



# Release Notes for Cisco SN 5428 Storage Router Release 2.3.1

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July 19, 2002



**Note**

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You can find the most current documentation on Cisco.com. This set of electronic documents may contain updates and modifications made after the hard-copy documents were printed.

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These release notes support Cisco SN 5428 Storage Router software release 2.3.1.

For a list of software caveats that apply to Release 2.3.1, see the “[Caveats](#)” section. The caveats are updated for every maintenance release and are located on Cisco.com and the Documentation CD-ROM.

## Contents

These Release Notes describe the following topics:

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**Corporate Headquarters:**  
**Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA**

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# Introduction

The Cisco SN 5428 Storage Router provides universal access to storage over IP networks. The storage router software controls the operation of the Cisco SN 5428 Storage Router. You can configure the software to provide one of two types of access to storage over IP networks; either SCSI routing, or Transparent SCSI routing.

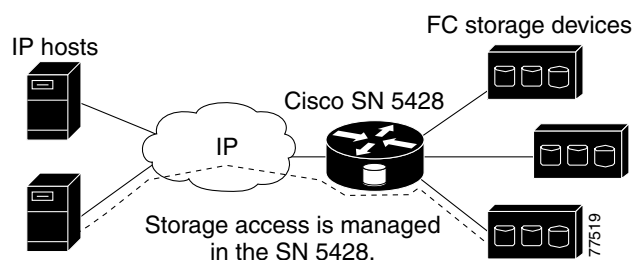
SCSI routing provides IP hosts with access to Fibre Channel (FC) storage devices, using iSCSI protocol.


**Note**

The iSCSI protocol is an IETF-defined protocol for IP storage (ips). For more information about the iSCSI protocol, refer to the IETF standards for IP storage at <http://www.ietf.org>.

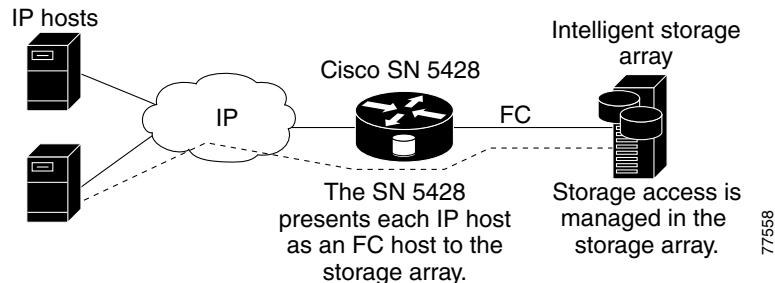
With SCSI routing, storage device access is managed primarily in the SN 5428. (See [Figure 1](#).)

**Figure 1** *iSCSI Routing*



Transparent SCSI routing provides IP hosts with transparent access to intelligent storage arrays using iSCSI protocol; that is, each IP host is presented as an FC host to an intelligent storage array. With transparent SCSI routing, availability of storage devices is managed primarily in the intelligent storage array. (See [Figure 2](#).)

**Figure 2** *Transparent SCSI Routing*



In addition to providing services for accessing storage over IP networks, the SN 5428 Storage Router software provides the following services:

- VLAN Access Control—provides IP access control to storage based on a VLAN identifier (VID) number (in addition to access control through access lists)
- Authentication—provides iSCSI authentication using AAA authentication methods
- High Availability (HA)—provides the ability to group SN 5428 Storage Routers in a cluster for failover and other cluster-related functions (for SCSI routing only)

- E\_Port with FC Fabric Zoning—provides the ability to connect FC ports to FC switches and participate in fabric zoning and support zone mergers
- SNMP/MIB support—provides network management of the SN 5428 through SNMP using selected MIBs
- A command-line interface (CLI) and a web-based GUI—provides user interfaces for configuration and maintenance of an SN 5428 Storage Router
- Secure Sockets Layer Support—provides HTTPS connection for secure access through the web-based GUI



