgoing segments from an LSR.

Table 3-46 MPLS-LSR-MIB Tables and Objects (continued)

Object	Description
mplsOutSegmentPerfTable	Contains statistical information about outgoing segments from an LSR. The counters in this entry should behave in a manner similar to that of the interface.
mplsXCTable	Specifies information for switching between LSP segments. It supports point-to-point, point-to-multipoint and multipoint-to-point connections. mplsLabelStackTable specifies the label stack information for a cross-connect LSR and is referred to from mplsXCTable.
mplsLabelStackTable	Specifies the label stack to be pushed onto a packet, beneath the top label. Entries into this table are referred to from mplsXCTable.
mplsTrafficParamTable	Specifies the Traffic Parameter objects for in and out-segments.

MIB Constraint

There are no constraints on this MIB.

MPLS-VPN-MIB

The MPLS-VPN-MIB:

- Describes managed objects for modeling a Multiprotocol Label Switching/Border Gateway Protocol Virtual Private network
- Configures and monitor routes and route targets for each VRF instance on a router
- Facilitates provisioning VPN Routing and Forwarding (VRF) instances on MPLS interfaces
- Measures the performance of MPLS/BGP VPNs

The MIB is based on Revision 05 of the IETF MPLS-VPN-MIB. Root OID is : 1.3.6.1.3.118

MIB Constraint

There are no constraints on this MIB.

NOTIFICATION-LOG-MIB

The NOTIFICATION-LOG-MIB contains objects for logging SNMP Notifications, that is, Traps and Informs.

MIB Constraint

There are no constraints on this MIB.

OLD-CISCO-CHASSIS-MIB

The OLD-CISCO-CHASSIS-MIB describes chassis objects in devices running an older implementation of the Cisco IOS operating system. Those objects are now described in the ENTITY-MIB.

Note Although currently supported on the router, the OLD-CISCO-CHASSIS-MIB is being phased out and could become unsupported without prior notice. We recommend that you use the ENTITY-MIB instead of OLD-CISCO-CHASSIS-MIB.

OLD-CISCO-CHASSIS-MIB Tables and Objects

Table 3-47 lists OLD-CISCO-CHASSIS-MIB Tables and Objects.

Table 3-47 OLD-CISCO-CHASSIS-MIB Tables and Objects

Object	Description
cardTable	Chassis card table.
cardIfIndexTable	Chassis card table.

MIB Constraints

The OLD-CISCO-CHASSIS-MIB is deprecated. Chassis objects are now described in the ENTITY-MIB; therefore, where possible, we recommend that you use the ENTITY-MIB instead of the OLD-CISCO-CHASSIS-MIB.

OLD-CISCO-FLASH-MIB

The OLD-CISCO-FLASH-MIB describes the local cisco Flash Group. This group is present in all products which contain flash.

OLD-CISCO-FLASH-MIB Tables and Objects

Table 3-47 lists OLD-CISCO-FLASH-MIB Tables and Objects.

Table 3-48 OLD-CISCO-FLASH-MIB Tables and Objects

Object	Description
flashSize	Total Size in Octets of Flash memory.
flashFree	Unused Size in Octets of Flash memory.

Table 3-48 OLD-CISCO-FLASH-MIB Tables and Objects (continued)

Object	Description
flashController	Provides the type of Flash controller (either CCTL or CCTL2) installed in the router.
flashCard	Provides the type of Flash Card installed in the router.
flashVPP	State of the VPP DIP jumper on the Flash memory card. Files can be written to the Flash memory card only if the VPP DIP jumper is turned on.
flashErase	Request to erase flash memory.
flashEraseTime	Indicates the value of sysUptime the last time Flash memory was erased.
flashEraseStatus	Status of current or last flash erasing.
flashToNet	Write flash entry to tftp server. Value should be the name of the flash entry to send.
flashToNetTime	Indicates the value of sysUpTime the last time a file was transfered from Flash memory on the router to a TFTP host.
flashToNetStatus	Status of current or last flash to net transfer.
netToFlash	Write flash entry from tftp server. Value should be the name of the flash entry to write.
netToFlashTime	Indicates the value of sysUpTime the last time file was copied from a Trivial File Transfer Protocol(TFTP) server to the Flash memory on the router.
netToFlashStatus	Status of current or last net to flash transfer.
flashStatus	Status of the availability of flash.
flashEntries	Number of entries in the flash directory.

MIB Constraints

The OLD-CISCO-CHASSIS-MIB is deprecated. Chassis objects are now described in the ENTITY-MIB; therefore, where possible, we recommend that you use the ENTITY-MIB instead of the OLD-CISCO-CHASSIS-MIB.

OLD-CISCO-INTERFACES-MIB

The OLD-CISCO-INTERFACES-MIB contains objects to manage interfaces on devices running an older implementation of the Cisco IOS operating system.

OLD-CISCO-INTERFACES-MIB Tables and Objects

Table 3-49 lists OLD-CISCO-INTERFACES-MIB Tables and Objects.

Table 3-49 OLD-CISCO-INTERFACES-MIB Tables and Objects

Object	Description
lifTable	Contains a list of interface entries.
IFSIPTable	Contains a list of card entries for 4T, HSSI, Mx serial or FSIP.

MIB Constraints

Although currently supported on the router, the OLD-CISCO-INTERFACES-MIB is being phased out and could become unsupported without prior notice. Therefore, use care if you implement the MIB.

OLD-CISCO-IP-MIB

The OLD-CISCO-IP-MIB contains objects to manage IP on devices running an older implementation of the Cisco IOS operating system.

OLD-CISCO-IP-MIB Tables and Objects

Table 3-50 lists OLD-CISCO-IP-MIB Tables and Objects.

Table 3-50 OLD-CISCO-IP-MIB Tables and Objects

Object	Description
lipAddrTable	Contains a list of IP address entries.
lipRouteTable	Contains a list of IP routing entries.
lipAccountingTable	Contains a list of accounting entries.
lipCkAccountingTable	Contains a list of IP checkpoint accounting entries.

MIB Constraints

Although currently supported on the router, the OLD-CISCO-IP-MIB is being phased out and could become unsupported without prior notice. Therefore, use care if you implement the MIB.

OLD-CISCO-SYS-MIB

The OLD-CISCO-SYS-MIB should only be used in the test tool environment in place of OLD-CISCO-CPU, OLD-CISCO-ENVMON-MIB, OLD-CISCO-MEMORY-MIB, and OLD-CISCO-SYSTEM-MIB MIBs.

OLD-CISCO-TS-MIB

The OLD-CISCO-TS-MIB contains objects to manage terminals and terminal lines on devices running an older implementation of the Cisco IOS operating system.

OLD-CISCO-TS-MIB Tables and Objects

Table 3-51 lists OLD-CISCO-TS-MIB Tables and Objects.

Table 3-51 OLD-CISCO-TS-MIB Tables and Objects

Object	Description
ltsLineTable	Contains a list of terminal server line entries.
ltsLineSessionTable	Contains a list of terminal server line and session entries.

MIB Constraints

Although currently supported on the router, the OLD-CISCO-TS-MIB is being phased out and could become unsupported without prior notice. Therefore, use care if you implement the MIB.

OSPF-MIB

The OSPF-MIB contains objects that describe the OSPF Version 2 Protocol. The RFC1253-MIB corresponds to the OSPF-MIB (Open Shortest Path First (OSPF) protocol).

Version: 200307180000Z

OSPF-MIB Tables and Objects

Table 3-52 lists OSPF-MIB Tables and Objects.

Table 3-52 OSPF-MIB Tables and Objects

Object	Description
cospfAreaTable	Information describing the configured parameters and cumulative statistics of the router's attached areas.
cospfLsdbTable	The OSPF Process's Link State Database. This table is meant for Opaque LSA's
cospfIfTable	The OSPF Interface Table describes the interfaces from the viewpoint of OSPF.
cospfVirtIfTable	Information about this router's virtual interfaces.
cospfShamLinkTable	Information about this router's sham links
cospfShamLinksTable	Information about this router's sham links.

