



# Release Notes for Cisco iSCSI Driver Version 2.1.4 for Sun Solaris 2.6 or Sun Solaris 7 or 8

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**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 iSCSI Driver version 2.1.4 for Sun Solaris 2.6, and Sun Solaris 7 and 8.

For a list of software caveats that apply to version 2.1.4, see the “[Caveats](#)” section. The caveats are updated for every maintenance version and are located on Cisco.com and the Documentation CD-ROM.

## Contents

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# Introduction

The iSCSI Driver for Sun Solaris provides an IP host with the ability to access storage through an IP network. The iSCSI driver uses iSCSI protocol to transport SCSI requests and responses over an IP network between the host and a Cisco SN 5400 Series system.

Architecturally, the iSCSI driver combines with the host TCP/IP stack, network drivers, and NICs to provide the same functions as a SCSI adapter driver with a host bus adapter (HBA).

The iSCSI driver provides a transport for SCSI requests and responses for storage devices; however, instead of providing a transport for directly attached devices, the driver transports the SCSI requests and responses between the IP host and a Cisco SN 5400 Series system via an IP network. The SN 5400 Series system, in turn, transports SCSI requests and responses between it and the storage devices attached to it.

Once the iSCSI driver is installed, the IP host will proceed with a discovery process for iSCSI storage devices as follows:

- 
- Step 1** The iSCSI driver requests available iSCSI targets from the SCSI routing instances in the SN 5400 Series systems listed in the configuration file `/etc/iscsi.conf`, in the order that they appear.
  - Step 2** Each SN 5400 Series system sends available iSCSI target names to the iSCSI driver.
  - Step 3** The iSCSI discovery daemon looks up each discovered target in the `/etc/iscsi_bindings` file. If an entry exists in the file for a target, the corresponding Solaris target ID is assigned to the target; if no entry exists for a target, the smallest available Solaris target ID is assigned and an entry is written to the `/etc/iscsi_bindings` file. The iSCSI driver logs into the first 64 iSCSI targets it discovers, ignoring any remaining targets.
  - Step 4** The SN 5400 Series system accepts the login and sends target identifiers.
  - Step 5** The Solaris IP host queries targets for device information.
  - Step 6** Targets respond with device information.
  - Step 7** The Solaris IP host creates a table of internal devices.
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The iSCSI Driver for Sun Solaris provides IP access to a maximum of 64 remote SCSI targets, with each target capable of supporting 256 LUNs.

**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>.

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## System Requirements

This section describes the system requirements for version 2.1.4 and includes the following information:

- [Operating System Requirements, page 3](#)
- [SN 5400 Series System Software Requirements, page 5](#)
- [Obtaining the iSCSI Driver and Updated SN 5400 Series System Software, page 5](#)
- [Upgrading to a New Version, page 6](#)
- [Uninstalling iSCSI Driver Software, page 7](#)

## Operating System Requirements

- The iSCSI Driver for Sun Solaris runs only on SPARC processor-based machines.
- The iSCSI Driver for Sun Solaris requires either Sun Solaris version 2.6 or Sun Solaris 7 or 8, with all Sun-recommended patches installed for the version being used.
- The iSCSI Driver for Sun Solaris supports both single and multiple processor machines.
- To ensure the best performance for the iSCSI driver, the extended windowing feature of TCP should be enabled on all IP hosts connecting to the SN 5400 Series system. In general, a larger window size enhances SN 5400 Series system throughput performance.
- To maximize performance, the receive and transmit flow control feature of the Gigabit Ethernet driver should be enabled on all IP hosts connecting to the SN 5400 Series system. If the IP hosts or the SN 5400 Series systems are connected to any Ethernet switches, the receive and transmit flow control attributes should be enabled on each of the connected switch ports.
- If you are using a 3Com Gigabit Ethernet Server network interface card in the IP host, the minimum supported revision level is “B” (3C985B-SX). Using a card with a lower revision level will significantly decrease performance.

## Mounting Devices

No iSCSI device can be mounted until after the iSCSI daemon has started and logged into the appropriate iSCSI targets in the Cisco SN 5400 Series system. The iSCSI `init.d` script looks for entries with the “mount at boot” field set to “iscsi” in the `/etc/vfstab` file, and attempts to mount those entries after the iSCSI daemon starts. This allows iSCSI devices to be automatically mounted as early as possible in the boot process.