**Note** The web-based GUI is not available in SN 5428s deployed for transparent SCSI routing.

## System Requirements

This section describes the system requirements for Release 2.3.1 and includes the following information:

- [Network Equipment, page 3](#)
- [IP Hosts, page 3](#)
- [Graphical User Interface, page 4](#)
- [iSCSI Driver Version Support, page 4](#)
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## Network Equipment

- The SN 5428 Storage Router's Gigabit Ethernet interfaces use a flow control mechanism for stopping and starting traffic that prevents the loss of data. Flow control should also be turned on at the router's Gigabit Ethernet interfaces where the SN 5428 Storage Router is connected.
- If the SN 5428 Storage Router is participating in a cluster, and the HA or management interfaces are plugged into a switch that has Spanning Tree Protocol (STP) enabled, the storage router should be considered as an end station and the affected ports on the switch should be configured appropriately. For example, set “portfast” on Cisco switches to cause the ports to immediately switch from blocking mode to forwarding mode. This helps prevent time-outs, which can cause unexpected behavior when storage routers join a cluster.

## IP Hosts

To ensure the best performance for the SN 5428 Storage Router and the iSCSI drivers, the extended windowing feature of TCP and the receive and transmit flow control feature of the Gigabit Ethernet driver should be enabled on all IP hosts connecting to the SN 5428. On the SN 5428 Storage Router, you can use the CLI **show scsirouter all connection tcp** command to display the current and maximum TCP window size for each connected host.

## Graphical User Interface

The SN 5428's web-based GUI officially supports the following browsers:

Browser	Platform
Microsoft Internet Explorer version 5.5 with service pack 2, or later	Microsoft Windows NT 4.0, Microsoft Windows 2000
Netscape Navigator version 4.76	Linux
Netscape Navigator version 4.7	Sun Solaris

The browser must be enabled to support JavaScript and style sheets.

## iSCSI Driver Version Support

A Cisco SN 5428 Storage Router running software release 2.3.1 or later is compatible with an IP host running any Cisco iSCSI Driver version 2.1.1 or later; it is not compatible with an IP host running any Cisco iSCSI Driver version 1.8.x.

## Obtaining Updated Software and iSCSI Drivers

From time to time, Cisco releases updated versions of SN 5428 Storage Router software and iSCSI drivers. Updated versions of storage router software and the Cisco iSCSI drivers, accompanying readme files, release notes and example configuration files are available for download.

You must be a registered Cisco.com user to download Cisco SN 5428 Storage Router software and iSCSI drivers.

You can access software by following these instructions:

- 
- Step 1** At <http://www.cisco.com>, log in to Cisco.com. Under **Service & Support**, click **Software Center**.
  - Step 2** At the Software Center web page, under **Software Products & Downloads**, click **Storage Networking Software**.
  - Step 3** At the Storage Networking Software web page, click the appropriate link for your software.
  - Step 4** At the Software Download web page, click the link for the software that you want to download. Clicking the link will cause another web page to be displayed. Follow the instructions on that and any subsequent web pages to download the software.
  - Step 5** To install and configure storage router software, see the appropriate storage router software configuration guide and release notes. To install and configure an iSCSI driver, see the readme file that accompanies the iSCSI driver (in the downloaded driver archive file) and the appropriate release notes.
-

## Determining the SN 5428 Software Version

To determine the version of SN 5428 software running on the Cisco SN 5428 Storage Router, establish a Telnet or console port session with the storage router, and enter the CLI **show version** command. (See [Example 1](#).)

### Example 1 Determining the Software Version

```
[SN5428-A01]$ show version

CISCO SN 5428 Storage Router

Operating System Software Ver: 2.3.1
→ System Bootstrap Ver: 2.3.1
→ Application Software Ver: 2.3.1
CLI Version 2.1

Copyright (c) 1986-2002 by Cisco Systems, Inc
```

The *Application Software* field displays the version of software currently running on the storage router. The *System Bootstrap* field displays the software version that will run the next time the storage router is restarted.

