About This Guide

This guide describes the implementation of the Simple Network Management Protocol (SNMP) applicable to the Cisco 4000 Series Integrated Services Router (ISR) SNMP provides a set of commands for setting and retrieving the values of operating parameters on the Cisco 4000 Series ISR. 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 these components.

This preface provides an overview of this guide, and contains the following sections:

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Audience

This guide is intended for system and network administrators who must configure the Cisco 4000 Series ISR 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 4000 Series ISR.

Organization

This guide contains the following chapters:

- Chapter 1, "Overview," provides background information about SNMP and its implementation on the Cisco 4000 Series ISR and a feature history table describing new features implemented since the last Cisco software release.
- Chapter 2, "Configuring MIB Support," provides instructions for configuring SNMP management support on the Cisco 4400 Series ISRs.
- Chapter 3, "MIB Specifications," describes each MIB included on the Cisco 4000 Series ISR. Each description lists any constraints as to how the MIB is implemented on the router.

- Chapter 4, “Monitoring Notifications,” describes the SNMP notifications (traps and informs) supported by the Cisco 4000 Series ISR.
- Chapter 5, “Using MIBs.” provides information about how MIBs are used.
- Glossary
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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 Trap definition). Alarm represents a condition which causes a 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 either traps, informs, or both. Use the command, **snmp-server enable *<notification>***, where notification is either trap or inform, 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, PABX, proprietary systems, or an application.
- Informs—Reliable SNMP notifications which are stored in memory until the SNMP manager issues a response. Informs use more system resources than traps.
- 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). It is a way of logically grouping data so that it is easily understood by all.
- MIB-II—The enhancements 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 word "simple" in SNMP is only in contrast to protocols which 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—SNMP 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. Traps are 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.
- User Datagram Protocol (UDP)—A connectionless, non-reliable IP-based transport protocol.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/en/US/docs/general/Illus_process/PDI/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

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

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://www.cisco.com/en/US/products/index.html

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html