For example, the following `/etc/vfstab` entries will fsck and mount the two iSCSI devices specified:

#device	device	mount	FS	fsck	mount	mount
#to mount	to fsck	point	type	pass	at boot	options
/dev/dsk/c1t5d0s6	/dev/rdisk/c1t5d0s6	/mnt/t5	ufs	1	iscsi	-
/dev/dsk/c1t6d0s6	/dev/rdisk/c1t6d0s6	/mnt/t6	ufs	1	iscsi	-



### Note

Due to network delays, targets may not always become available in the same order. This means that the order in which iSCSI devices are mounted may vary, and may not match the order of the devices listed in `/etc/vfstab`. You should not assume that mounts of iSCSI devices will occur in any particular order.

The “mount at boot” field in `/etc/vfstab` should never be set to “yes” for an iSCSI device, because the standard Solaris boot sequence mounts devices before the network is available. Mounts of iSCSI devices with the “mount at boot” field set to “yes” fail because the iSCSI devices are not available that early in the boot process. If a mount fails, a maintenance shell will start and the Solaris boot process will not complete until the shell is exited. A user at the console must exit from the shell to cause the boot process to complete without the listed devices mounted.

## Unmounting Devices

All iSCSI devices must be unmounted before the iSCSI driver stops. If the iSCSI driver stops while iSCSI devices are mounted, buffered writes may not be committed to disk and filesystem corruption may occur. Because Solaris will not unmount devices that are being used by a running process, all processes using the iSCSI devices must be killed before the devices can be unmounted.

The `init.d` script will attempt to kill all processes using iSCSI devices by sending them `SIGTERM` and `ILL`. The `init.d` script then unmounts all iSCSI devices, and kills the iSCSI daemon, terminating all connections to iSCSI devices.



### Note

The `init.d` script may not be able to successfully unmount filesystems because they are in use by processes that cannot be killed. Best practice is to manually stop all applications using the filesystem before stopping the driver.

## Persistent Target Bindings

Persistent target binding ensures that a Solaris SCSI target always maps to the same physical storage device across system restarts. The iSCSI daemon stores bindings of iSCSI target iSCSI Names (or WWUIs) to Solaris target IDs in the file `/etc/iscsi_bindings`.

If any entry exists for a discovered target, the Solaris target ID from the entry is assigned to the target. If no entry exists for a discovered target, an entry is written to the file.

The `iscsi_bindings` file contains the Solaris target ID, the discovery address, and the iSCSI Name (or WWUI) of the iSCSI target, as shown in the following example:

```
TargetId  DiscoveryAddress  TargetName
0  10.100.100.156      iqn.1987-05.com.cisco.00.7e9d6f942e45736be69cb65c4c22e54c.disk_one
1  10.100.100.156      iqn.1987-05.com.cisco.00.4d678bd82965df7765c788f3199ac15f.disk_two
```

A discovery connection to each `DiscoveryAddress` remains open; new targets that become available to the Solaris host after the driver is started are automatically logged into and added to the `iscsi_bindings` file (if no entry currently exists).

To use these new targets, Solaris administrative command, such as `drvconfig`, `disks`, or `tapes`, must be issued to add the required `/dev` entries. If the required target and LUN entries for the new target do not exist in `/kernel/drv/sd.conf`, you may have to add them and reboot the system before you can access the target.

The `/etc/iscsi_bindings` file contains persistent entries for all iSCSI targets ever logged into from this host. If a target is no longer available to a host, you can stop the iSCSI driver and manually edit the `iscsi_bindings` file and remove the entry so the obsolete target no longer consumes a Solaris target ID.

For more information about the `iscsi_bindings` file and persistent target binding, see the iSCSI driver `readme` file.

## Starting and Stopping the iSCSI Driver

It is possible to manually stop and start the iSCSI driver. This may be necessary if you want to make configuration changes without rebooting the Solaris system. When stopping the iSCSI driver, the `init.d` script will attempt to unmount iSCSI devices. Because the `init.d` script may not be able to unmount busy filesystems, best practice is to manually stop all applications that are using iSCSI filesystems before stopping the driver.

