



Release Notes for the Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 11.2(8.10)SA6

February 2002

Cisco IOS Release 11.2(8.10)SA6 runs on Catalyst 2900 series XL and Catalyst 3500 series XL switches.

These release notes include important information about Cisco IOS Release 11.2 (8.x)SA6 and any limitations, restrictions, and caveats that apply to it, as well as resolved caveats in IOS Release 11.2(8.2)SA6, resolved caveats and new features in IOS Release 11.2(8.5)SA6, and resolved caveats in Release 11.2(8.10)SA6. See the [“Related Documentation” section on page 23](#) for the complete list of Catalyst 2900 and 3500 XL documentation.

This IOS release is part of a special release of Cisco IOS software that is not released on the same 8-week maintenance cycle that is used for other platforms. As maintenance releases and future IOS releases become available, they will be posted to CCO in the Cisco IOS software area.

These release notes apply to the Cisco IOS Release 11.2(8.10)SA6 Enterprise Edition Software (-EN suffix) and the standard edition software (-A suffix). Those sections that make no reference to the Enterprise Edition Software or the standard edition software apply to both editions.

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Release 11.2(8.10)SA6 Modifications

This problem was resolved in Cisco IOS Release 11.2(8.10)SA6:

- CSCdw65903

An error can occur with management protocol processing. Please use the following URL for further information:

<http://www.cisco.com/cgi-bin/bugtool/onebug.pl?bugid=CSCdw65903>

Release 11.2(8.5)SA6 Modifications

This section describes new features in IOS Release 11.2(8.5)SA6 and IOS Release 11.2(8.2) caveats that are resolved in IOS Release 11.2(8.5)SA6.

- LED indications for power-on self-test (POST) failures are different in this release. If a port fails a test, the port LED and the system LED turn amber and remain amber. In previous releases, only LEDs of failed linked ports remained amber.
- A new command has been added in this release. You can use the CLI **show post** command to determine if a switch or port has passed POST.
- When a 4-MB Catalyst 2900 XL switch is added to a cluster, reloading the switch by a soft reset or power recycling no longer brings down the switch. [CSCdm94877]
- When a port is changed from a multi-VLAN port to an access port, there is no longer a possible loss of connectivity. [CSCdm72514]
- The privileged EXEC mode **config clock summer-time recurring** command no longer resets the switch. [CSCdm94936]

Release 11.2(8.2)SA6 Modifications

This section describes IOS Release 11.2(8.1)SA6 caveats that were resolved with IOS Release 11.2(8.2)SA6.

- When using the GigaStack GBIC with a 3500 XL switch or 2900 XL modular switch and IOS Release 11.2(8.1)SA6, you could experience a problem with traffic flow in one direction when you insert a cable. This potential problem has been resolved in this release. [CSCdm40538]
- The **configure overwrite-network** command, when issued, no longer overwrites the configuration file with gibberish. [CSCdm24149]

Important Notes

This section describes important information related to IOS Release 11.2 (8.x)SA6.

Configuring Microsoft Internet Explorer

The instructions in the *Quick Start: Catalyst 2900 Series XL Cabling and Setup* and *Quick Start: Catalyst 3500 Series XL Cabling and Setup* explain the basic configuration for Internet Explorer 4.01. To use Cluster Management or Switch Network View, you need to complete the browser configuration as described in the *Cisco IOS Desktop Switching Software Configuration Guide*.

Microsoft Internet Explorer 5.0 has been added to the list of browsers that support Cisco Visual Switch Manager (CVSM), Cluster Management, and Switch Network View. Follow these steps to configure Microsoft Internet Explorer 5.0 for use with these products:

-
- Step 1** Start Internet Explorer 5.0.
 - Step 2** From the menu bar, select **Tools > Internet Options**.
 - Step 3** In the Internet Options window, click **Security**.
 - Step 4** Select the **Trusted Sites** icon, and click **Sites...**
 - Step 5** Deselect the **Require server verification** checkbox, and click **Add**.
 - Step 6** Add the switches that you want to manage by entering their URLs in the **Add this web site to the zone** field. A URL is the switch IP address preceded by **http://**.
 - Step 7** After you have finished entering the URLs for your switches, click **OK**.
 - Step 8** While still in the Security tab of Internet Options, click **Custom Level...**
 - Step 9** In the **Security Settings** dialog box, scroll down to the **Java > Java permissions** section.
 - Step 10** Select **Custom**. This enables the **Java Custom Settings** button.
 - Step 11** Click **Java Custom Settings**, and then select **Edit Permissions**.
 - Step 12** Under Run Unsigned Content, click **Enable**, and click **OK**.
 - Step 13** Click OK to close the **Security Settings** dialog box.
-