You can also check the version of the SN 5428 software by using the SN 5428 web-based GUI. Log in as Monitor to display the **Processor and Software Information** table, or click **Processor and SW** (under **System**) in the **Monitor** dynamic menu list in the left frame. The **Software Version** field contains the current software version information.

## Upgrading to a New Software Release



### Note

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If you are upgrading from SN 5428 Storage Router software release 2.2.x to 2.3.x, you must follow the additional procedures described in the [“Upgrading from Release 2.2.x to 2.3.x”](#) section on page 6 after upgrading your software to assure a successful transition to the new release.

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For information about upgrading to new SN 5428 software using the CLI, see the section “Installing Updated Software” in Chapter 10, “Maintaining and Managing the SN 5428 Storage Router,” of the *Cisco SN 5428 Storage Router Software Configuration Guide, Release 2.3*.

To upgrade to new SN 5428 software using the web-based GUI, follow these instructions.

- 
- Step 1** Log in as “admin”.
  - Step 2** Click **Maintenance** to view information about the software versions currently available to the storage router. If multiple versions of software are available, delete all versions except the currently running version.
  - Step 3** (Optional) Based on your storage router configuration, click the appropriate link in the Upgrade section of the **Maintenance** dynamic menu list in the left frame to download a list of currently available software versions. Use this list to determine the software version you want to download.
  - Step 4** Click the appropriate link in the Upgrade section of the **Maintenance** dynamic menu list to download the desired version of software.
  - Step 5** After you have downloaded the new version of software, click **Reset** in the System section of the **Maintenance** dynamic menu list.
  - Step 6** At **Select next boot version**, select the new software version. If you have made configuration changes to the storage router that have not been saved, click the **Save unsaved changes?** checkbox to save any configuration changes that have been made but not saved to the storage router’s bootable configuration.
  - Step 7** Click **Reset System**.
  - Step 8** After the storage router has rebooted, verify that it is running the new software. (See the [“Determining the SN 5428 Software Version”](#) section on page 5.)
- 

## Upgrading from Release 2.2.x to 2.3.x

If you are upgrading from SN 5428 Storage Router software release 2.2.x, additional procedures are required.

To complete the upgrade process using the CLI, follow these instructions:

- 
- Step 1** The logging algorithms have changed in software release 2.3.1. You must restore the default logging rules to the logging table or the SN 5428 will not log any event messages after the upgrade from release 2.2.x to 2.3.x. Use the CLI command **clear logging table to factory defaults** to restore the default logging rules.  
  
For details on the new logging algorithms and information about customizing the SN 5428 logging table, see the section “Understanding Logging” in Chapter 10, “Maintaining and Managing the SN 5428 Storage Router,” of the *Cisco SN 5428 Storage Router Software Configuration Guide, Release 2.3*.
  - Step 2** (Optional) If you are going to attach to a Fibre Channel fabric through an inter-switch link or by connecting to another SN 5428, you must change your port type to generic loop (GL\_Port) and reset the interface. For example, to change the port type for Fibre Channel interface *fc3*, use the CLI command **interface fc3 type gl-port**. To reset the *fc3* interface, disable and enable the interface using the **no interface fc3 enable** and **interface fc3 enable** CLI commands.

For details on configuring the SN 5428 for FC fabric zoning participation, see Chapter 5, “Configuring for FC Fabric Zoning,” in the *Cisco SN 5428 Storage Router Software Configuration Guide, Release 2.3*

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To complete the upgrade process using the web-based GUI, follow these instructions.