To manually stop the iSCSI driver, enter:

```
/etc/init.d/iscsi stop
```

To manually start the iSCSI driver, enter:

```
/etc/init.d/iscsi start
```



### Caution

When installing the iSCSI driver, do not manually stop and restart the iSCSI driver. Always reboot the Solaris system after doing a “`pkgadd`” of the driver.

## Rebooting Solaris

All iSCSI devices should be unmounted prior to a system shutdown.

The Solaris `/usr/sbin/reboot` command should not be used to reboot the system while iSCSI devices are mounted. This reboot command will not execute the iSCSI shutdown script in `/etc/rc0.d`, and file system corruption can occur.

To safely reboot the Solaris system, use the following shutdown command:

```
/usr/sbin/shutdown -i 6
```

## SN 5400 Series System Software Requirements

The iSCSI Driver version 2.1.4 for Sun Solaris is compatible with a Cisco SN 5400 Series system running software release 2.1.1 or later; this driver is not compatible with any Cisco SN 5420 Storage Router running software release 1.1.x.

## Obtaining the iSCSI Driver and Updated SN 5400 Series System Software

From time to time, Cisco releases updated versions of SN 5400 Series system software and iSCSI drivers. Updated versions of SN 5400 Series system 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 5400 Series system software and iSCSI drivers.

You can access software by following these instructions:

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- 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.

## Upgrading to a New Version

To upgrade to a new version of iSCSI driver software, follow these instructions.



### Note

You must be super-user (root) to install and configure the iSCSI driver package.

- Step 1** Unmount all iSCSI file systems and stop the old iSCSI driver. To manually stop the iSCSI driver, enter:
- ```
/etc/init.d/iscsi stop
```

- Step 2** Save the current `/etc/iscsi.conf` and `/kernel/drv/sd.conf` configuration files to another location.

- Step 3** Remove the old iSCSI package.

```
pkgrm CSKOiscsi
```

- Step 4** Copy the `solaris_iscsi_<version>.tar.Z` file to a working directory, such as `/usr/local/iscsi`. Make the directory if it does not exist. If the directory does exist, remove any files from a previous installation. The `<version>` is the three digit version, such as 2.1.4. For example:

```
mkdir /usr/local/iscsi
cp /tmp/solaris-iscsi-2.1.4.tar.Z /usr/local/iscsi
```

- Step 5** Change to the working directory created in Step 4, and untar the file using the tar command. For example:

```
cd /usr/local/iscsi
uncompress solaris-iscsi-2.1.4.tar.Z
tar xvf solaris-iscsi-2.1.4.tar
```

Your working directory (`/usr/local/iscsi` in the examples above) now contains the iSCSI driver package. The package contains the drivers and associated files.

- Step 6** Add the package.

```
cd /usr/local/iscsi
pkgadd -d . CSKOiscsi
```

The package installation instructions note that the system must be rebooted. Continue with the following configuration steps before rebooting the system.

- Step 7** Compare the current `/etc/iscsi.conf` file to the `iscsi.conf` file saved in Step 2. Update it with any new information from the upgrade file, and save it as `/etc/iscsi.conf`. (If an `/etc/iscsi.conf` file exists when the new iSCSI driver package is installed, it is not overwritten or deleted. The updated `iscsi.conf` file is installed as `iscsi.conf.<version>`; for example `iscsi.conf.2.1.4`.)

- Step 8** Compare the current `/kernel/drv/sd.conf` to the `sd.conf` file saved in Step 2. Update it with any new information from the upgrade file, and save it as `/kernel/drv/sd.conf`.
- Step 9** Reboot the system to start and reload the iSCSI driver.
- Step 10** Rebooting the system in Step 9 should reconfigure devices and load the iSCSI driver. Once the iSCSI daemon starts, execute the commands in [Example 1](#) or [Example 2](#) to reconfigure the SCSI disk devices:

**Example 1** *Configure the `/devices` Directory and Create `/dev` Entries*

```
drvconfig
disks
```

**Example 2** *Solaris Administration Command for `/dev` and `/devices`*

```
devfsadm
```

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See the readme file for additional information about installing or upgrading iSCSI driver software.