Hardware and Supporting Software

[Table 1](#) lists the 3500 XL switches for this IOS release, [Table 2](#) lists the 8-MB 2900 XL switches for this IOS release, and [Table 3](#) lists the 4-MB 2900 XL switches for this IOS release. The 4-MB switches are supported by the original edition software of this IOS release. [Table 4](#) lists the Catalyst 2900 and Catalyst 3500 series XL modules and GBICs and their required IOS releases.



Note

Original edition software is Enterprise Edition Software that runs only on the 4-MB switches listed in [Table 3](#). This software does not support TACACS+, STP UplinkFast, or NTP.

Table 1 Catalyst 3500 Series XL Switches

Model	Description	Number of VLANs	Standard Edition?	Enterprise Edition?	Command Capable?
WS-C3512-XL-EN WS-C3512-XL-A	12 autosensing 10/100 ports and two Gigabit Ethernet ports	250	Yes	Yes	Yes
WS-C3524-XL-EN WS-C3524-XL-A	24 autosensing 10/100 ports and two Gigabit Ethernet ports	250	Yes	Yes	Yes
WS-C3508G-XL-A WS-C3508G-XL-EN	8 Gigabit Ethernet ports	250	Yes	Yes	Yes

Table 2 8-MB Catalyst 2900 Series XL Switches

Model	Description	Number of VLANs	Standard Edition?	Enterprise Edition?	Command Capable?
WS-C2912MF-XL	12 100BaseFX ports and 2 high-speed expansion slots	250	No	Yes	With upgrade
WS-C 2912-XL-A WS-C2912-XL-EN	12 autosensing 10/100 ports	64	Yes	Yes	With upgrade
WS-C2924M-XL-A WS-C2924M-XL-EN	24 autosensing 10/100 ports and 2 high-speed expansion slots	250	Yes	Yes	With upgrade
WS-C2924-XL-A WS-C2924-XL-EN	24 autosensing 10/100 ports	64	Yes	Yes	With upgrade
WS-C2924C-XL-A WS-C2924C-XL-EN	22 autosensing 10/100 ports and 2 100BaseFX ports	64	Yes	Yes	With upgrade

Table 3 4-MB Catalyst 2900 Series XL Switches with Original Edition Software

Model	Description	Number of VLANs	Original Edition Software?	Command Capable?
WS-C2908-XL	8 autosensing 10/100 ports	64	Yes	No
WS-C2924-XL	24 autosensing 10/100 ports	64	Yes	No
WS-C2924C-XL	22 autosensing 10/100 ports and 2 100BaseFX ports	64	Yes	No
WS-C2916M-XL	16 autosensing 10/100 ports and 2 high-speed expansion slots	64	Yes	No

Table 4 Catalyst 2900 and Catalyst 3500 Series XL Modules and GBICs

Model	Description	Minimum Release Required	VLAN Trunking Ports?
WS-X3500-XL=	1 GigaStack GBIC	IOS Release 11.2(8)SA6	Yes, with a point-to-point connection (-EN only) ¹
WS-X2972-XL	1 ATM 155 SM-LR fiber port	IOS Release 11.2(8)SA5	Yes (-EN only)
WS-X2971-XL	1 ATM 155 SM-MR fiber port	IOS Release 11.2(8)SA5	Yes (-EN only)
WS-X2961-XL	1 ATM 155 MM fiber port	IOS Release 11.2(8)SA5	Yes (-EN only)
WS-X2951-XL	1 ATM 155 UTP port	IOS Release 11.2(8)SA5	Yes (-EN only)
WS-X2931-XL	1 1000BaseX port	IOS Release 11.2(8)SA5	Yes (-EN only)