Table 3-52 OSPF-MIB Tables and Objects (continued)

Object	Description
cospfShamLinkNbrTable	A table of sham link neighbor information.
cospfLocalLsdbTable	The OSPF Process's Link-Local Link State Database for non-virtual links.
cospfVirtLocalLsdbTable	The OSPF Process's Link-Local Link State Database for virtual links.

MIB Constraints

There are no constraints on this MIB.

OSPFv3-MIB

The OSPFV3-MIB is the MIB module for OSPF version 3.

Version: 200404081200Z

OSPFv3-MIB Tables and Objects

Table 3-53 lists OSPFv3-MIB Tables and Objects.

Table 3-53 OSPFv3-MIB Tables and Objects

Object	Description
ospfv3AreaTable	OSPFv3 Process's AS-Scope Link State Database (LSDB). The LSDB contains the AS-Scope Link State Advertisements from throughout the areas that the device is attached to.
ospfv3AsLsdbTable	OSPFv3 Process's AS-Scope LSDB. The LSDB contains the AS-Scope Link State Advertisements from throughout the areas that the device is attached to.
ospfv3AreaLsdbTable	OSPFv3 Process's Area-Scope LSDB. The LSDB contains the Area-Scope Link State Advertisements from throughout the area that the device is attached to.
ospfv3LinkLsdbTable	OSPFv3 Process's Link-Scope LSDB for non-virtual interfaces. The LSDB contains the Link-Scope Link State Advertisements from the interfaces that the device is attached to
ospfv3HostTable	Host/Metric Table indicates what hosts are directly attached to the router and their corresponding metrics.
ospfv3IfTable	OSPFv3 Interface Table describes the interfaces from the viewpoint of OSPFv3.
ospfv3VirtIfTable	Information about this router's virtual interfaces that the OSPFv3 Process is configured to carry on.
ospfv3NbrTable	A table describing all neighbors in the locality of the OSPFv3 router.

Table 3-53 OSPFv3-MIB Tables and Objects (continued)

Object	Description
ospfv3VirtNbrTable	Table describing all virtual neighbors.
ospfv3AreaAggregateTable	Area Aggregate Table acts as an adjunct to the Area Table. It describes those address aggregates that are configured to be propagated from an area. Its purpose is to reduce the amount of information that is known beyond an Area's borders. A range of IPv6 prefixes specified by a prefix/prefix length pair. **Note** If ranges are configured such that one range subsumes another range the most specific match is the preferred one.
ospfv3GeneralGroup	A 32-bit integer uniquely identifying the router in the AS. To ensure uniqueness, this may default to the value of one of the router's IPv4 interface addresses if IPv4 is configured on the router
ospfv3CfgNbrTable	A table describing all configured neighbors. This table provides OSPFv3 information for sending OSPFv3 packets to potential neighbors and is typically used on NBMA and Point-to-Multipoint networks.
ospfv3NotificationEntry	Fields that are required for notifications.

MIB Constraints

There are no constraints on this MIB.

PERFHIST-TC-MIB

The PERFHIST-TC-MIB provides Textual Conventions to be used by systems supporting 15 minute based performance history counts.

Version: 9811071100Z

MIB Constraints

There are no constraints on this MIB.

RFC1213-MIB

The RFC1213-MIB defines the second version of the Management Information Base (MIB-II) for use with network-management protocols in TCP-based internets. This MIB was released as RFC 1213, *Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II*.

The MODULE-IDENTITY for the RFC1213-MIB is mib-2, and its top-level OID is 1.3.6.1.2.1 (iso.org.dod.internet.mgmt.mib-2).

RFC1213-MIB Tables and Objects

Table 3-54 lists RFC1213-MIB Tables and Objects.

Table 3-54 RFC1213-MIB Tables and Objects

Object	Description
ifTable	Contains a list of interface entries. The number of entries is given by the value of ifNumber.
atTable	The Address Translation tables contain the NetworkAddress to 'physical' address equivalences. Some interfaces do not use translation tables for determining address equivalences (e.g., DDN-X.25 has an algorithmic method); if all interfaces are of this type, then the Address Translation table is empty, i.e., has zero entries.
ipAddrTable	Contains addressing information relevant to this entity's IP addresses.
ipRouteTable	This entity's IP Routing table.
ipNetToMediaTable	The IP Address Translation table used for mapping from IP addresses to physical addresses.
tcpConnTable	Contains TCP connection-specific information.
udpTable	Contains UDP listener information.
egpNeighTable	The EGP neighbor table.

MIB Constraints

There are no constraints on this MIB.

RMON-MIB

The RMON-MIB contains objects to remotely monitor devices in the network. This MIB was released as RFC 1757, *Remote Network Monitoring Management Information Base*.

The MODULE-IDENTITY for the RMON-MIB is rmon, and its top-level OID is 1.3.6.1.2.1.16 (iso.org.dod.internet.mgmt.mib-2.rmon).

Version: 200005110000Z

RMON-MIB Tables and Objects

Table 3-55 lists RMON-MIB Tables and Objects.

Table 3-55 RMON-MIB Tables and Objects

Object	Description
etherStatsTable	Contains a list of Ethernet statistics entries.
historyControlTable	Contains a list of history control entries.
etherHistoryTable	Contains a list of Ethernet history entries.
alarmTable	Contains a list of alarm entries.
hostControlTable	Contains a list of host table control entries.
hostTable	Contains a list of host entries.
hostTimeTable	Contains a list of time-ordered host table entries.
hostTopNControlTable	Contains a list of top N host control entries.
hostTopNTable	Contains a list of top N host entries.
matrixControlTable	Contains a list of information entries for the traffic matrix on each interface.
matrixSDTable	Contains a list of traffic matrix entries indexed by source and destination MAC address.
matrixDSTable	Contains a list of traffic matrix entries indexed by destination and source MAC address.
filterTable	Contains a list of packet filter entries.
channelTable	Contains a list of packet channel entries.
bufferControlTable	Contains a list of buffers control entries.
captureBufferTable	Contains a list of packets captured off of a channel.
eventTable	Contains a list of events to be generated.
logTable	Contains a list of events that have been logged.

MIB Constraints

There are no constraints on this MIB.

RMON2-MIB

The RMON2-MIB contains supplements to RMON-MIB and contains additional objects to remotely monitor devices in the network.

The MODULE-IDENTITY for the RMON2-MIB is rmon2, and its top-level OID is 1.3.6.1.2.1.16 (iso.org.dod.internet.mgmt.mib-2.rmon2).

Version: 9605270000Z

RMON2-MIB Tables and Objects

Table 3-56 lists RMON2-MIB Tables and Objects.

Table 3-56 RMON2-MIB Tables and Objects

Object	Description
protocolDirTable	Lists the protocols that this agent has the capability to decode and count. There is one entry in this table for each such protocol. These protocols represent different network layer, transport layer, and higher-layer protocols. The agent should boot up with this table preconfigured with those protocols that it knows about and wishes to monitor. Implementations are strongly encouraged to support protocols higher than the network layer (at least for the protocol distribution group), even for implementations that don't support the application layer groups.
protocolDistControlTable	Controls the setup of protocol type distribution statistics tables. Implementations are encouraged to add an entry per monitored interface upon initialization so that a default collection of protocol statistics is available. Rationale: This table controls collection of very basic statistics for any or all of the protocols detected on a given interface. An NMS can use this table to quickly determine bandwidth allocation utilized by different protocols. A media-specific statistics collection could also be configured (e.g. etherStats, trPStats) to easily obtain total frame, octet, and droppedEvents for the same interface.
protocolDistStatsTable	An entry is made in this table for every protocol in the protocolDirTable which has been seen in at least one packet. Counters are updated in this table for every protocol type that is encountered when parsing a packet, but no counters are updated for packets with MAC-layer errors. Note that if a protocolDirEntry is deleted, all associated entries in this table are removed.
addressMapControlTable	Controls the collection of network layer address to physical address to interface mappings. Note that this is not like the typical RMON controlTable and dataTable in which each entry creates its own data table. Each entry in this table enables the discovery of addresses on a new interface and the placement of address mappings into the central addressMapTable. Implementations are encouraged to add an entry per monitored interface upon initialization so that a default collection of address mappings is available.

