Preface

This guide describes the implementation of the Simple Network Management Protocol (SNMP) and MIB for the Cisco Carrier Routing System (CRS) and Cisco XR 12000 Series Router executing IOS XR. For the Cisco XR 12000 Series Router executing IOS, see the IOS MIB Locator Tool at http://tools.cisco.com/ITDIT/MIBS/servlet/index. SNMP provides a set of commands for setting and retrieving the values of operating parameters on the Cisco CRS and Cisco XR 12000 Series routers. The router information is stored in a virtual storage area called a *MIB*, which contains many MIB objects that describe router components and provides information about the status of the components.

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

Revision History

The following Revision History tables record technical changes, additions, and corrections to this document. The table shows the release number and document revision number for the change, the date of the change, and a summary of the change.

Cisco IOS XR Release	Part Number	Publication Date
IOS XR Software Release 4.3	OL-29005-01	February 2013

Description of Changes

- Updates made to these sections:
  - Updated BGP4-MIB Tables and Descriptions Table
  - Updated BGP4-MIB Constraints Table
  - Updated CISCO-CDP-MIB Tables and Descriptions Table
  - Updated CISCO-CLASS-BASED-QOS-MIB Constraints Table

- Updated CISCO-IETF-BFD-MIB Constraints Table
- Updated CISCO-IETF-FRR-MIB Constraints Table
- Updated CISCO-IETF-IPMROUTE-MIB Constraints Table
- Updated CISCO-RTTMON-MIB Tables and Descriptions Table
- Updated CISCO-RTTMON-MIB Constraints Table
- Updated CISCO-SYSLOG-MIB Constraints Table
- Updated IEEE8023-LAG-MIB Constraints Table
- Updated IPV6-MIB Tables and Descriptions Table
- Updated ISIS-MIB Constraints Table
- Updated MPLS-L3VPN-STD-MIB Constraints Table
- Updated MPLS-LDP-GENERIC-STD-MIB
- Updated MPLS-TC-STD-MIB
- Updated MPLS-TE-STD-MIB
- Updated MPLS-TE-STD-MIB Constraints
- Updated RSVP-MIB Constraints

Audience

This guide is intended for system and network administrators who configure the Cisco CRS or Cisco XR 12000 Series router for operation and monitor performance in the network.

This guide may also be useful for application developers who are developing management applications for the Cisco CRS or Cisco XR 12000 Series router.

Organization

This guide contains the following chapters:

Chapter	Description
Chapter 1, “Cisco CRS and Cisco XR 12000 Series Router MIB Overview”	Provides background information about SNMP and its implementation on the Cisco CRS and Cisco XR 12000 Series routers.
Chapter 2, “Configuring MIB Support”	Provides instructions for configuring SNMP management support on the Cisco CRS and Cisco XR 12000 Series routers.
Chapter 3, “Platform-Independent MIB Specifications”	Describes MIBs for which the majority of their operation and data is independent of the specific platform or hardware or the feature is supported across all XR platforms.
Chapter 4, “Cisco Carrier Routing System MIB Specifications”	Describes each MIB included on the Cisco CRS. Each description lists any constraints as to how the MIB is implemented on the router.

Chapter	Description
Chapter 5, "Cisco XR 12000 Series Router MIB Specifications"	Describes each MIB included on the Cisco XR 12000 Series router. Each description lists any constraints as to how the MIB is implemented on the router.
Chapter 6, "Monitoring Notifications"	Describes the SNMP notifications supported by the Cisco CRS and Cisco XR 12000 Series routers, provides a description of each notification, a probable cause, and recommended action to take.
Appendix A, "Using MIBs"	Provides information about how to use SNMP to perform system functions such as bulk-file retrieval and QoS[1].
Appendix B, "QoS MIB Implementation"	Provides information about how to implement QoS in addition to a matrix that defines which objects support QoS policy actions.
Appendix C, "Evolution of RFC 1213"	Provides information about the evolution of RFC1213 to other MIBs.
Appendix D, "Process Information for SNMP-centric MIBs"	Provides process information for SNMP-centric MIBs.
Appendix E, "IOS XR SNMP Best Practices"	Provides information on best practices to be adopted by an OSS[2] for optimized use of IOS-XR SNMP protocol.

1. QoS = Quality of Service
2. OSS = Operations Support System

Terminology and Definitions

This section discusses conventions and terminology used in this guide.

- Alarm—In SNMP, the word *alarm* is commonly misused to mean the same as a trap (see the Trap definition below). *Alarm* represents a condition which causes an SNMP trap to be generated.

Note Many commands use the word **traps** in the command syntax. Unless there is an option in the command to select traps. Use the **snmp-server host** and **snmp-server** *notification* command to specify whether to send SNMP notifications as traps.

- Element Management System (EMS)—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, Private Automatic Branch Extension (PABX), proprietary systems, or applications.
- Management Information Base (MIB)—Management objects available in an SNMP managed device. The information is represented in Abstract Syntax Notation 1 (ASN.1). This is a way of logically grouping data so that it is easily understood by all.
- MIB-II—Successor to MIB-I, which was the original standard SNMP MIB.
- Multiprotocol Label Switching (MPLS)—Standardized version of the Cisco original tag-switching proposal. It uses a label-forwarding paradigm (forward packets based on labels).

- SNMP—Application layer protocol that allows you to remotely manage networked devices. The *simple* in SNMP is only in contrast to protocols that are thought to be even more complex than SNMP. SNMP consists of the following components: a management protocol, a definition of management information and events, a core set of management information and events, and a mechanism and approach used to manage the use of the protocol including security and access control.
- Trap—Device-initiated SNMP notification message. The contents of the message might be simply informational, but it is mostly used to report real-time trap information. Traps can be used in conjunction with other SNMP mechanisms, as in trap-directed polling.
- User Datagram Protocol (UDP)—Connectionless, non-reliable IP-based transport protocol.

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:

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