- 
- Step 1** The logging algorithms have changed in software release 2.3.1. You must restore the default logging rules to the logging table or the SN 5428 will not log any event messages after the upgrade from release 2.2.x to 2.3.x. Click **Configuration** and then click **Debug** in the System section of the **Configuration** dynamic menu. Click the **Reset to Defaults** link in the Logging table. If prompted to confirm your actions, click OK.
- Step 2** (Optional) If you are going to attach to a Fibre Channel fabric through an inter-switch link or by connecting to another SN 5428, you must change your port type to generic loop and reset the interface. Click **Configuration** and then click **FC Interface** in the System section of the **Configuration** dynamic menu. Click on the Fibre Channel interface you want to configure. Select Generic Loop from the **Port Type** select box, and click the **Enable Interface Disabled** radio button. Click **Apply** to save your changes. After the page updates, click the **Enable Interface Enabled** radio button. Click **Apply** to reset the interface.
- 

## Uninstalling an Upgrade

To return to a previous SN 5428 software release (2.3.x or 2.2.x) and remove the updated SN 5428 software using the CLI, follow these instructions:

	Command	Description
Step 1	<b>enable</b>	Enter Administrator mode
Step 2	<b>show software version all</b>	Verify that the previous version of SN 5428 software is still available. If it is not, see the section “Installing Updated Software” in Chapter 10, “Maintaining and Managing the SN 5428 Storage Router,” of the <i>Cisco SN 5420 Storage Router Software Configuration Guide, Release 2.3</i> .
Step 3	<b>software version 2.2.2</b>	Select the software to be booted when the system next starts; for example, boot version 2.2.2 when the system restarts. This may take several minutes.
Step 4	<b>reboot</b>	Reboot the SN 5428 Storage Router.
Step 5	<b>enable</b>	Enter Administrator mode after the SN 5428 reboots.
Step 6	<b>show version</b>	Verify that the SN 5428 Storage Router is now running the correct software.
Step 7	<b>delete software version 2.3.1</b>	(Optional) Remove the updated software from the SN 5428 Storage Router.

To return to a previous SN 5428 software release and remove the updated SN 5428 software using the SN 5428 web-based GUI, follow these instructions:

- 
- Step 1** Log in as Admin.
  - Step 2** Click **Maintenance** to display the dynamic Maintenance menu list in the left frame.
  - Step 3** Click **Reset** from the dynamic Maintenance menu list.
  - Step 4** Select the version of software to be run when the SN 5428 reboots from the **Select next boot version:** select box.
  - Step 5** (Optional) To save configuration changes before rebooting, click the **Save unsaved changes?** checkbox. If the checkbox is not checked, any unsaved configuration changes will be lost.
  - Step 6** Click **Reset System**.
  - Step 7** After the SN 5428 reboots, verify that it is running the selected software. (See [“Determining the SN 5428 Software Version”](#) section on page 5.)
  - Step 8** (Optional) Click **Maintenance** and then click the **Delete?** link to the right of the updated software in the Show Storage Router Software table to remove it from the SN 5428 Storage Router.
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## Limitations and Restrictions on SN 5428 Storage Router Clusters

This release includes the following restrictions on SN 5428 Storage Router clusters:

- A cluster can contain up to two SN 5428 Storage Routers.
- A cluster can contain up to 12 SCSI routing instances.
- A cluster can support up to 100 iSCSI targets.

## New and Changed Information

- The logging algorithms for event messages changed in SN 5428 Storage Router software release 2.3.1. After you upgrade to software release 2.3.x from software release 2.2.x, you must reset the default logging rules or the SN 5428 Storage Router will not log any event messages.
- The default port type changed in SN 5428 Storage Router software release 2.3.1. In release 2.2.x, the default port type was *auto*, which was saved in the SN 5428’s bootable configuration as fabric (F\_Port) or fabric loop (FL\_Port), depending on the connected device. If no device was connected, the port type was saved as FL\_Port.

In release 2.3.1, the default port type is *gl-port* (generic loop, also know as GL\_Port), which configures as FL\_Port when connected to a loop of public devices, F\_Port when connected to a single device, or E\_Port when connected to a switch or another SN 5428.

After you upgrade to software release 2.3.x from software release 2.2.x, you must change the port type to generic loop for any Fibre Channel interface you connect to a switch or another SN 5428. After setting the port type, you must reset the interface.

# Caveats

Caveats describe unexpected behavior or defects in SN 5428 software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious.

This document describes open and resolved severity 1 and 2 caveats and selected caveats of other severities.

