



Release Notes for Cisco SN 5420 Storage Router Release 1.1.8

January 30, 2002



Note

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.

These release notes support Cisco SN 5420 Storage Router Release 1.1.8.

For a list of software caveats that apply to Release 1.1.8, see the “[Caveats](#)” section. The caveats are updated for every maintenance release and are located on Cisco.com and the Documentation CD-ROM.

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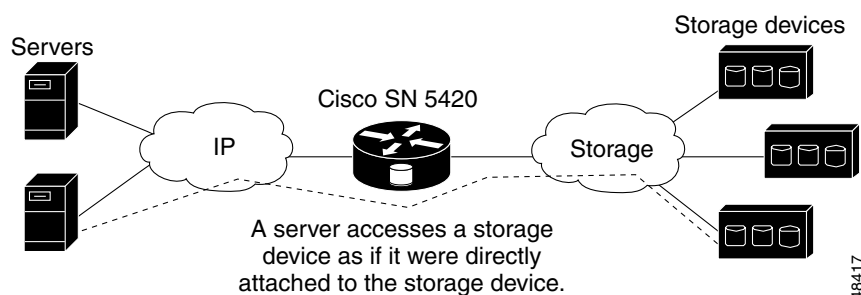
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Introduction

The SN 5420 Storage Router provides servers with IP access to storage through SCSI routing using iSCSI protocol. The iSCSI protocol is a protocol for encapsulating SCSI requests and responses over IP. With SCSI routing, servers use an IP network to access storage as if the servers were directly attached to the storage devices. (See [Figure 1](#).)

Figure 1 SN 5420 Storage Router Overview



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>.

System Requirements

This section describes the system requirements for Release 1.1.8 and includes the following information:

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Obtaining Updated Software and iSCSI Drivers

From time to time, Cisco releases updated versions of storage router software and iSCSI drivers. Servers accessing the SN 5420 Storage Router must have a Cisco Storage Networking iSCSI driver installed and configured. Updated versions of storage router software and the Cisco Storage Networking iSCSI drivers, accompanying readme files, release notes and example configuration files are available for download.

If you are a registered Cisco.com user, you can download storage router software and iSCSI drivers. If you are a non-registered Cisco.com user, you can download only iSCSI drivers.

You can access software by following these instructions:

-
- Step 1** Go to one of the following web pages:
- For registered Cisco.com users:
<http://www.cisco.com/cgi-bin/tablebuild.pl/sn5420>
 (You will be prompted to enter your user name and password.)
 - For non-registered Cisco.com users (iSCSI drivers only):
<http://www.cisco.com/pcgi-bin/tablebuild.pl/sn5420>
- Step 2** At the Select a File to Download table, in the Filename column, click a file.
- Step 3** If you agree to the terms and conditions of the software license agreement, download the file.
-

In addition, you can check these websites for information about the availability of new drivers, updated storage router software and drivers, driver compatibility, and other relevant information.



Note

URLs are subject to change without notice. If the URL changes, go to <http://www.cisco.com> and click **Software Center** at **Service & Support**. At Software Center, click **Storage Networking Software**. Then, at Storage Networking Software, click **Cisco SN 5420 Storage Router Software**. If you are a registered Cisco.com user, be sure to log in first.

External Devices

The SN 5420 Storage Router Gigabit Ethernet interface uses a flow control mechanism for stopping and starting traffic that prevents the loss of data. Flow control should also be turned on at the Gigabit Ethernet port that the SN 5420 Storage Router is plugged in to.

External Hosts

- To ensure the best performance for 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 servers connecting to the SN 5420. You can use the CLI **show scsirouter connection tcp** command to display the current and maximum TCP window size for each connected host.
- If you are using a 3Com Gigabit Ethernet Server network interface card, the minimum supported revision level is “B” (3C985B-SX). Using a card with a lower revision level will decrease performance.

