Preface

This guide describes the Cisco ASR 1000 Series Aggregation Services Routers implementation of the Simple Network Management Protocol (SNMP). SNMP provides a set of commands for setting and retrieving the values of operating parameters on the Cisco ASR 1000 Series Router. Router information is stored in a virtual storage area called a Management Information Base (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 Release	Part Number	Publication Date
12.2(33)XNE	OL-15161-05	November 2009

Description of Changes

- Added the following new MIBs:
  - CISCO-NBAR-PROTOCOL-DISCOVERY-MIB
  - NHRP-MIB
- Updated the following MIBs for new constraints:
  - ATM-MIB
  - CISCO-ATM-EXT-MIB
  - CISCO-ATM-QOS-MIB

  - CISCO-CLASS-BASED-QOS-MIB
  - CISCO-ENTITY-SENSOR-MIB
  - CISCO-IF-EXTENSION-MIB
  - ENTITY-MIB (RFC 4133)
  - NHRP-MIB
- Moved the following MIB from the Unsupported list to the Supported and Verified List
  - CISCO-MVPN-MIB
- Moved from the Supported and Unverified list to the Supported and Verified list:
  - CISCO-ATM-QOS-MIB
  - CISCO-IETF-FRR-MIB
  - CISCO-IPMROUTE-MIB
  - MPLS-TE-MIB
- Added new SPA to the CISCO-ENTITY-ALARM-MIB.
- Added SPA modules in Table 3-24, Alarms Supported for Cisco ASR 1000 Series Routers SPA module, under the CISCO-ENTITY-ALARM-MIB.
- Added Table 3-68, Table 3-69, for RP Module, SIP Module, SPA Module 0/0, and FP or ESP Module built-in with the CISCO ASR 1002-F chassis, under ENTITY-MIB (RFC 4133).
- Updated support matrix for the Table 3-54 CISCO-PROCESS-MIB.
- Added a note under ATM-MIB.
- Added the section Using ENTITY-ALARM-MIB to Monitor Entity Alarms in Appendix A under Managing Physical Entities.

Cisco IOS Release	Part Number	Publication Date
12.2(33)XND	OL-15161-04	June 2009

Description of Changes

- Added the following new MIBs:
  - CISCO-802-TAP-MIB
  - CISCO-IP-TAP-MIB
  - CISCO-LAG-MIB
  - CISCO-SESS-BORDER-CTRLR-CALL-STATS-MIB
  - CISCO-SESS-BORDER-CTRLR-EVENT-MIB
  - CISCO-TAP2-MIB
  - CISCO-TAP-MIB
  - CISCO-USER-CONNECTION-TAP-MIB
  - IEEE8023-LAG-MIB
  - RFC1213-MIB
- Updated the following MIBs for new constraints:

  - CISCO-CLASS-BASED-QOS-MIB
  - CISCO-ENTITY-EXT-MIB
  - CISCO-IETF-PW-ATM-MIB
  - CISCO-IETF-PW-ENET-MIB
  - CISCO-IETF-PW-MIB
  - CISCO-IETF-PW-MPLS-MIB
- Updated versions for:
  - CISCO-CLASS-BASED-QOS-MIB
  - CISCO-ENTITY-EXT-MIB
- Added new SPAs to CISCO-ENTITY-ALARM-MIB.
- Added Table 3-22, Alarms Supported for Cisco ASR 1000 Series Routers WMA Virtual Ports under CISCO-ENTITY-ALARM-MIB.
- Updated Table 3-16, Alarms Supported for Cisco ASR 1000 Series Routers POS Ports , for vendorType information under CISCO-ENTITY-ALARM-MIB.
- Added SPA Modules to Table 3-24, Alarms Supported for Cisco ASR 1000 Series Routers SPA Module, under CISCO-ENTITY-ALARM-MIB.
- Added Table 3-37, Alarms Supported for Cisco ASR 1000 Series Routers Fan Modules, under CISCO-ENTITY-ALARM-MIB.
- Added note for ASR1002-F Router support under CISCO-ENTITY-SENSOR-MIB and ENTITY-SENSOR-MIB (RFC 3433).
- Upated description for CISCO-ENTITY-VENDORTYPE-OID-MIB.
- Added Table 3-69, for RP Module, SIP Module, SPA Module 0/0, and FP or ESP Module built-in with the CISCO ASR 1002-F chassis, under ENTITY-MIB (RFC 4133).
- Updated Appendix A with information about Steps to Bring Up the SPA-WMA-K9 in Cisco ASR 1000 Chassis.