- The “[Open Caveats](#)” section lists caveats that are open in the current release and may be open in previous releases.
- The “[Resolved Caveats](#)” section lists caveats that are resolved in this release, but open in previous releases.

Within the sections, the caveats are sorted alphanumerically by caveat number.

**Note**

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If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on Cisco.com at Service & Support: [http://www.cisco.com/cgi-bin/Support/Bugtool/launch\\_bugtool.pl](http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl).

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## Open Caveats

All the caveats in this section are open in SN 5428 software release 2.3.1.

### SNMP

- CSCdx39505  
A memory leak may occur when walking the CDP MIB. A bulk walk that traverses cdpVTPMgmtDomain has caused a leak of approximately 1.2KB.  
Workaround: Avoid bulk walks of the CDP MIB.

### Software-Other

- CSCdy06564  
If you are using TFTP for the software download process and receive a TFTP error, the SN 5428 may restart. For example, if you are attempting to download a specific version of software and the file cannot be found on the TFTP server, TFTP returns an error. During the cleanup process, a memory exception causes the SN 5428 to reboot.  
Workaround: Verify that the software version to be downloaded is on the TFTP server. Use the **download software** command with the **version** keyword, rather than the **filename** keyword.

### Syslog

- CSCdx57912  
When upgrading from release 2.2.x to release 2.3.1, the logging routes are lost.  
Workaround: Logging algorithms have changed in release 2.3.1. You must reset your desired logging routes using the CLI or the GUI.

## Resolved Caveats

All of the caveats listed in this section are resolved in SN 5428 software release 2.3.1.

### CLI

- CSCdx03598

Pressing the question mark (?) key after the **facility** keyword in the **logging route add** command does not display a list of valid facility names.

Workaround: In release 2.2.x, enter a valid facility name as described in the *Cisco SN 5428 Storage Router Software Configuration Guide*. In release 2.3.1, the logging algorithm and commands have changed. See the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3* for details.

- CSCdx25092

Selecting a logging destination of *gui* or *smtp* with the **logging route add** command fails to log messages to any destination.

Workaround: In release 2.2.x, the *gui* and *smtp* logging destinations are not yet implemented. Select another destination, or select all destinations to route log messages to all valid destinations. In release 2.3.1, the logging algorithm and commands have changed. See the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3* for details.

### Configuration Management

- CSCdx18936

After the SN 5428 Storage Router is restarted, all levels of log messages are displayed on the serial console. A **show logging** command shows the console logging level set to *notification*, but all messages are logged to the serial console as if the console logging level was set to *debugging*. Management sessions via Telnet are correctly logging messages at the appropriate level; the problem only occurs on the serial console after the SN 5428 is restarted.

Workaround: In release 2.2.x, issue the **logging console level** command on the serial console to set the logging level as desired for that session. In release 2.3.1, the logging algorithm and commands have changed. See the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3* for details.

- CSCdx31126

When using the GUI to set a host name for the NTP server, the SN 5428 may hang and require a restart.

Workaround: Restart the SN 5428 and use an IP address to identify the desired NTP server.

## HA

- CSCdx81322

After all SCSI routing instances in a large configuration are failed over from one SN 5428 Storage Router to another one in the same cluster, the node that did the failover may hang. This is an extremely intermittent situation, occurring sporadically in a testbed that was performing continuous HA failovers every 90 seconds. The failure occurred after almost 11 hours of runtime (300 - 500 failovers completed successfully).

Workaround: Power-cycle the hung SN 5428. There should be no loss of connectivity, since the other node in the cluster takes over ownership of all the SCSI routing instances when heartbeats from the affected node are not received.

## iSCSI Server

- CSCdx67855

An iSCSI initiator does not know if it is talking to a Cisco target.

Workaround: An iSCSI initiator can send the key “X-com.Cisco.pop=value” and it will receive a finger print to validate that it is from a Cisco target.

# Documentation Updates

This section describes corrections to the Cisco SN 5428 Storage Router Release 2.3 documentation set since initial publication.