Graphical User Interface

- To ensure the display of the most current SN 5420 information, disable your browser cache. If caching is enabled, use your browser Refresh or Reload function to force the current page to be reloaded from the storage router.
- If you are accessing the GUI from a browser running on a Microsoft Windows platform, Cisco recommends the use of Microsoft Internet Explorer version 5.5 with service pack 2 or Netscape Navigator 4.71, or later, to make updated software available to the storage router. Earlier versions of Microsoft Internet Explorer running on Microsoft Windows platforms may return an “Access Denied” message and fail to download the software. (This problem does not occur with Microsoft Internet Explorer version 5.0x running on UNIX or other platforms.)

This browser restriction applies only to the Download Software feature (available from the Maintenance function) and only when accessing the GUI with a browser running on the Microsoft Windows platform. There are no browser limitations or requirements associated with other features and functions of the SN 5420 web-based GUI.

- To access the online Help system for the SN 5420 web-based GUI, use a browser that is compatible with HTML 3.2, such as Internet Explorer 3.0 or later, or Netscape Navigator 3.0 or later. Any browser that does not provide full support for Dynamic HTML (such as Netscape Navigator) must be enabled to support Java, JavaScript and style sheets. This browser restriction applies only to the online Help system.

Determining the Storage Router Software Version

To determine the version of SN 5420 software running on the Cisco SN 5420 Storage Router, establish a Telnet or console port session with the storage router, and change to Administrator mode. Then enter the CLI **show software** command. (See [Example 1](#).)

Example 1 Determining the Software Version

```
[SN5420-A01]# show software
Version          Boot Hash Sign Crash      Size Date
1.1.7            OK  OK   N/A    0    7.40 MB Now 29 13:33 CST 2001
1.1.8            OK  OK   N/A    0    7.62 MB Jan 30 09:15 CST 2002
Disk Space Free: 10.5 Mbytes
  Download URL: http://10.1.11.32/~software/sn5420
  Download User: SWAdmin01
Running Version: 1.1.8
Will boot Version: 1.1.8
```

The last entries in the table of information displayed in response to the command show the running version (*Running Version*) and the version that the storage router will run at the next reboot (*Will boot Version*).

You can also check the version of the SN 5420 software by using the SN 5420 web-based GUI. At the web-based GUI **Monitor** page, click **Processor and SW** under the **System** menu. Clicking **Processor and SW** causes the **Processor and Software Information** table to be displayed. The **Software Version** field contains the current software version information.

Upgrading to a New Software Release

For information about upgrading to new SN 5420 software using the CLI, see the section “Installing Updated Software” in Chapter 6, “Maintaining and Managing the SN 5420,” of the *Cisco SN 5420 Storage Router Software Configuration Guide*.

To upgrade to new SN 5420 software using the SN 5420 web-based GUI, follow these instructions.



Note If you are accessing the GUI from a browser running on a Microsoft Windows platform, Cisco recommends that you use Microsoft Internet Explorer version 5.5 with service pack 2 or Netscape Navigator version 4.71, or later, to perform the software download functions.

-
- 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** Click **Download Software** in the **Maintenance** menu and follow the instructions.
 - Step 4** After you have downloaded the new version of software, click **System Reset** in the **Maintenance** menu.
 - Step 5** At **Select next boot version**, select the new software version.
 - Step 6** Click **Reset System**.
 - Step 7** After the storage router has rebooted, verify that it is running the new software. (See the [“Determining the Storage Router Software Version”](#) section on page 4.)
-

For information about upgrading to new iSCSI driver software, see the readme file for the appropriate iSCSI driver.