## Uninstalling iSCSI Driver Software

To uninstall the iSCSI driver software, follow these instructions:

- Step 1** Unmount all iSCSI devices and stop the driver. For example:

```
/etc/init.d/iscsi stop
```

You may want to save the `/etc/iscsi.conf` configuration file to another location before proceeding with the removal process.

- Step 2** Remove the iSCSI driver. You must have super-user (root) authority to remove the driver.

```
pkgrm CSCOiscsi
```

All configuration files installed by the package will be deleted.

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# Caveats

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

- The “[Open Caveats](#)” section describes open severity 1 and 2 caveats that apply to the current version and may apply to previous versions.
- The “[Resolved Caveats](#)” section describes severity 1 and 2 caveats resolved in this version, but open in previous versions.

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 version. 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

- CSCdw58478

While running traffic to a tape drive, the Gigabit Ethernet connection from a Sun Solaris IP host to the SN 5420 Storage Router may be intermittently dropped and re-added for no apparent reason.

Workaround: None. However, the user should check the connections between the hosts and the SN 5420, and verify that the flow control is consistent between the hosts, switches, and the SN 5420s.

## Resolved Caveats

All of the caveats listed in this section are resolved in the iSCSI driver version 2.1.4 for Sun Solaris.

- CSCdy08637

When the iSCSI driver loses communication with the SN 5400 Series system, the iSCSI driver holds a data packet until the SCSI timer expires, or communication is re-established. Because the Solaris sd driver attempts several retries for each aborted command, Powerpath failover can be significantly delayed.

Workaround: None. This problem is resolved in the iSCSI driver version 2.1.4 through the implementation of the ConnFailTimeout parameter in the `/etc/iscsi.conf` file. For more information about the `/etc/iscsi.conf` file format and the ConnFailTimeout parameter, see the iSCSI driver readme file.

## Related Documentation

The following sections describe the related documentation available for the iSCSI Driver version 2.1.4 for Sun Solaris and the Cisco SN 5400 Series systems. These documents consist of the iSCSI driver release notes, readme and example configuration files, and the SN 5400 Series system hardware installation and software configuration guides.

The SN 5400 Series system hardware installation and software configuration documentation sets are available as printed manuals or electronic documents. The iSCSI driver readme file and example configuration file are available in electronic format, as part of the software download package. See the [“Obtaining the iSCSI Driver and Updated SN 5400 Series System Software” section on page 5](#) for details.

## Release-Specific Documents

This Release Notes document is the only document specific to the iSCSI Driver version 2.1.4 for Sun Solaris. It is located on Cisco.com and the Documentation CD-ROM.

Each release of SN 5400 Series system software includes an associated Release Notes document, which is also available as an electronic document on Cisco.com and the Documentation CD-ROM.

## Hardware Documents

Refer to the appropriate SN 5400 Series system hardware installation guide for hardware installation procedures. The *Cisco SN 5420 Storage Router Hardware Installation Guide* provides hardware installation procedures for SN 5420 Storage Routers. The *Cisco SN 5428 Storage Router Hardware Installation Guide* provides hardware installation procedures for SN 5428 Storage Routers. These documents are available as printed manuals. They are also available as electronic documents on Cisco.com and the Documentation CD-ROM.

## Software Documents

Refer to the appropriate SN 5400 Series system software configuration guide for software configuration information. The *Cisco SN 5420 Storage Router Software Configuration Guide Release 2.1* provides configuration information for SN 5420 Storage Routers. The *Cisco SN 5428 Storage Router Software Configuration Guide (Release 2.2 or later)* provides configuration information for SN 5428 Storage Routers. These documents are available as printed manuals. They are also available as electronic documents on Cisco.com and the Documentation CD-ROM.

For documentation on the SN 5400 Series system web-based GUI, refer to the SN 5400 Series system 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 5400 Series system software and iSCSI driver installation, configuration and usage tips are available on the Cisco Technical Assistance Center (TAC) Web Site.

For example, you can access Cisco SN 5420 “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 **SN 5420 Product Support** link.
- Step 3** At the Cisco SN 5420 Storage Router Product Support web page, click the appropriate links for additional information about installing and configuring SN 5400 Series system software and iSCSI drivers.
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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.

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
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- 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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