- CLI command **radius-server host**

The first example shown on page 11-133 of the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3* is incorrect. The example should read as follows:

The following example identifies the server with IP address 10.5.0.53 as the RADIUS server and uses the default port for authentication:

```
[SN5428A]# radius-server host 10.5.0.53
```

- CLI command **show hosts**

The documentation for the **show hosts** command on page 11-279 of the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3*, should be deleted. This command was removed from the CLI in release 2.3.1 and is no longer available.

- FC interface default settings

On page 6-14 of the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3*, the last bullet point in the section “Default Values for FC Interfaces” is incorrect. The default port type is generic loop. The bullet point should be updated to read as follows:

- Automatic selection of port type as Fabric (F\_Port), Fabric Loop (FL\_Port or public loop) or Expansion (E\_Port or switch to switch)

- Recovering lost console passwords

The URL listed on page 10-18 of the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3*, for password recovery procedures may not include procedures for the SN 5428. If you require assistance in recovering a lost console password and cannot locate the appropriate procedures at the documented URL, contact the Cisco Technical Assistance Center. (See the [“Obtaining Technical Assistance”](#) section on page 14 for details.)

## Related Documentation

The following sections describe the related documentation available for Cisco SN 5428 Storage Router Release 2.3.1. These documents consist of hardware installation and software configuration guides, and platform-specific release notes, readme and example configuration files for the Cisco iSCSI drivers.

## Release-Specific Documents

This Release Notes document is the only document specific to SN 5428 Release 2.3.1. It is only available as an electronic document on Cisco.com and the Documentation CD-ROM.

## Platform-Specific Documents

Platform-specific documents consist of the release notes, readme and example configuration files for Cisco iSCSI drivers, version 2.1.x. The files are currently available in electronic format only. See the [“Obtaining Updated Software and iSCSI Drivers”](#) section on page 4 for details.

## Hardware Documents

Refer to the *Cisco SN 5428 Storage Router Hardware Installation Guide* for hardware installation procedures. This document is available as a printed manual. It is also available as an electronic document on Cisco.com and the Documentation CD-ROM.

## Software Documents

Refer to the *Cisco SN 5428 Storage Router Software Configuration Guide Release 2.3*, for configuration information and procedures. This document is available as a printed manual. It is also available as an electronic document on Cisco.com and the Documentation CD-ROM.

For documentation on the SN 5428 web-based GUI, refer to the SN 5428 Storage Router web-based GUI online Help system.

## Service and Support

For service and support for a product purchased from a reseller, contact the reseller, who offers a wide variety of Cisco service and support programs described in “Service and Support” of Cisco Information Packet shipped with your product.

**Note**

If you purchased your product from a reseller, you can access Cisco.com as a guest. Cisco.com is Cisco Systems’ primary real-time support channel. Your reseller offers programs that include direct access to Cisco.com services.

For service and support for a product purchased directly from Cisco, use Cisco.com.

## Software Configuration Tips on the Cisco TAC Home Page

A variety of Cisco SN 5428 Storage Router software installation, configuration and usage tips are available on the Cisco Technical Assistance Center (TAC) Web Site.

You can access “tech tips” by following these instructions:

- 
- Step 1** At <http://www.cisco.com> (or <http://www.cisco.com/login/cisco/>, if you are a registered Cisco.com user and logged in), under **Products & Technologies**, select **Routers** from the drop-down list.
  - Step 2** At the Cisco Routers web page, under **Cisco SN 5400 Series Storage Routers**, click the appropriate **Product Support** link.
  - Step 3** At the Product Support web page, click the appropriate links for additional information about installing and configuring storage router software.
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## Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com>

Translated documentation is available at this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

## Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

## Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:  
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the “Leave Feedback” section at the bottom of the page.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

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

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

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

## Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

<http://www.cisco.com>

## Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

## Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

<http://www.cisco.com/register/>

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

## Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

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This document is to be used in conjunction with the documents listed in the "Related Documentation" section.



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