Table 4 Catalyst 2900 and Catalyst 3500 Series XL Modules and GBICs

WS-X2924-XL-V	4 100BaseFX ports	IOS Release 11.2(8)SA4	Yes, with minimum release of 11.2(8)SA5-EN
WS-X2922-XL-V	2 100BaseFX ports	IOS Release 11.2(8)SA4	Yes, with minimum release of 11.2(8)SA5-EN
WS-X2914-XL-V	4 autosensing 10/100 UTP ports	IOS Release 11.2(8)SA4	Yes, with minimum release of 11.2(8)SA5-EN
WS-X2922-XL	2 100BaseFX ports	IOS Release 11.2(8)SA	No
WS-X2914-XL	4 autosensing 10/100 UTP ports	IOS Release 11.2(8)SA	No

1. GigaStack GBICs can operate in full-duplex point-to-point mode or in half-duplex stacking mode.

Changes Since IOS Release 11.2(8)SA5

This IOS release supports the creation of a *cluster* of up to 16 switches through the HTML-based Cluster Management tools. You create a cluster by assigning an IP address to a *command* switch, which can then connect to up to 15 *member* switches. The command switch can then manage communication between the member switches and the management interfaces. Cluster members must be running IOS Release 11.2(8.1)SA6 or later.

Cluster Management features include a map of the cluster devices and links, single- and multiple-port configuration, and device reports. In addition, you can use the command switch to upgrade multiple switches to new software releases.

All 3500 XL switches can be command switches. The 8-MB 2900 XL switches can be upgraded to act as command switches. The 4-MB 2900 XL switches cannot be upgraded to be command switches.

Increased Number of VLANs

On some switches, the maximum number of supported VLANs has increased from 64 to 250. See the tables in the [“Hardware and Supporting Software”](#) section on page 3 to identify these platforms.

TACACS+

TACACS+, an Enterprise Edition Software feature, provides the means to manage network security from a server. You can configure the TACACS+ server to perform switch authentication, authorization, and accounting. Authentication is the action of determining who the user is and whether he or she is allowed to access the switch. Authorization is the action of determining what the user is allowed to do on the system, and accounting is the action of collecting data related to resource usage.

The original edition software for 4-MB switches does not support TACACS+.



Note

TACACS+ does not manage access authentication for CVSM. The switch enable password is used.

STP UplinkFast

STP UplinkFast, an Enterprise Edition Software feature, is an enhancement to Spanning-Tree Protocol (STP) that accelerates the choice of a new root port when a link or switch fails or when STP reconfigures itself. When UplinkFast is enabled, the status of the root port changes to forwarding immediately without going through the listening and learning states.

The original edition software for 4-MB switches does not support STP UplinkFast.

Network Time Protocol

The Network Time Protocol (NTP) controls how a switch receives time information from an external source. This IOS release supports the configuration of switches to act as an NTP client—requesting timing information from an NTP server—or as an NTP broadcast client—receiving time broadcasts from an NTP broadcast server, such as a router.

The original edition software for 4-MB switches does not support NTP.

Catalyst 3500 Series XL Switch Support

IOS Release 11.2(8.1)SA6 or later supports three new 3500 XL switches. As with the 2900 XL switches, you can order these switches with either the standard edition software or the Enterprise Edition Software.

[Table 1](#) lists the different port densities of the 3500 XL models. See the [“Related Documentation” section on page 23](#) for the complete list of 3500 XL documentation.

Changes to the Documentation Set

Because of the addition of the 3500 XL switches, the documentation set for IOS Release 11.2(8.1)SA6 or later changed substantially. In general, the hardware documentation has been separated from the software documentation, and the online help system for the HTML interfaces has been expanded to include all the how-to procedures for network and device management.

Minimum IOS Release for Major Features

[Table 5](#) lists the minimum IOS release required for the major features of the 2900 and 3500 XL switches.