Uninstalling an Upgrade

To return to a previous SN 5420 software release and remove the updated SN 5420 software using the CLI, follow these instructions:

	Command	Description
Step 1	enable	Enter Administrator mode.
Step 2	show software	Verify that the previous version of SN 5420 software is still available. If it is not, see the section “Installing Updated Software” in Chapter 6, “Maintaining and Managing the SN 5420” of the <i>Cisco SN 5420 Storage Router Software Configuration Guide</i> .
Step 3	set software version 1.1.7	Select the software to be booted when the system next starts; for example, boot version 1.1.7 when the system restarts. This may take several minutes.
Step 4	reboot	Reboot the SN 5420 Storage Router.
Step 5	enable	Enter Administrator mode after the storage router reboots.

	Command	Description
Step 6	show software	Verify that the storage router is now running the correct software.
Step 7	delete software version 1.1.8	(Optional) Remove the updated SN 5420 software from the storage router.

To return to a previous SN 5420 software release and remove the updated SN 5420 software using the SN 5420 web-based GUI, follow these instructions:

-
- Step 1** Log in as Admin.
- Step 2** Click **System Reset** in the **Maintenance** menu.
- Step 3** At **Select next boot version**, select the software version to be run on the SN 5420.
- Step 4** Click **Reset System**.
- Step 5** After the storage router has rebooted, verify that it is running the selected software. (See the [“Determining the Storage Router Software Version”](#) section on page 4.)
- Step 6** (Optional) Click the **Maintenance** menu, then click the **Delete?** link to the right of the new software version to remove it from the storage router.
-

For information about uninstalling updated iSCSI driver software, see the readme file for the appropriate iSCSI driver.

New and Changed Information

- The Cisco Storage Networking iSCSI Driver for Microsoft Windows NT version 1.8.8, when used in conjunction with Cisco SN 5420 software release 1.1.7 or higher, supports a maximum of 255 LUNs per target.
- The Cisco Storage Networking iSCSI Driver for Microsoft Windows 2000 version 1.8.9, when used in conjunction with Cisco SN 5420 software release 1.1.7 or higher, supports a maximum of 255 LUNs per target.

Limitations and Restrictions on SN 5420 Storage Router Clusters

For this release, there are no new limitations or restrictions on SN 5420 Storage Router clusters. The limitations and restrictions associated with SN 5420 release 1.1.3 still apply, as follows:

- A storage router cluster can contain up to two SN 5420 Storage Routers.
- A cluster can contain up to four instances of SCSI routing services.
- Each instance of SCSI routing services in a cluster can support up to 32 servers. (Each server connects to an instance of SCSI routing services with only one TCP/IP session. Each instance of SCSI routing services can support up to 32 TCP/IP sessions.)

Caveats

Caveats describe unexpected behavior or defects in SN 5420 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 open caveats that apply to the current release and may apply to previous releases.
- The “[Resolved Caveats](#)” section list caveats resolved in a particular release, but open in previous releases.

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

**Note**

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.

Open Caveats

There are no severity 1 or 2 caveats open against SN 5420 Release 1.1.8. For a more complete list of caveats against this release, access Cisco.com as described in the section “[Cisco.com](#)” at the end of this document.

Resolved Caveats

All the caveats listed in this section are resolved in SN 5420 Release 1.1.8.

Fibre Channel

- CSCdw31567

If the Fabric network is experiencing many loop and/or link initializations, the SN 5420 Storage Router may perform a spontaneous restart. The storage router crash log shows a Mailbox Command entry in the stack trace of both the “tNetTask” and “qlScsiMgr” task entries.

Workaround: Change the configuration of the Fabric network to reduce loop and/or link initializations.

- CSCdw34532

When a Windows 2000 host accesses a Compaq RA4100 array through the SN 5420 Storage Router, the array may hang and require a reset. The problem may occur if TASK management requests are sent to the RA4100 array, which does not support these types of commands.

Workaround: None.

Documentation Updates

This section describes changes to the Cisco SN 5420 Storage Router documentation set since initial publication.