Cisco IOS Release	Part Number	Publication Date
12.2(33)XNC	OL-15161-03	February 2009

Description of Changes

- Updated version CISCO-NETFLOW-MIB, CISCO-RF-MIB, CISCO-RTTMON-MIB, CISCO-VPDN-MGMT-MIB, and CISCO-IPMROUTE-MIB.
- Moved the following MIBs from Unsupported to Supported and Verified List
  - CISCO-IGMP-FILTER-MIB
- Moved the following MIBs fromUnSupported to Supported and Unverified List:
  - CISCO-IETF-FRR-MIB
  - MPLS-TE-MIB
- Moved the following MIBs from Supported and Verified List to Unsupported List:
  - CISCO-SLB-EXT-MIB
  - CISCO-SLB-MIB

- Added the following MIBS to Supported and Verified MIBs list:
  - ATM-MIB
  - CISCO-AAL5-MIB
  - CISCO-ATM-EXT-MIB
  - CISCO-ATM-PVCTRAP-EXTN-MIB
  - CISCO-IETF-ATM2-PVCTRAP-MIB
  - CISCO-IETF-PW-MIB
  - CISCO-IETF-PW-ATM-MIB
  - CISCO-IETF-PW-MPLS-MIB
  - MPLS-L3VPN-STD-MIB (RFC 4382)
- Added the following MIBS to Supported and UnVerified MIBs list:
  - ATM-FORUM-ADDR-REG-MIB
  - ATM-FORUM-MIB
  - CISCO-ATM-QOS-MIB
- Added the following MIBS to Unsupported MIBs List:
  - ATM-ACCOUNTING-INFORMATION-MIB
  - ATM-SOFT-PVC-MIB
  - ATM-TRACE-MIB
  - CISCO-ATM2-MIB
  - CISCO-ATM-CONN-MIB
  - CISCO-ATM-RM-MIB
  - CISCO-ATM-TRAFFIC-MIB
  - CISCO-IETF-PW-ENET-MIB
  - CISCO-IETF-PW-FR-MIB
  - CISCO-IETF-PW-TDM-MIB
- Added SPA-1XOC3-ATM-V2 andSPA-3XOC3-ATM-V2 to SPA support list under CISCO-ENTITY-ALARM-MIB.
- Added the following tables to CISCO-ENTITY-ALARM-MIB:
  - Table 3-19 for T1/E1 ports
  - Table 3-20 for ATM
  - Table 3-33 for Unknown RP Module
- Update Table 3-32 for new RP Module Alarms.
- Added the following tables to ENTITY-MIB (RFC 4133):
  - Table 3-66 variation between entPhysicalTable values for harddisk in RP1 and RP2 modules
- Added a note indicating constraints due to 64-bit architecture in ASR1000 RP2 under CISCO-ENTITY-EXT-MIB, CISCO-PROCESS-MIB, and CISCO-ENHANCED-MEMPOOL-MIB
- Added notes under CISCO-FLASH-MIB and CISCO-ENTITY-ALARM-MIB.

Cisco IOS Release	Part Number	Publication Date
12.2(33)XNB	OL-15161-02	September 2008