Table 5 Major Catalyst 2900 and 3500 XL Features and the Minimum IOS Release that Supports Them

Feature	Minimum Release Required
Catalyst 3500 Series XL switches	IOS Release 11.2(8)SA6
Cluster Management	IOS Release 11.2(8)SA6
Terminal Access Control Access Server+ (TACACS+)	IOS Release 11.2(8)SA6 (Enterprise Edition Software) ¹
Network Time Protocol (NTP)	IOS Release 11.2(8)SA6 ¹
Spanning-Tree Protocol (STP) UplinkFast	IOS Release 11.2(8)SA6 (Enterprise Edition Software) ¹

Table 5 Major Catalyst 2900 and 3500 XL Features and the Minimum IOS Release that Supports Them (continued)

Feature	Minimum Release Required
250 VLANs (See the “ Hardware and Supporting Software ” section on page 3 for the models that can support this number of VLANs.)	IOS Release 11.2(8)SA6
Catalyst 2900 series XL 1000BaseX modules	IOS Release 11.2(8)SA5
Catalyst 2900 series XL ATM modules	IOS Release 11.2(8)SA5
VLAN Management Policy Server (VMPS)	IOS Release 11.2(8)SA4 (Enterprise Edition Software)
8192 MAC addresses on modular switches	IOS Release 11.2(8)SA4
Inter-Switch Link (ISL) trunking	IOS Release 11.2(8)SA4 (Enterprise Edition Software)
IEEE 802.1Q trunking	IOS Release 11.2(8)SA5 (Enterprise Edition Software)
Switch Network View stack management	IOS Release 11.2(8)SA3
Web-based switch management	IOS Release 11.2(8)SA
Fast EtherChannel port groups	IOS Release 11.2(8)SA

1. Not available in the original edition software for 4-MB switches.

Limitations and Restrictions

This section should be reviewed before you begin working with the switches. Some features might not work as documented, and some features could be affected by recent changes to the switch hardware or software.

Connecting to the 600W Cisco Redundant Power System

The following restrictions apply to using the 600W Cisco Redundant Power System (RPS) with a 2900 or 3500 XL switch:

- Do not connect a switch power cord to an AC outlet if the switch is also connected to a powered-up RPS.
- The switches *do not* support the fully-redundant or redundant-with-reboot configurations that are described in the *Cisco RPS Hardware Installation Guide*. These configurations should not be used with Catalyst 2900 or 3500 XL switches.

The Cisco RPS can provide a quasi-redundant power source for four external devices that use up to 150W DC each. You can use a one-to-one cable (one connector at each cable end) to connect four external devices to the four DC output power modules. The power source is quasi-redundant because there are two AC input power modules for the Cisco RPS and one DC output power module for each external device. The AC input to the Cisco RPS is fully redundant, but the DC output to the external devices is not.

Cluster Management Link Report

The link report in Cluster Management is no longer supported. The documentation and help might refer to the link report, but it is no longer part of the product.

TACACS+ and CVSM

TACACS+ does not manage access authentication for Cisco Visual Switch Manager (CVSM). The switch enable password is used.

Hot-Swapping Not Supported for ATM and Gigabit Ethernet Modules

A Catalyst 2900 XL switch must be turned off before you can insert one of the following modules:

- Catalyst 2900 series XL 1000BaseX modules
- Catalyst 2900 series XL ATM modules

Port Configuration Conflicts

Certain combinations of port features create configuration conflicts (see [Table 6](#)). For example, the network port floods all unknown unicast and multicast packets to a port; therefore, port security, which limits traffic on a port, cannot be enabled on the network port. If you try to enable incompatible features, CVSM issues a warning message and prevents you from making the change. Reload the page to refresh CVSM. In [Table 6](#), *no* means that the two referenced features are not compatible.

Table 6 Port Configuration Conflicts

	ATM Port¹	Port Group	Port Security	Monitor Port	Multi-VLAN Port	Network Port²	Connect to Cluster?
ATM port	–	No	No	No	No	No	Yes
Port group	No	–	No	No	Yes	Yes	Yes
Port security	No	No	–	No	No	No	Yes
Monitor port	No	No	No	–	No	No	Yes
Multi-VLAN port	No	Yes	No	No	–	Yes	Yes
Network port	No	Yes (only source-based group)	No	No	Yes	–	No
Connect to cluster	Yes	Yes	Yes	Yes	Yes	No	–

1. Catalyst 2900 series XL switches only

2. A network port cannot connect cluster members to the command switch.

IEEE 802.1Q Configuration Considerations

IEEE 802.1Q trunks impose some limitations on the trunking strategy for a network. The following restrictions apply to IEEE 802.1Q trunks:

- Make sure the native VLAN for an IEEE 802.1Q trunk is the same on both ends of the trunk link. If the native VLAN on one end of the trunk is different from the native VLAN on the other end, spanning-tree loops might result.
- Disabling STP on the native VLAN of an IEEE 802.1Q trunk without disabling STP on every VLAN in the network can potentially cause STP loops. We recommend that you either leave STP enabled on the native VLAN of an IEEE 802.1Q trunk or disable STP on every VLAN in the network. Make sure your network is loop-free before disabling STP.