Table 3-56 RMON2-MIB Tables and Objects (continued)

Object	Description
addressMapTable	Contains network layer address to physical address to interface mappings. The probe will add entries to this table based on the source MAC and network addresses seen in packets without MAC-level errors. The probe will populate this table for all protocols in the protocol directory table whose value of protocolDirAddressMapConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirAddressMapConfig value of supportedOff(2).
hlHostControlTable	Contains higher layer (i.e. non-MAC) host table control entries. These entries will enable the collection of the network and application level host tables indexed by network addresses. Both the network and application level host tables are controlled by this table is so that they will both be created and deleted at the same time, further increasing the ease with which they can be implemented as a single datastore (note that if an implementation stores application layer host records in memory, it can derive network layer host records from them). Entries in the nlHostTable will be created on behalf of each entry in this table. Additionally, if this probe implements the alHostTable, entries in the alHostTable will be created on behalf of each entry in this table. Implementations are encouraged to add an entry per monitored interface upon initialization so that a default collection of host statistics is available.
nlHostTable	A collection of statistics for a particular network layer address that has been discovered on an interface of this device. The probe will populate this table for all network layer protocols in the protocol directory table whose value of protocolDirHostConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirHostConfig value of supportedOff(2). The probe will add to this table all addresses seen as the source or destination address in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors.

Table 3-56 RMON2-MIB Tables and Objects (continued)

Object	Description
hlMatrixControlTable	Contains higher layer (i.e. non-MAC) matrix control entries. These entries will enable the collection of the network and application level matrix tables containing conversation statistics indexed by pairs of network addresses. Both the network and application level matrix tables are controlled by this table is so that they will both be created and deleted at the same time, further increasing the ease with which they can be implemented as a single datastore (note that if an implementation stores application layer matrix records in memory, it can derive network layer matrix records from them). Entries in the nlMatrixSDTable and nlMatrixDSTable will be created on behalf of each entry in this table. Additionally, if this probe implements the alMatrix tables, entries in the alMatrix tables will be created on behalf of each entry in this table.
nlMatrixSDTable	Contains traffic matrix entries which collect statistics for conversations between two network-level addresses. This table is indexed first by the source address and then by the destination address to make it convenient to collect all conversations from a particular address. The probe will populate this table for all network layer protocols in the protocol directory table whose value of protocolDirMatrixConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirMatrixConfig value of supportedOff(2). The probe will add to this table all pairs of addresses seen in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors. Further, this table will only contain entries that have a corresponding entry in the nlMatrixDSTable with the same source address and destination address.
nlMatrixDSTable	Contains traffic matrix entries which collect statistics for conversations between two network-level addresses. This table is indexed first by the destination address and then by the source address to make it convenient to collect all conversations to a particular address. The probe will populate this table for all network layer protocols in the protocol directory table whose value of protocolDirMatrixConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirMatrixConfig value of supportedOff(2). The probe will add to this table all pairs of addresses seen in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors. Further, this table will only contain entries that have a corresponding entry in the nlMatrixSDTable with the same source address and destination address.

Table 3-56 RMON2-MIB Tables and Objects (continued)

Object	Description
nlMatrixTopNControlTable	Contains a set of parameters that control the creation of a report of the top N matrix entries according to a selected metric.
nlMatrixTopNTable	Contains a set of statistics for those network layer matrix entries that have counted the highest number of octets or packets.
alHostTable	Contains a collection of statistics for a particular protocol from a particular network address that has been discovered on an interface of this device. The probe will populate this table for all protocols in the protocol directory table whose value of protocolDirHostConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirHostConfig value of supportedOff(2). The probe will add to this table all addresses seen as the source or destination address in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors. Further, entries will only be added to this table if their address exists in the nlHostTable and will be deleted from this table if their address is deleted from the nlHostTable.
alMatrixSDTable	Contains a list of application traffic matrix entries which collect statistics for conversations of a particular protocol between two network-level addresses. This table is indexed first by the source address and then by the destination address to make it convenient to collect all statistics from a particular address. The probe will populate this table for all protocols in the protocol directory table whose value of protocolDirMatrixConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirMatrixConfig value of supportedOff(2). The probe will add to this table all pairs of addresses for all protocols seen in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors. Further, entries will only be added to this table if their address pair exists in the nlMatrixSDTable and will be deleted from this table if the address pair is deleted from the nlMatrixSDTable.

Table 3-56 RMON2-MIB Tables and Objects (continued)

Object	Description
alMatrixDSTable	Contains application traffic matrix entries which collect statistics for conversations of a particular protocol between two network-level addresses. This table is indexed first by the destination address and then by the source address to make it convenient to collect all statistics to a particular address. The probe will populate this table for all protocols in the protocol directory table whose value of protocolDirMatrixConfig is equal to supportedOn(3), and will delete any entries whose protocolDirEntry is deleted or has a protocolDirMatrixConfig value of supportedOff(2). The probe will add to this table all pairs of addresses for all protocols seen in all packets with no MAC errors, and will increment octet and packet counts in the table for all packets with no MAC errors. Further, entries will only be added to this table if their address pair exists in the nlMatrixDSTable and will be deleted from this table if the address pair is deleted from the nlMatrixDSTable.
alMatrixTopNControlTable	Contains a set of parameters that control the creation of a report of the top N matrix entries according to a selected metric.
alMatrixTopNTable	Contains a set of statistics for those application layer matrix entries that have counted the highest number of octets or packets.
usrHistoryControlTable	Contains a list of data-collection configuration entries.
usrHistoryObjectTable	Contains a list of data-collection configuration entries.
usrHistoryTable	Contains a list of user defined history entries.
serialConfigTable	Contains serial interface configuration entries. This data will be stored in non-volatile memory and preserved across probe resets or power loss.
netConfigTable	Contains netConfigEntries.
trapDestTable	Contains trap destination entries.
serialConnectionTable	Contains serialConnectionEntries.
etherStats2Table	Contains the RMON-2 augmentations to RMON-1.
historyControl2Table	Contains the RMON-2 augmentations to RMON-1.
hostControl2Table	Contains the RMON-2 augmentations to RMON-1.
matrixControl2Table	Contains the RMON-2 augmentations to RMON-1.
channel2Table	Contains the RMON-2 augmentations to RMON-1.
tokenRingMLStats2Table	Contains the RMON-2 augmentations to RMON-1.
tokenRingPStats2Table	Contains the RMON-2 augmentations to RMON-1.
ringStationControl2Table	Contains the RMON-2 augmentations to RMON-1.

Table 3-56 RMON2-MIB Tables and Objects (continued)

Object	Description
sourceRoutingStats2Table	Contains the RMON-2 augmentations to RMON-1.
filter2Table	Provides a variable-length packet filter feature to the RMON-1 filter table.

MIB Constraints

There are no constraints on this MIB.

SNMP-FRAMEWORK-MIB

The SNMP-FRAMEWORK-MIB contains objects that describe the SNMP management architecture. This MIB was released as RFC 2571, *An Architecture for Describing SNMP Management Frameworks*.

The MODULE-IDENTITY for the SNMP-FRAMEWORK-MIB is snmpFrameworkMIB, and its top-level OID is 1.3.6.1.6.3.10 (iso.org.dod.internet.snmpv2.snmpModules.snmpFrameworkMIB).

Version: 200210140000Z

SNMP-FRAMEWORK-MIB Tables and Objects

Table 3-57 lists SNMP-FRAMEWORK-MIB Tables and Objects.

Table 3-57 SNMP-FRAMEWORK-MIB Tables and Objects

Object	Description
snmpEngineID	An SNMP engine's administratively-unique identifier. This information SHOULD be stored in non-volatile storage so that it remains constant across re-initializations of the SNMP engine.
snmpEngineBoots	The number of times that the SNMP engine has (re-)initialized itself since snmpEngineID was last configured.
snmpEngineTime	The number of seconds since the value of the snmpEngineBoots object last changed. When incrementing this object's value would cause it to exceed its maximum, snmpEngineBoots is incremented as if a re-initialization had occurred, and this object's value consequently reverts to zero.
snmpEngineMaxMessageSize	The maximum length in octets of an SNMP message which this SNMP engine can send or receive and process, determined as the minimum of the maximum message size values supported among all of the transports available to and supported by the engine.