- References to iSCSI driver CD

On pages vii, 1-1 and 1-10 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, and page 1-1 of the *Cisco SN 5420 Storage Router Hardware Installation Guide*, there are references to a Cisco Storage Networking iSCSI Drivers CD. The iSCSI drivers, readme and example configuration files referenced there are currently available only through the Cisco.com website. The Cisco SN 5420 Storage Router does not currently ship with a Cisco Storage Networking iSCSI Drivers CD.

See the “[Obtaining Updated Software and iSCSI Drivers](#)” section on page 2 for details on obtaining iSCSI drivers.

- Fibre Channel Port Cabling Specifications

On page B-2 of the *Cisco SN 5420 Storage Router Hardware Installation Guide*, Table, B-2, “Fibre Channel Port Cabling Specifications,” the values in the Maximum Cable Distance column should be changed as follows:

- Row 1: Change 300 ft (91 m) to 984 ft (300 m).
- Row 2: Change 500 ft (152 m) to 1640 ft (500 m).

- CLI command **add route gw**

On page 7-6 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, an **interface** keyword should be added to the **add route gw** command. This optional keyword allows a route to be associated with a specific interface, for example, the Gigabit Ethernet interface. If the interface is not specified, the storage router will try to determine the interface on its own by checking already existing routes and interface addresses. This command was enhanced to resolve caveat CSCdu24643.

If a route is added for an interface that is not yet configured with an IP address, a message displays indicating that the specified gateway is currently unreachable by the named interface, but the route will be added when the named interface is configured with a suitable IP address. To display the route before it is added to the routing table, use the new **show route** command.

The new **add route gw** command syntax is:

```
add route {A.B.C.D/bits | A.B.C.D/1.2.3.4 | default} gw E.F.G.H [interface ifname]
```

- CLI command **add scsirouter target**

On pages 7-11 and 7-15 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the following sentences should be added to the end of the first paragraph in the “Usage Guidelines” section. On page 7-21, the sentences should be inserted into the “Usage Guidelines” section between the fourth and fifth paragraphs.

Mapping to a loop ID assumes a compatible device interface topology, such as *loop*. If an incompatible device interface topology, such as point-to-point (PTP), is detected, a warning message is displayed (although the requested mapping action is still processed by the storage router).

- Backing Up System Configuration

The CLI does not support saving system configuration files to a URL. On page 6-5 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the third paragraph should be changed to read as follows:

Configuration files are normally maintained in the *savedconfig* directory on the SN 5420. By accessing the web-based GUI from a remote server, you can also create storage router backup files directly on that server. See the GUI online help for details.

The text and procedures under the heading “Remote Backup” should be deleted.

- CLI command **delete scsirouter target**

The functionality of the **delete scsirouter target** command has been enhanced. Any attempt to delete a target or LUN that is currently logged into by an iSCSI driver will result in an informational message indicating that the object is in use and will not be deleted.

On page 7-32 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, an optional **force** keyword should be added to the **delete scsirouter target** command. The **force** keyword allows the deletion of a target or LUN that is in use by an iSCSI driver, overriding the default protections.

Use the **force** keyword with caution. Deleting a target or LUN that is being actively used by an iSCSI driver can cause unexpected results.

The new command syntax is:

delete scsirouter name target {name | all} [lun nn] [force]

- Downloading Updated Software

To eliminate potential space problems when downloading updated software, the download process will now fail if more than one version of software is detected on the storage router.

On pages 6-3 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the following sentences should be added to the end of the first paragraph in the “Make Updated Software Available to the SN 5420” section. On page 7-39, these sentences should be inserted into the “Usage Guidelines” section as the second paragraph.

You can store two versions of software on the storage router. Before attempting to install updated software, verify that only a single version of software exists on the storage router. If necessary, delete any software except the current running version.

- CLI command **download software readme**

The **download software readme** command has been removed. The Release Notes document for each software release is only available as an electronic document on Cisco.com and the Documentation CD-ROM.

All references to the **download software readme** command should be removed from the *Cisco SN 5420 Storage Router Software Configuration Guide*.