Spanning-Tree Maximum Age Command

The range of seconds for the **span-tree max-age** command is now 6 to 200 seconds. If you use this command in a previous release to set a value greater than this new range and then upgrade your software to IOS Release 11.2(8.1)SA6 or later, the switch sets this value to the default: 20 seconds for IEEE STP, 15 seconds for DEC STP, and 10 seconds for IBM STP.

Compatibility with the CiscoWorks2000 RME Suite

When using the Software Image Management (SWIM) application in the Resource Manager Essentials (RME) suite of CiscoWorks2000 product family to perform automated system software and boot loader upgrades, you should note the following:

- Catalyst 2900 series XL switches require IOS Release 11.2(8)SA4 or later and RME version 2.1 or 2.2.
- Catalyst 3500 series XL switches require IOS Release 11.2(8.1)SA6 or later and RME version 2.2.

Upgrading to a New Software Release

This section describes the procedure for upgrading your switch software by using the IOS command-line interface (CLI).



Caution

There are separate procedures for upgrading 4-MB and 8-MB Catalyst 2900 series XL switches. Please review the two procedures before starting the upgrade. Both procedures include a step for determining the amount of memory that a switch has.

If you are running IOS Release 11.2(8)SA3 or later, we recommend that you upgrade the switch by using the web-based CVSM. Instructions for upgrading through CVSM are in the *Catalyst 2900 Series XL Installation and Configuration Guide*, or, for this IOS release, the *Cisco IOS Desktop Switching Software Configuration Guide*.



Note

You cannot use the web-based interface to upgrade a switch running IOS Release 11.2(8)SA2 or previous releases. Use the CLI to perform the upgrade in such cases.

The CLI upgrade procedure consists of the following major steps:

-
- Step 1** Downloading the combined .tar file from CCO. This file contains the IOS image and the HTML files. The **tar** command extracts the IOS image and the HTML files from the combined .tar file during the TFTP copy to the switch.
 - Step 2** If necessary, downloading the TFTP server application to copy the switch software from your PC to the switch.
 - Step 3** Using the CLI or CVSM to upgrade your switch to the new software.
-

Which Files to Use

Review [Table 7](#) and [Table 8](#) before you download the software. [Table 7](#) describes the file extensions and what they mean for the upgrade procedure. In general, it is easier to upgrade the switch software by using a combined .tar file that contains the HTML files and the IOS image. The upgrade procedures in these release notes describe how to use a combined .tar file, and you must use a combined .tar file to upgrade a switch through the switch HTML interfaces.

[Table 8](#) describes the various versions of the software that can be downloaded. Each IOS version can support command-switch or member-switch capabilities. The software files for this IOS release are listed by switch in [Table 9](#) and [Table 10](#).

Table 7 Possible Extensions for IOS Software Files

Extension	Description
.tar	A compacted file from which you can extract files by using the tar command. There are two types of .tar files: <ul style="list-style-type: none"> • A <i>combined .tar</i> file that contains both the IOS image file and the HTML files. You can upgrade the switch software with this file from the CLI or from the CVSM System page. • An <i>HTML .tar</i> file that has the letters <i>HTML</i> in its name and contains just the HTML files for an IOS release. You can upgrade the switch software from the CLI with this HTML file and the IOS image file.
.bin	The IOS image file that you can copy to the switch through TFTP.

Table 8 Possible Versions of IOS Software Files

IOS Version	Description
Standard edition software	The set of features that is available on all switches.
Enterprise Edition Software	The advanced set of features that is in addition to the standard edition software.
Original edition software	Enterprise Edition Software that runs on the following 4-MB switch models: WS-C2908-XL, WS-C2924-XL, WS-C2924C-XL, or WS-C2916M-XL. Original edition software does not support TACACS+, STP UplinkFast, or NTP.
Cluster Management Capabilities	
Command switch	Software that enables the switch to act as a cluster command switch.
Member switch	Software that enables the switch to act as a cluster member switch.