MIB Constraints

There are no constraints on this MIB.

SNMP-TARGET-MIB

The SNMP-TARGET-MIB contains objects to remotely configure the parameters used by an entity to generate SNMP notifications. The MIB defines the addresses of entities to send SNMP notifications to, and contains a list of tag values that are used to filter the notifications sent to these entities (see the SNMP-NOTIFICATION-MIB). This MIB was defined as part of RFC 2573, *SNMP Applications*.

The MODULE-IDENTITY for the SNMP-TARGET-MIB is snmpTargetMIB, and its top-level OID is 1.3.6.1.6.3.12 (iso.org.dod.internet.snmpv2.snmpModules.snmpTargetMIB).

Version: 9808040000Z

SNMP-TARGET-MIB Tables and Objects

Table 3-58 lists SNMP-TARGET-MIB Tables and Objects.

Table 3-58 SNMP-TARGET-MIB Tables and Objects

Object	Description
snmpTargetAddrTable	A table of transport addresses to be used in the generation of SNMP messages.
snmpTargetParamsTable	A table of SNMP target information to be used in the generation of SNMP messages.

MIB Constraints

There are no constraints on this MIB.

SNMPv2-MIB

The SNMPv2-MIB contains objects to manage SNMPv2 entities on the router. This MIB was released as RFC 1907,Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2).

The MODULE-IDENTITY for the SNMPv2-MIB is snmpMIB, and its top-level OIDs are 1.3.6.1.6.3.1 (iso.org.dod.internet.snmpv2.snmpModules.snmpMIB) and 1.3.6.1.2.1.1 (iso.org.dod.internet.mgmt.mib-2.system).

Version: 200210160000Z

SNMPv2-MIB Tables and Objects

Table 3-59 lists SNMPv2-MIB Tables and Objects.

Table 3-59 SNMPv2-MIB Tables and Objects

Object	Description
sysORTable	The (conceptual) table listing the capabilities of the local SNMP application acting as a command responder with respect to various MIB modules. SNMP entities having dynamically-configurable support of MIB modules will have a dynamically-varying number of conceptual rows.

MIB Constraints

There are no constraints on this MIB.

SNMPv2-SMI

The SNMPv2-SMI is based on RFC1902 and describes the management information structure for Simple Network Management Protocol version 2 (SNMPv2).

MIB Constraints

There are no constraints on this MIB.

SNMPv2-TC-MIB

The SNMPv2-TC-MIB represents textual information taken from the NVT ASCII character set, as defined in RFC 854.

MIB Constraints

There are no constraints on this MIB.

TCP-MIB

The TCP-MIB contains objects to manage the Transmission Control Protocol (TCP) on the router. This MIB was derived from RFC 2012, SNMPv2 Management Information Base for the Transmission Control Protocol Using SMIv2.

The MODULE-IDENTITY for the TCP-MIB is tcpMIB, and its top-level OIDs are 1.3.6.1.2.1.49 (iso.org.dod.internet.mgmt.mib-2.tcpMIB) and 1.3.6.1.2.1.6 (iso.org.dod.internet.mgmt.mib-2.tcp).

Version: 200502180000Z

TCP-MIB Tables and Objects

Table 3-60 lists TCP-MIB Tables and Objects.

Table 3-60 TCP-MIB Tables and Objects

Object	Description
tcpConnectionTable	Contains information about existing TCP connections. Note that unlike earlier TCP MIBs, there is a separate table for connections in the LISTEN state.
tcpListenerTable	Contains information about TCP listeners. A listening application can be represented in three possible ways: 1. An application that is willing to accept both IPv4 and IPv6 datagrams is represented by a tcpListenerLocalAddressType of unknown (0) and a tcpListenerLocalAddress of ''h (a zero-length octet-string). 2. An application that is willing to accept only IPv4 or IPv6 datagrams is represented by a tcpListenerLocalAddressType of the appropriate address type and a tcpListenerLocalAddress of '0.0.0.0' or '::' respectively. 3. An application that is listening for data destined only to a specific IP address, but from any remote system, is represented by a tcpListenerLocalAddressType of an appropriate address type, with tcpListenerLocalAddress as the specific local address. NOTE: The address type in this table represents the address type used for the communication, irrespective of the higher-layer abstraction. For example, an application using IPv6 'sockets' to communicate via IPv4 between ::ffff:10.0.0.1 and ::ffff:10.0.0.2 would use InetAddressType ipv4(1)).
tcpConnTable	Contains information about existing IPv4-specific TCP connections or listeners. This table has been deprecated in favor of the version neutral tcpConnectionTable.

MIB Constraints

There are no constraints on this MIB.

UDP-MIB

The UDP-MIB contains objects to manage the User Datagram Protocol (UDP) on the router. This MIB was released as RFC 2013, SNMPv2 Management Information Base for the User Datagram Protocol Using SMIv2.

The MODULE-IDENTITY for the UDP-MIB is udpMIB, and its top-level OIDs are 1.3.6.1.2.1.50 (iso.org.dod.internet.mgmt.mib-2.udpMIB) and 1.3.6.1.2.1.7 (iso.org.dod.internet.mgmt.mib-2.udp).

Version: 200505200000Z

UDP-MIB Tables and Objects

Table 3-61 lists UDP-MIB Tables and Objects.

Table 3-61 UDP-MIB Tables and Objects

Object	Description
udpEndpointTable	Contains information about this entity's UDP endpoints on which a local application is currently accepting or sending datagrams. The address type in this table represents the address type used for the communication, irrespective of the higher-layer abstraction. For example, an application using IPv6 'sockets' to communicate via IPv4 between ::ffff:10.0.0.1 and ::ffff:10.0.0.2 would use InetAddressType ipv4(1). Unlike the udpTable in RFC 2013, this table also allows the representation of an application that completely specifies both local and remote addresses and ports. A listening application is represented in three possible ways: 1) An application that is willing to accept both IPv4 and IPv6 datagrams is represented by a udpEndpointLocalAddressType of unknown(0) and a udpEndpointLocalAddress of ''h (a zero-length octet-string). 2) An application that is willing to accept only IPv4 or only IPv6 datagrams is represented by a udpEndpointLocalAddressType of the appropriate address type and a udpEndpointLocalAddress of '0.0.0.0' or '::' respectively. 3) An application that is listening for datagrams only for a specific IP address but from any remote system is represented by a udpEndpointLocalAddressType of the appropriate address type, with udpEndpointLocalAddress specifying the local address. In all cases where the remote is a wildcard, the udpEndpointRemoteAddressType is unknown(0), the udpEndpointRemoteAddress is ''h (a zero-length octet-string), and the udpEndpointRemotePort is 0. If the operating system is demultiplexing UDP packets by remote address and port, or if the application has 'connected' the socket specifying a default remote address and port, the udpEndpointRemote* values should be used to reflect this.
udpTable	Contains IPv4-specific UDP listener information. It contains information about all local IPv4 UDP end-points on which an application is currently accepting datagrams.

MIB Constraints

There are no constraints on this MIB.

Using MIBs

This chapter describes the objects and MIBs that are needed to use Simple Network Management Protocol (SNMP) requests to perform the following tasks on Cisco ASR 901 and ASR 901S routers.

- Tips and Guidelines, page 4-1
- Obtaining Basic Information About the Router, page 4-2
- Managing Physical Components, page 4-5
- Generating SNMP Traps, page 4-6
- Monitoring SYSLOG Messages, page 4-8

Tips and Guidelines

When using SNMP to manage Cisco ASR 901 and ASR 901S routers, be aware of the following points.

IF-MIB Caching

The Cisco ASR 901 or ASR 901S router implements a cache to allow continuous polling of the ifTable interface counters, without creating spikes in the CPU usage. An SNMP request for these counters returns the values that were last stored in the counter cache memory, instead of returning the current run-time value of these counters.