- Failover Commands

On page 7-40, 7-41, and 7-42 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the description of failover functionality on a stand-alone system should be changed to read as follows:

If no eligible storage router is found, the SCSI routing service will start running again on the same storage router. If the SN 5420 is configured as a stand-alone system, failover is not allowed.

- First-Time Configuration

On page 2-4 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the steps in the section “Entering the Management Interface IP Address” should be changed as follows:

	Command	Description
Step 1	set mgmt ipaddress <i>A.B.C.D/bits</i>	<i>A.B.C.D</i> is the IP address of the SN 5420 management interface. <i>/bits</i> is the subnet mask, in CIDR style.
Step 2	set ha configuration clustered or set ha configuration standalone	Set the configuration mode for the storage router. If the storage router is to participate in a cluster, use the command set ha configuration clustered . The HA and MGMT cables must be connected. If the storage router is a stand-alone system, use the command set ha configuration standalone . In stand-alone mode, the storage router can be configured even if the management and HA interfaces are not operational.
	 Note	After completing both configuration commands, the storage router will automatically reboot.



Note If the management IP address is set and the storage router rebooted without setting the configuration mode for the SN 5420, the storage router defaults to clustered mode.

- CLI command **set ha configuration**

The **set ha configuration** command is a new command, added as part of the resolution to caveat CSCdt56378. To specify the configuration mode for the storage router, or to manually switch between modes, use the **set ha configuration** command. This is an Administrator-mode command.

set ha configuration {standalone | clustered}

Use the **standalone** keyword to configure a storage router that will not participate in a storage router cluster. A stand-alone storage router does not require the management or HA interfaces to be available in order to complete the SN 5420 configuration. The MGMT and HA ports do not need to be cabled.

Use the **clustered** keyword to configure a storage router that will participate in a storage router cluster. A clustered storage router requires the management and HA interfaces to be available in order to complete the SN 5420 configuration. The MGMT and HA ports must be correctly cabled.

Use the **save system** or **save all** CLI command to save the setting.

- CLI command **set scsirouter reserveproxy**

The **set scsirouter reserveproxy** command is a new command, added as part of the resolution to caveat CSCdu85322. To configure a Reserve / Release proxy on the specified SCSI routing services instance and to specify whether the SCSI reserve and release commands are forwarded to the target, use the **set scsirouter reserveproxy** command. This is an Administrator-mode command.

set scsirouter name reserveproxy {enable | disable} [passthru {yes | no}]

The SCSI Reserve / Release command allows an initiator to reserve the storage device for its own use. Attempts to access the storage device from other initiators are rejected until the first initiator releases the storage device. If this feature is enabled, the storage router keeps track of the reserved status of target LUNs and returns the appropriate SCSI command status to other initiators that issue SCSI commands to that target LUN. If passthru is set to **yes**, the reserve is sent to the target.



Note This functionality does not apply to operating systems (such as Windows NT) which do not utilize the SCSI Reserve command.

The Reserve / Release proxy feature is disabled by default.

- CLI command **set software version**

The functionality and output of the **set software version** command have been enhanced to include verification of software, confirmation of required disk space, and status at each step in the process.

- CLI command **show devices**

On page 7-131 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the “Usage Guidelines” section should be updated to read as follows:

Use this command to display the WWNN, WWPN, LUN number, vendor, product name and serial number for all devices found on the SN 5420 Fibre Channel network. For loop-attached devices, loop ID information is also displayed. For fabric-attached devices, the 24-bit port ID is displayed. The output indicates the type of topology on which the devices are detected as *private/public loop* or *fabric attached*.

The following “Examples” section should be added.