Description of Changes

- Updated ASR 1002 Router behavioral changes under ENTITY-MIB (RFC 4133).
- Updated constraint information for CISCO-ENTITY-FRU-CONTROL-MIB, CISCO-FLASH-MIB, CISCO-IETF-NAT-MIB, ENTITY-MIB (RFC 4133), and IP-MIB (RFC 4293).
- Added list of new SPAs supported under CISCO-ENTITY-ALARM-MIB.
- Added new alarm descriptions for the Cisco ASR 1000 Series Routers SPA modules in CISCO-ENTITY-ALARM-MIB.
- Added ciscoFlashFileType constraint for CISCO-FLASH-MIB.
- Added CISCO-IETF-NAT-MIB to manage Network Address Translation (NAT) operations on the Cisco ASR 1K router.
- Updated CISCO-PRODUCTS-MIB description to include CISCO ASR 1006, ASR 1004 and ASR 1002 OIDs support.
- Added dsx3LineStatusChange notification for DS3-MIB (RFC 2496).
- Moved CISCO-SLB-MIB and CISCO-SLB-EXT-MIB from Unsupported MIBs to Supported and Verified MIBs.
- Added ciscoSonetVTStatusChange constraint to CISCO-SONET-MIB.
- Added entPhysicalAssetAlias and entPhysicalAssetId constraints to ENTITY-MIB (RFC 4133).
- Added ifStackStatus constraint to IF-MIB (RFC 2863).
- Added SonetMediumTable and sonetSESthresholdSet constraints to SONET-MIB (RFC 2558).
- Added cefcModuleOperStatus and cefcModuleResetReason constraints to CISCO-ENTITY-FRU-CONTROL-MIB.
- Added cempMemPoolTable and cempMemBufferPoolTable constraints to CISCO-ENHANCED-MEMPOOL-MIB.
- Added ciscoFlashPartitionFileCount and ciscoFlashPhyEntIndex constraints to CISCO-FLASH-MIB.
- Added Table 3-16 to list alarm descriptions and severity levels for the Cisco ASR 1000 Series Routers POS ports under CISCO-ENTITY-ALARM-MIB.
- Added Table 3-17 to list alarm descriptions and severity levels for the Cisco ASR 1000 Series Routers CHOC3-STM1 ports under CISCO-ENTITY-ALARM-MIB.
- Added a note about no support for Aggregate Fragment Counters under CISCO-CLASS-BASED-QOS-MIB.
- Updated constraints for CISCO-FLASH-MIB.
- Added two new objects, cpmCPURisingThreshold and cpmCPUFallingThreshold, under constraints for CISCO-PROCESS-MIB.
- Updated constraints for CISCO-QINQ-VLAN-MIB.
- Added a new table,Table 3-65, that lists mapping between external label and entPhysicalParentRelPos values under ENTITY-MIB (RFC 4133).

Audience

This guide is intended for system and network administrators who must configure the Cisco ASR 1000 Series 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 Cisco ASR 1000 Series Router.

Organization

This guide contains the following chapters:

Chapter	Description
Chapter 1, "Cisco ASR 1000 Series Aggregation Services Routers Overview,"	Provides background information about SNMP and its implementation on the Cisco ASR 1000 Series Router.
Chapter 2, "Configuring MIB Support,"	Provides instructions for configuring SNMP management support on the Cisco ASR 1000 Series Router.
Chapter 3, "Cisco ASR 1000 Series Routers MIB Specifications,"	Describes each MIB included on the Cisco ASR 1000 Series Router. In addition, constraints for each MIB are listed to indicated how a MIB is implemented on the router.
Chapter 4, "Monitoring Notifications,"	Describes the SNMP notifications, traps and informs, supported by the Cisco ASR 1000 Series Router. It provides description of each notification, probable cause, and recommended action.
Appendix A, "Using MIBs,"	Provides information about how to use SNMP to perform system functions such as bulk-file retrieval and Quality of Service (QoS).
Appendix B, "QoS MIB Implementation,"	Provides information about how to implement Quality of Service (QoS) in addition to a matrix that defines which objects support QoS policy actions.

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 (seethe 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 either traps or informs, the keyword **traps** refers to traps, informs, or both. Use the **snmp-server host** and **snmp-server enable** <*notification*> command to specify whether to send SNMP notifications as traps or informs.

- Element Management System (EMS)—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, Private Automatic Branch Exchange (PABX), proprietary systems, or an application.
- Inform—Reliable SNMP notifications that are stored in memory until the SNMP manager issues a response. Informs use more system resources than traps. The SNMP Inform mechanism can be used when a reliable fault reporting system is required.
- Lawful Intercept (LI)—The term used to describe the process by which law enforcement agencies conduct electronic surveillance as authorized by judicial or administrative order. Legislation and regulations are increasingly being adopted that require service providers (SPs) to design and implement their networks to explicitly support authorized electronic surveillance.
- Management Information Base (MIB)—The objects that are 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—The successor to MIB-I, which was the original standard SNMP MIB.
- Multiprotocol Label Switching (MPLS)—MPLS is the standardized version of the Cisco original tag-switching proposal. It uses a label-forwarding paradigm (forward packets based on labels).
- Remote Network Monitoring (RMON) MIB—SNMP MIB for remote management of networks. While other MIBs are usually created to support a network device whose primary function is other than management, RMON was created to provide management of a network. RMON is one of the many SNMP-based MIBs that are IETF Standards.
- Simple Network Management Protocol (SNMP)—An 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.
- Synchronous Optical Network (SONET)—A physical layer interface standard for fiber-optic transmission.
- Trap—A 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)—A connectionless, non-reliable IP-based transport protocol.

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