The ifTable counter cache is updated approximately every 10 seconds, which means that if you read the ifTable interface counters more quickly than every 10 seconds, the SNMP request might not return new values. The run-time counters do continue to increment, however, to account for the actual traffic occurring on the interfaces, and another SNMP request in 10 seconds does show the new values.

SNMP-Based and CLI-Based Counters

The SNMP specifications do not allow most SNMP-based counters to be cleared, except at system initialization. Instead, during normal operations the counters continue incrementing until they reach their maximum value, at which point they wrap around to zero and continue incrementing again.

This behavior requires the following considerations when managing the router using SNMP commands:

- 32-bit counters—A 32-bit counter wraps around to zero after reaching approximately 4.2 billion. On a busy router, this means that byte and packet counters could wrap around after only a few days. To ensure that you are maintaining the correct counts for packets and other objects, regularly poll the

desired counters and always save the previous values. Subtract the previous value from the current value, and if the difference between the two counters becomes negative, it indicates that the counters have wrapped.

To accurately total the counters over a period of several weeks or months, you might also need to keep track of the number of times that the counter wraps during this time period. You should poll the counters often enough so that they do not wrap around to zero more than once without being detected.

Tip Some SNMPv3 MIBs are beginning to include 64-bit counters, as well as 32-bit counters, for many of the same objects. If given a choice, use the 64-bit counters, because they typically will not wrap around to zero for months or years, if ever.

- Counting from a specified event or time period—SNMP-based counters begin incrementing from zero when the router is powered on, and continue incrementing until they wrap. To track the number of packets or other objects from a particular event, you must save the value of the counters at the time of the event. Then when you want to obtain a new packet count, compare the current value of the counters with the saved value.
- Comparison with command-line interpreter (CLI) values—Many **show** commands have a corresponding **clear** command that resets the counters to zero. The **clear** command, however, affects only the counters that are displayed by the CLI, not the SNMP-based counters. In addition, many CLI-based counters automatically reset whenever a certain function, such as resetting an interface, is performed. This means that the counters displayed using CLI commands are not usually the same as the counters displayed by SNMP commands. Be aware of these differences when comparing the CLI-based and SNMP-based counters.

Obtaining Basic Information About the Router

Basic information about the Cisco ASR 901 and ASR 901S routers can be obtained from objects in the following MIBs:

- OLD-CISCO-CHASSIS-MIB, page 4-2
- SNMPv2-MIB, page 4-3
- ENTITY-MIB, page 4-3

OLD-CISCO-CHASSIS-MIB

The following object in the OLD-CISCO-CHASSIS-MIB provides a convenient location to store the chassis serial number for the router, so that it can be easily retrieved when calling Cisco Technical Support:

- chassisId—Provides the serial number or ID number for the chassis, as defined by the **snmp-server chassis-id** command, which is typically used to identify the service contract and levels of service that you have purchased from Cisco Technical Support. This object defaults to the empty string, so you must use the **snmp-server chassis-id** command to set the value of this object before you can retrieve it.

```
csh% getmany -v2c 10.10.11.12 public chassisId

chassisId.0 = TBA06500113
```

SNMPv2-MIB

The following objects in the SNMPv2-MIB provide basic information about the router, its software, and other run-time information:

- sysDescr—Provides an overall description of the router, including its model number and the version of Cisco IOS software that it is running. For example:

```
csh% getmany -v2c 10.10.11.12 public sysDescr

Cisco IOS Software, 901 Software (ASR901-UNIVERSALK9-M), Version 15.1(2)SNG, RELEASE
SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2011 by Cisco Systems, Inc.
Compiled Wed 05-Oct-11 00:23 by prod_rel_team
```

- sysObjectID—Provides the specific model number, as it is defined in the CISCO-PRODUCTS-MIB. For example:

```
csh% getmany -v2c 10.10.11.12 public sysObjectId

sysObjectID.0 = ciscoProducts.ciscoASR901
```

- sysName—Provides the host name for the router, as assigned by the **hostname** command. For example:

```
csh% getmany -v2c 10.10.11.12 public sysName

sysName.0 = ASR901-Router
```

- sysUpTime—Provides the time, in hundredths of a second, since the router was last initialized. For example:

```
csh% getmany -v2c 10.10.11.12 public sysUpTime

sysUpTime.0 = 138389875
```

- sysContact—Provides the name, phone number, or other identifying information for the person or department responsible for this router, as it was entered using the **snmp-server contact** command. For example:

```
csh% getmany -v2c 10.10.11.12 public sysContact

sysContact.0 = IT Support at 408-555-1212 or epage it-support
```

- sysLocation—Provides a description of the router's location, as it was entered using the **snmp-server location** command. For example:

```
csh% getmany -v2c 10.10.11.12 public sysLocation
```

ENTITY-MIB

The following objects in the ENTITY-MIB provide basic information about the router's hardware:

- entPhysicalDescr—Provides a description of each hardware component in the router. For example, the following is a typical description for the Cisco ASR 901 chassis:

```
csh% getnext -v2c 10.10.11.12 public entPhysicalDescr

entPhysicalDescr.1 = ASR901 chassis, Hw Serial#: 65100, Hw Revision: A
```

- entPhysicalHardwareRev—Provides the hardware revision of each component, if present and supported for that particular component. For example:

```
csh% getnext -v2c 10.10.11.12 public entPhysicalHardwareRev

entPhysicalHardwareRev.1 = 1.1
```

- entPhysicalSerialNum—Provides the serial number for each component, if present and supported for that particular component. For example:

```
csh% getnext -v2c 10.10.11.12 public entPhysicalSerialNum

entPhysicalSerialNum.1 = TBC06481339
```

- entPhysicalModelName—Provides the model name for each component, if present and supported for that particular component. For example:

```
csh% getnext -v2c 10.10.11.12 public entPhysicalModelName

entPhysicalModelName.1 = ASR901
```

Tip Also see the next section for more information about the ENTITY-MIB and how to use it.

Cisco Unique Device Identifier Support

The ENTITY-MIB supports the Cisco compliance effort for a Cisco unique device identifier (UDI) standard, which is stored in IDPROM. The Cisco UDI provides a unique identity for every Cisco product. The UDI is composed of three separate data elements that must be stored in the entPhysicalTable:

- Orderable product identifier—Product Identifier (PID) is the alphanumeric identifier used by customers to order Cisco products. Two examples include NM-1FE-TX and CISCO3745. PID is limited to 18 characters and must be stored in the entPhysicalModelName object.
- Version identifier—Version Identifier (VID) is the version of the PID. The VID indicates the number of times a product has versioned in ways that are reported to a customer. For example, the product identifier NM-1FE-TX may have a VID of V04. VID is limited to three alphanumeric characters and must be stored in the entPhysicalHardwareRev object.
- Serial number—Serial number (SN) is the 11-character identifier used to identify a specific part within a product and must be stored in the entPhysicalSerialNum object. Serial number content is defined by manufacturing part number 7018060-0000.

Serial number format is defined in four fields:

  - Location (L)
  - Year (Y)
  - Workweek (W)
  - Sequential serial ID (S)

The SN label is represented as: LLLYYWWSSS.

Note The VID returns NULL for those old or existing cards with IDPROMs that do not have the VID field. Therefore, corresponding entPhysicalHardwareRev returns NULL for cards that do not have the VID field in IDPROM.

Managing Physical Components

The Cisco ASR 901 and ASR 901S routers support a number of MIBs to manage the physical components of the routers. These MIBs provide the following functions:

- Organizes the physical entities in the chassis into a containment tree that describes the relationship of each entity to all other entities
- Maps physical ports to their respective interfaces
- Provides asset information for asset tagging
- Provides firmware and software information for chassis components

See the following sections for a description of each MIB, as well as instructions on how to use the MIBs to track the components in the router:

- Managing Physical Components using ENTITY-MIB, page 4-5
- Cisco-Specific MIBS, page 4-6
- Performing Inventory Management, page 4-6

Tip To retrieve the chassis serial number for the router, retrieve the chassisId object from the OLD-CISCO-CHASSIS-MIB. This object defaults to the empty string, so you must use the **snmp-server chassis-id** command to set the value of this object before you can retrieve it.