The following is an example of output for the **show devices** command when the device interface topology is set to PTP:

```
[SN5420A]# show devices
Private/Public Loop Devices detected:
lunwwn:wwpn:loopid:lun:vendor:product:serial
NONE
Fabric Attached Devices detected:
lunwwn:          wwpn:          portId: lun: vendor:   product:   serial
3000102037f9bf2a 3100003078b9bf2a 0x411ea 0  SEAGATE   ST31951FD 4DZA4MZB012
4000402037e9c036 4100004056b9c036 0x4113c 0  SEAGATE   ST31951FD 3CX04M4T015
5003002037d9c01e 5100002088b9c01e 0x511f0 0  SEAGATE   ST31951FD 3CPQ4MN0715
6000082037c9bf7c 6100001137b9bf7c 0x511f1 0  SEAGATE   ST31951FD 3CZZ46H7005
```

The following is an example of output for the **show devices** command when the device interface topology is set to loop:

```
[SN5420A]# show devices
Private/Public Loop Devices detected:
lunwwn:          wwpn:          loopid: lun: vendor:   product:   serial
3000102037b7847d 3100002037b7847d 1      0x0  SEAGATE   ST31951FD 3CC03007110
2008002047z78e44 2100002047z78e44 2      0x0  SEAGATE   ST31951FD 3C3A830010C
9000002038c59748 2100002038c59748 3      0x0  SEAGATE   ST31951FD 3CCPNT00711
2000002067c51e08 2100002067c51e08 4      0x0  SEAGATE   ST31951FD 3CV2X000711
Fabric Attached Devices detected:
lunwwn:wwpn:portId:lun:vendor:product:serial
NONE
```

- CLI command **show log**

On page 7-138 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the description for the **match string** syntax should be updated as follows:

- (Optional) Display all entries that match the specified string or regular expression.

The second bullet in the “Usage Guideline” section should be updated as follows:

- Use the **match string** parameter to display messages matching the specified string or regular expression. You can search the entire log file for matching messages by using the **all** keyword, or restrict the search to the last *nn* number of messages.

- CLI command **show route**

The **show route** command is a new command, added as part of the resolution to caveat CSCdu24643. To display all routes that have been configured, including those that have not been added to the routing table because the associated interface is not yet configured, use the **show route** command. This is an Administrator-mode command.

show route

- CLI command **verify software version**

The output of the verify software version command has been enhanced to display additional information. On page 7-69 of the *Cisco SN 5420 Storage Router Software Configuration Guide*, the “Usage Guidelines” section should be updated to read as follows:

Use this command after downloading software to verify that the download completed successfully and that the download software is bootable. The output includes the name, size and status for each module in the SN 5420 Storage Router software.

Related Documentation

The following sections describe the related documentation available for Cisco SN 5420 Storage Router Release 1.1.8. These documents consist of hardware installation and software configuration guides, and platform-specific release notes, readme and example configuration files for the Cisco Storage Networking iSCSI drivers.

Release-Specific Documents

This Release Notes document is the only document specific to SN 5420 Release 1.1.8. 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 Storage Networking iSCSI drivers. The files are currently available in electronic format only. See the [“Obtaining Updated Software and iSCSI Drivers” section on page 2](#) for details.

Hardware Documents

Refer to the *Cisco SN 5420 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 5420 Storage Router Software Configuration Guide* 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 5420 web-based GUI, refer to the SN 5420 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.

Obtaining Documentation

The following 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 the following URL:

<http://www.cisco.com>

Translated documentation is available at the following URL:

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

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:
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 corporate headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

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To submit your comments by mail, use the response card behind the front cover of your document, or write to the following address:

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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 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.

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- Download and test software packages
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- Register for online skill assessment, training, and certification programs

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

<http://www.cisco.com>

Technical Assistance Center

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

Inquiries to Cisco TAC 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.

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

Cisco TAC Web Site

The Cisco TAC Web Site allows you 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 the following URL:

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

All customers, partners, and resellers who have a valid Cisco services 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 the following URL to register:

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

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

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

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; 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 will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following 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). In addition, please have available your service agreement number and your product serial number.

This document is to be used in conjunction with the documents listed in the [“Related Documentation”](#) section.



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