Managing Physical Components using ENTITY-MIB

The Cisco ASR 901 and ASR 901S routers use the ENTITY-MIB, which is defined as the standard RFC 2737, to manage its physical components, which are known as entities. An entity could be a port on a card, a slot in the chassis, or any other equipment that is installed in the router.

The ENTITY-MIB defines a set of objects that uniquely identify each entity in the router, using a hierarchical containment tree that shows how each entity relates to each other. Other MIBs can then use the objects defined by the ENTITY-MIB to provide additional information about each entity.

The following are the most important objects in the ENTITY-MIB for the management of physical entities on the router:

- entPhysicalTable—Describes each physical component (entity) in the router. The table contains a row entry for the top-most entity (the chassis) and then for each entity in the chassis. Each entry provides the name and description of the entry, its type and vendor, and a description of how the entity fits into the containment tree.
- entPhysicalIndex—Uniquely identifies each entry. This value is guaranteed to be unique across all equipment in this chassis and across all MIBs, allowing you to correlate the data from several MIBs for any particular entity.
- entAliasMappingTable—Maps each physical port's entPhysicalIndex value to the corresponding ifIndex value in the ifTable in the IF-MIB. This provides a quick way of identifying a particular port with a particular interface.
- entPhysicalContainsTable—For each physical entity, lists the entPhysicalIndex value for any child objects of the entity. This provides an easy way of creating the container tree for the router, which shows the relationship between physical entities in the chassis.

Cisco-Specific MIBS

In addition to the ENTITY-MIB, the Cisco ASR router uses the following MIBs to provide additional information about the physical components that are installed in the router:

- CISCO-ENTITY-VENDORTYPE-OID-MIB—Contains the object identifiers (OIDs) for all physical entities in the router.
- CISCO-ENVMON-MIB—Contains information about the status of environmental sensors (for voltage, temperature, fans, and power supplies). For example, this MIB reports the chassis core and inlet temperatures.

Performing Inventory Management

The ENTITY-MIB provides all of the information needed to collect an inventory of the physical components in the router.

To collect and organize the information in the ENTITY-MIB, use the following procedure.

Step 1 Collect the list of physical entities by displaying all of the entPhysicalDescr objects.

Step 2 Obtain additional information about each entPhysicalDescr object by collecting the entPhysicalVendorType, entPhysicalName, and entPhysicalClass objects. Use the index value to match the objects with their corresponding entPhysicalDescr object.

Step 3 To create the containment tree for the router, collect the EntPhysicalContainedIn object for each entPhysicalDescr object. The value in EntPhysicalContainedIn is the index number for the parent (or "container") for the corresponding entPhysicalDescr device.

Step 4 (Optional) If a parent object contains multiple children that are the same type of object, use the entPhysicalParentRelPos objects to organize the child objects into their proper order. The entPhysicalParentRelPos objects contain an integer that shows the sequential order of the child objects. This integer typically starts incrementing from 0, so that it matches the actual numbering of the physical objects (slot 0 has an entPhysicalParentRelPos value of 0, slot 1 has an entPhysicalParentRelPos value of 1, and so forth).

Note If entPhysicalParentRelPos contains –1, then the object does not have an identifiable relationship with the other objects.

Generating SNMP Traps

This section describes how to configure the Cisco ASR 901 and ASR 901S routers to generate SNMP traps when certain events or conditions occur on the router. To use SNMP commands to configure the router to generate SNMP traps, you must define at least one target host to receive the traps, using the following procedure:

Step 1 Create an entry in the snmpTargetAddrTable, which is defined in SNMP-TARGET-MIB, for each host that is to receive traps. Each entry contains the following objects:

- snmpTargetAddrName—Unique string, up to 32 characters long, that identifies this host.
- snmpTargetAddrTDomain—The TCP/IP transport service to be used when delivering traps to this host, typically snmpUDPDomain.
- snmpTargetAddrTAddress—The transport address for the host, typically a six-octet value that is composed of the host's four-byte IP address followed by the two-byte UDP port number to which the traps should be sent.
- snmpTargetAddrTimeout—Maximum period of time, in hundredths of a second, that the Cisco ASR 901 or ASR 901S router waits for a response from the host (if any). The default is 1500 (15 seconds).
- snmpTargetAddrRetryCount—Default number of times that the Cisco ASR 901 or ASR 901S router resends a trap if a response is not received within the timeout period. The default value is 3 retries.
- snmpTargetAddrTagList—List of tags (defined below) that should be associated with this particular target host. If a host's tag value matches an snmpNotifyTag value, the host receives the types of notifications that are defined by the corresponding snmpNotifyType.
- snmpTargetAddrParams—Arbitrary string, up to 32 characters long, that identifies an entry in the snmpTargetParamsTable, which defines the parameters to be used in generating traps.
- snmpTargetAddrStorageType—Type of storage to be used for this row entry: volatile(2), nonVolatile(3), permanent(4), or readOnly(5). The default is nonVolatile(4).
- snmpTargetAddrRowStatus—Must be set to createAndGo(4) or createAndWait(5) to create this row entry. This object must be set only after all of the other entries in the row have been set.

Step 2 Create an entry in the snmpTargetParamsTable, which is defined in SNMP-TARGET-MIB, to define the SNMP parameters that the router should use when generating SNMP notifications. Each entry contains the following objects:

- snmpTargetParamsName—Unique string, up to 32 characters long, that defines this particular entry. This string is also used in the snmpTargetAddrParams to define the parameters to be used when sending traps to any particular host.
- snmpTargetParamsMPModel—Version of SNMP to be used in sending this trap: 0=SNMPv1, 1=SNMPv2c, and 3=SNMPv3.
- snmpTargetParamsSecurityModel—Version of SNMP security to be used in sending traps: 0=SNMPv1, 1=SNMPv2c, and 3=SNMPv3.
- snmpTargetParamsSecurityName—String, up to 32 characters long, to be used in identifying the Cisco ASR 901 or ASR 901S router when sending traps.
- snmpTargetParamsSecurityLevel—Type of security to be used when sending traps: noAuthNoPriv(1), authNoPriv(2), and authPriv(3).
- snmpTargetParamsStorageType—Type of storage to be used for this row entry: volatile(2), nonVolatile(3), permanent(4), or readOnly(5). The default is nonVolatile(4).
- snmpTargetParamsRowStatus—Must be set to createAndGo(4) or createAndWait(5) to create this row entry. This object must be set only after all of the other entries in the row have been set.

A number of notifications and traps can also be enabled using CLI commands. Table 4-1 lists some of the most common traps, how they can be enabled through the CLI, and the situations that generate these traps.

Table 4-1 Common Notifications and Traps

Type of Trap	Configuration Command to Enable	Description
Configuration Changes	`snmp-server enable traps entity`	When ENTITY traps are enabled, the router generates an entConfigChange trap when the information in any of the following tables in the ENTITY-MIB changes: • entPhysicalTable • entAliasMappingTable • entPhysicalContainsTable **Note** The SNMP manager should also regularly poll the entLastChangeTime object to detect whether traps were missed due to throttling or transmission loss.
Environmental Changes	`snmp-server enable traps envmon`	When ENVMON traps are enabled, the router generates the following traps (defined in CISCO-ENVMON-MIB) to notify you of potential environmental problems: • ciscoEnvMonShutdownNotification—Sent when the router is about to shut down. • ciscoEnvMonTemperatureNotification—Sent when a temperature is outside its normal range. • ciscoEnvMonFanNotification—Sent when a fan fails. • ciscoEnvMonRedundantSupplyNotification—Sent when a redundant Power Entry Module fails.
Alarm is Asserted or Cleared	`snmp-server enable traps alarms`	When ALARM traps are enabled, the router generates a trap whenever an alarm is asserted or cleared for physical entities that are defined in the entPhysicalTable in the ENTITY-MIB.
SYSLOG Message is Generated	`snmp-server enable traps syslog`	By default, the Cisco ASR 901 or ASR 901S router logs a SYSLOG message each time an alarm is asserted or cleared. To also generate a separate trap when any SYSLOG message is logged, set the clogNotificationsEnabled object to true(1). Set the clogMaxSeverity object in CISCO-SYSLOG-MIB to the maximum severity level for the SYSLOG messages that are to be stored in the CISCO-SYSLOG-MIB and for which notifications should generated. The default is 5 (warning), which indicates that SYSLOG messages of severity levels 1 through 5 are processed by the MIB.

Monitoring SYSLOG Messages

The CISCO-SYSLOG-MIB defines a number of objects that store the SYSLOG messages that the Cisco ASR 901 or ASR 901S router generates during its normal operations. You can regularly poll this MIB to obtain the list of SYSLOG messages that have been generated.

Message Table Objects

When enabled, SYSLOG messages are stored as an entry in the clogHistoryTable. Each clogHistoryEntry contains the following objects for each message that is stored:

- clogHistIndex—Index number that uniquely identifies each SYSLOG message that is stored in the table. This index is a 32-bit value that continually increases until it reaches its maximum value, at which point it wraps around back to 1.
- clogHistFacility—Facility identifier, up to 20 characters, of the SYSLOG message.
- clogHistSeverity—Severity level of the SYSLOG message, as defined by the SyslogSeverity textual convention, which ranges from 1 (emergency) to 8 (debug).

Note The severity numbers used in the SyslogSeverity and clogHistSeverity objects are one more than the numbers used in the actual SYSLOG messages. For example, an error SYSLOG message has a severity of 3, but SyslogSeverity uses 4 for error messages.

- clogHistMsgName—Mnemonic that identifies this SYSLOG message, up to 30 characters. If the mnemonic is longer than 30 characters, it is truncated to 29 characters and an asterisk (*) is appended to the end of the message to indicate that it has been truncated.
- clogHistMsgText—Actual text of the SYSLOG message, up to 255 characters, as it would appear in the console and SYSLOG logs. If a message is longer than 255 characters, it is truncated to 254 characters and an asterisk (*) is appended to the end of the message to indicate it has been truncated.
- clogHistTimestamp—Time stamp, in terms of sysUpTime, for when the SYSLOG message was generated.

Control Objects

The following objects in the CISCO-SYSLOG-MIB control the number and type of messages that are stored in the clogHistoryTable:

- clogMaxSeverity—Maximum severity level for the SYSLOG messages that are processed by this MIB. The default is 5 (warning), which indicates that SYSLOG messages of severity levels 1 through 5 are processed by the MIB.
- clogMsgIgnores—Number of SYSLOG messages that were ignored because it had a severity level greater than that specified by the clogMaxSeverity.
- clogMsgDrops—Number of SYSLOG messages that were dropped and not stored in the clogHistoryTable because of a lack of resources.
- clogHistTableMaxLength—Maximum number of SYSLOG messages that can be stored in the clogHistoryTable. When the table is full, the oldest message in the table is deleted to make room when a new SYSLOG message is generated. The valid range is 0 to 500, with a default of 1.
- clogHistMsgsFlushed—Number of entries that have been removed from the clogHistoryTable to make room for new entries. If this object is continually increasing, it indicates that you either need to increase the size of the table (clogHistTableMaxLength) or need to poll the table more frequently.

SYSLOG Notifications

You can configure the Cisco ASR 901 or ASR 901S router so that it generates an SNMP notification when a SYSLOG message is generated. The notification sends an clogMessageGenerated object, which contains the following objects that identify the SYSLOG message:

- clogHistFacility
- clogHistSeverity
- clogHistMsgName
- clogHistMsgText
- clogHistTimestamp

To enable SYSLOG notifications using CLI commands, give the following command in global configuration mode:

```
snmp-server enable traps syslog
```

To enable these notifications using SNMP commands, set the clogNotificationsEnabled object to true(1). The clogNotificationsSent object then contains the number of clogMessageGenerated notifications that have been sent.

Example

The following example shows typical output from the CISCO-SYSLOG-MIB when using the SNMP utilities that are standard on many UNIX-based systems. This router uses the default configuration, where only one SYSLOG message is stored in the clogHistoryTable. The table currently contains an entry with the index of 25, and clogHistMsgsFlushed shows that the 24 previous messages have already been flushed from the table.

```
csh% getmany -v2c 10.10.11.12 public ciscoSyslogMIB
```

B

Bandwidth The difference between the highest and lowest frequencies available for network signals. The term is also used to describe the rated throughput capacity of a given network medium or protocol.

C

CLI Command-Line Interface

Community name Defines an access environment for a group of NMSs. NMSs within the community are said to exist within the same administrative domain. Community names serve as a weak form of authentication because devices that do not know the proper community name are precluded from SNMP operations.

D

DS0 Digital signal level 0. Framing specification used in transmitting digital signals at 64 Kbps. Twenty-four DS0s equal one DS1.

DS1 Digital signal level 1. Framing specification used in transmitting digital signals at 1.544 Mbps on a T1 facility.

DS3 Digital signal level 3. Framing specification used for transmitting digital signals at 44.736 Mbps on a T3 facility.

E

EMS Element Management System. An EMS manages a specific portion of the network. For example the SunNet Manager, an SNMP management application, is used to manage SNMP manageable elements. Element Managers may manage asynchronous lines, multiplexers, PABXs, proprietary systems or an application.

F

Forwarding Process of sending a frame toward its ultimate destination by way of an internetworking device.

Frame Logical grouping of information sent as a data link layer unit over a transmission medium. Often refers to the header and trailer, used for synchronization and error control, that surround the user data contained in the unit. The terms cell, datagram, message, packet, and segment are also used to describe logical information groupings at various layers of the OSI reference model and in various technology circles.

G

Gb gigabit

GBIC Gigabit Interface Converter —An optical transceiver (transmitter and receiver) housed in a small (30 mm x 65 mm), hot-pluggable, subenclosure. A GBIC converts electric currents (digital highs and lows) to optical signals and optical signals to digital electric currents.

Gbps gigabits per second

GB gigabyte

10GE 10 Gigabit per second Ethernet

I

Informs Reliable messages, which are stored in memory until the SNMP manager issues a response. Informs use more system resources than traps.

ifIndex Each row of the interfaces table has an associated number, called an ifIndex. You use the ifIndex number to get a specific instance of an interfaces group object. For example, ifInNUcastPkts.1 would find you the number of broadcast packets received on interface number one. You can then find the description of interface number one by looking at the object which holds the interface description (from MIB-II) ifDescr.

Integer A numeric value that can be an actual number. For example, the number of lost IP packets on an interface. It also can be a number that represents a nonnumeric value. For example, the variable tsLineType returns the type of terminal services line to the SNMP manager.

Interface counters Interface management over SNMP is based on two tables: ifTable and its extension, ifXTable described in RFC1213/RFC2233. Interfaces can have several layers, depending on the media, and each sub-layer is represented by a separate row in the table. The relationship between the higher layer and lower layers is described in the ifStackTable.

The ifTable defines 32-bit counters for inbound and outbound octets (ifInOctets / ifOutOctets), packets (ifInUcastPkts / ifOutUcastPkts, ifInNUcastPkts / ifOutNUcastPkts), errors, and discards.

The ifXTable provides similar 64-bit counters, also called high capacity (HC) counters: ifHCInOctets / ifHCOutOctets, and ifHCInUcastPkts / ifHCOutUcastPkts.

IP Address The variable hostConfigAddr indicates the IP address of the host that provided the host configuration file for a device.

K

Keepalive message Message sent by one network device to inform another network device that the virtual circuit between the two is still active.

L

Label A short, fixed-length identifier that is used to determine the forwarding of a packet.

LDP Label Distribution Protocol.

LSR Label Switching Router. A device that forwards MPLS packets based on the value of a fixed-length label encapsulated in each packet.

LSP Label Switched Path.

M

Major alarm severity type Used for hardware or software conditions. Indicates a serious disruption of service or the malfunctioning or failure of important hardware. Requires immediate attention and response of a technician to restore or maintain system stability. The urgency is less than in critical situations because of a lesser effect on service or system performance. For example, a minor alarm is generated if a secondary NSE-100 or NPE-G100 card fails or it is removed.

Minor alarm severity type Used for troubles that do not have a serious effect on service to customers or for alarms in hardware that are not essential to the operation of the system.

MIB Management Information Base. Database of network management information that is used and maintained by a network management protocol such as SNMP. The value of a MIB object can be changed or retrieved by means of SNMP commands, usually through a network management system. MIB objects are organized in a tree structure that includes public (standard) and private (proprietary) branches.

MIB II MIB-II is the follow on to MIB-I which was the original standard SNMP MIB. MIB-II provided some much needed enhancements to MIB-I. MIB-II is very old, and most of it has been updated (that which has not is mostly obsolete). It includes objects that describe system related data, especially data related to a system's interfaces.

MPLS Multiprotocol Label Switching. MPLS is a method for forwarding packets (frames) through a network. It enables routers at the edge of a network to apply labels to packets (frames). ATM switches or existing routers in the network core can switch packets according to the labels with minimal lookup overhead.

MPLS interface An interface on which MPLS traffic is enabled. MPLS is the standardized version of Cisco original tag switching proposal. It uses a label forwarding paradigm (forward packets based on labels).

N

NMS Network management system. System responsible for managing at least part of a network. An NMS is generally a reasonably powerful and well-equipped computer, such as an engineering workstation. NMSs communicate with agents to help keep track of network statistics and resources.

O

OID Object identifier. Values are defined in specific MIB modules. The Event MIB allows you or an NMS to watch over specified objects and to set event triggers based on existence, threshold, and Boolean tests. An event occurs when a trigger is fired; this means that a specified test on an object returns a value of true. To create a trigger, you or an NMS configures a trigger entry in the mteTriggerTable of the Event MIB. This trigger entry specifies the OID of the object to be watched. For each trigger entry type, corresponding tables (existence, threshold, and Boolean tables) are populated with the information required for carrying out the test. The MIB can be configured so that when triggers are activated (fired) either an SNMP Set is performed, a notification is sent out to the interested host, or both.

P

Polling Access method in which a primary network device inquires, in an orderly fashion, whether secondaries have data to transmit. The inquiry occurs in the form of a message to each secondary that gives the secondary the right to transmit.

Q

QoS Quality of service. Measure of performance for a transmission system that reflects its transmission quality and service availability.

R

Read-write This variable can be used to monitor information and to set a new value for the variable. For example, the tsMsgSend variable, whose access is read-write, determines what action to take after a message has been sent.

The possible integer values for this variable follow:

1 = nothing

2 = reload

3 = message done

4 = abort

RFC

Requests for Comments, started in 1969, form a series of notes about the Internet (originally the ARPANET). The notes discuss many aspects of computer communication, focusing on networking protocols, procedures, programs, and concepts, but also include meeting notes, opinions, and sometimes humor.

The RFC Editor is the publisher of RFCs and is responsible for the final editorial review of the documents. The RFC Editor also maintains a master file of RFCs, the RFC index, that you can search online here.

The specification documents of the Internet protocol suite, as defined by the Internet Engineering Task Force (IETF) and its steering group, the Internet Engineering Steering Group (IESG), are published as RFCs. Thus, the RFC publication process plays an important role in the Internet standards process. Go to the following URL for details:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios103/mib_doc/80516.htm#xtocid13

RMON

The Remote Network Monitoring MIB is a SNMP MIB for remote management of networks. RMON is one of the many SNMP based MIBs that are IETF Standards. RMON allows network operators to monitor the health of the network with a Network Management System (NMS). RMON watches several variables, such as Ethernet collisions, and triggers an event when a variable crosses a threshold in the specified time interval.

RSVP

Resource Reservation Protocol. Protocol that supports the reservation of resources across an IP network. Applications running on IP end systems can use RSVP to indicate to other nodes the nature (bandwidth, jitter, maximum burst, and so forth) of the packet streams they want to receive. RSVP depends on IPv4. Also known as Resource Reservation Setup Protocol.

S

Scalar object

One type of managed object which is a single object instance (for example, ifNumber in the IF-MIB and bgpVersion in the BGP4-MIB).

Security model

A security model is an authentication strategy that is set up for a user and the group in which the user resides. A security level is the permitted level of security within a security model. A combination of a security model and a security level determines which security mechanism is employed when handling an SNMP packet.

SNMPv1

The Simple Network Management Protocol: An Internet standard, defined in RFC 1157. Security is based on community strings. SNMPv1 uses a community-based form of security. The community of managers who are able to access the agent MIB is defined by an IP address Access Control List and password.

SNMPv2 The community-string based administrative framework for SNMPv2. SNMPv2c is an update of the protocol operations and data types of SNMPv2p (SNMPv2 classic), and uses the community-based security model of SNMPv1.

SNMPv2c support includes a bulk-retrieval mechanism and more detailed error message reporting to management stations. The bulk-retrieval mechanism supports the retrieval of tables and large quantities of information, minimizing the number of round-trip transmissions required. SNMPv2c improved error handling support includes expanded error codes that distinguish different kinds of error conditions; these conditions are reported through a single error code in SNMPv1. Error return codes now report the error type. Three kinds of exceptions are also reported:

- no such object exceptions
- no such instance exceptions
- end of MIB view exceptions

SNMPv3 SNMPv3—Version 3 of SNMP. SNMPv3 uses the following security features to provide secure access to devices:

- Message integrity—Ensuring that a packet has not been tampered within transit.
- Authentication—Determining that the message is from a valid source.
- Encryption—Scrambling the contents of a packet to prevent it from being learned by an unauthorized source.

SNMP agent A software component in a managed device that maintains the data for the device and reports the data, as needed, to managing systems. The agent and MIB reside on the routing device (router, access server, or switch). To enable the SNMP agent on a managed device, you must define the relationship between the manager and the agent.

SNMP manager A system used to control and monitor the activities of network hosts using SNMP. The most common managing system is called a Network Management System (NMS). The term NMS can be applied to either a dedicated device used for network management, or the applications used on a network-management device. A variety of network management applications are available for use with SNMP. These features range from simple command-line applications to feature-rich graphical user interfaces (such as the CiscoWorks2000 line of products).

SONET Synchronous Optical Network. A physical layer interface standard for fiber optic transmission. High-speed synchronous network specification developed by Telcordia Technologies, Inc. and designed to run on optical fiber. STS-1 is the basic building block of SONET. Approved as an international standard in 1988.

SX Short wavelength

T

Time stamp Provides the amount of time that has elapsed between the last network reinitialization and generation of the trap.

TLV Type Length Value. Dynamic format for storing data in any order. Used by Cisco's Generic ID PROM for storing asset information.

Trap A trap is an unsolicited (device initiated) message. The contents of the message might be simply informational, but it is mostly used to report real-time trap information. Since a trap is a UDP datagram, sole reliance upon them to inform you of network problems (i.e. passive network monitoring) is not wise. They can be used in conjunction with other SNMP mechanisms as in trap-directed polling or the SNMP inform mechanism can be used when a reliable fault reporting system is required.

Tunnel A secure communication path between two peers, such as routers.

U

UDI Cisco Unique Device Identifier

UDP User Datagram Protocol.

V

VBR Variable bit rate. QOS class defined by the ATM Forum for ATM networks. VBR is subdivided into a real time (RT) class and non-real time (NRT) class. VBR (RT) is used for connections in which there is a fixed timing relationship between samples. VBR (NRT) is used for connections in which there is no fixed timing relationship between samples, but that still need a guaranteed QOS.

VRF VPN Routing and Forwarding Tables.

W

Write-only This variable can be used to set a new value for the variable only. For example, the writeMem variable, whose access is write-only, writes the current (running) router configuration into nonvolatile memory where it can be stored and retained even if the router is reloaded. If the value is set to 0, the writeMem variable erases the configuration memory.

Write view A view name (not to exceed 64 characters) for each group; the view name defines the list of object identifiers (OIDs) that can be created or modified by users of the group.

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