Table 9 Catalyst 3500 Series XL Cisco IOS Software Files

Filename	Description	CCO Location ¹
c3500XL-c3h2-mz-112.8.5-SA6.bin	Standard edition IOS image file	Registered and public
c3500XL-c3h2-mz-112.8.5-SA6.tar	Standard edition IOS image file and HTML files	Registered and public
c3500XL-html-plus.112.8.5-SA6.tar	Standard and Enterprise Edition Software HTML files	Registered and public
c3500XL-c3h2s-mz-112.8.5-SA6.bin	Enterprise Edition Software IOS image file	Registered only
c3500XL-c3h2s-mz-112.8.5-SA6.tar	Enterprise Edition Software IOS image file and HTML files	Registered only

1. Software files are available through both a registered site, for which you must register to have access, and a public site for which there are no restrictions.

Table 10 Catalyst 2900 Series XL Cisco IOS Software Files

Filename	Description	CCO Location ¹
c2900XL-hs-mz-112.8.5-SA6.bin	Original edition IOS image-only file ²	Registered and public
c2900XL-hs-mz-112.8.5-SA6.tar	Original edition IOS image and HTML files ²	Registered and public
c2900XL-html.112.8.5-SA6.tar	Original, standard, and Enterprise Edition Software HTML files (member switch)	Registered and public
c2900XL-h2-mz-112.8.5-SA6.bin	Standard edition IOS image-only file (member switch)	Registered and public
c2900XL-h2-mz-112.8.5-SA6.tar	Standard edition IOS image and HTML files (member switch)	Registered and public
c2900XL-c3h2-mz-112.8.5-SA6.bin	Standard edition IOS image-only file (command switch)	Registered only
c2900XL-c3h2-mz-112.8.5-SA6.tar	Standard edition IOS image and HTML files (command switch)	Registered only
c2900XL-html-plus.112.8.5-SA6.tar	Standard and Enterprise Edition Software HTML files (command switch)	Registered only
c2900XL-h2s-mz-112.8.5-SA6.bin	Enterprise Edition Software IOS image-only file (member switch)	Registered only
c2900XL-h2s-mz-112.8.5-SA6.tar	Enterprise Edition Software IOS image and HTML files (member switch)	Registered only
c2900XL-c3h2s-mz-112.8.5-SA6.bin	Enterprise Edition Software IOS image-only file (command switch)	Registered only
c2900XL-c3h2s-mz-112.8.5-SA6.tar	Enterprise Edition Software IOS image and HTML files (command switch)	Registered only

1. Software files are available through both a registered site, for which you must register to have access, and a public site for which there are no restrictions.

2. Original edition software does not support TACACS+, STP UplinkFast, or NTP.

Downloading the New Software

Follow these steps to download a new version of IOS 11.2(8.5)SA6 software and, if necessary, the TFTP server application.

Step 1 Use [Table 7](#) to [Table 10](#) to identify the files that you want to download.



Note It is recommended that you download the combined .tar file that contains the image file and the HTML files. The procedures in these release notes are for upgrading a switch by using a combined .tar file, and the web-based CVSM interface is designed to upgrade a switch by using this combined file.

Step 2 Registered users can download files from the following locations:

- For 2900 XL switches, enter the following URL in your browser Go To or Location field:
<http://www.cisco.com/cgi-bin/tablebuild.pl/cat2900XL>
- For 3500 XL switches, enter the following URL in your browser Go To or Location field:
<http://www.cisco.com/cgi-bin/tablebuild.pl/cat3500XL>

Non-registered users can download files from the following locations:

- For 2900 XL switches:
<http://www.cisco.com/pcgi-bin/tablebuild.pl/cat2900XL>
- For 3500 XL switches:
<http://www.cisco.com/pcgi-bin/tablebuild.pl/cat3500XL>

Step 3 Download the IOS file or files.

Step 4 Download the TFTP server from this URL, if necessary. The readme.txt file describes how to download the TFTP server.

After you have downloaded the correct file to your PC or workstation, you can use the CLI to perform a TFTP transfer of the file or files to the switch.

Upgrading Catalyst 3500 Series XL Switches

This procedure is only for upgrading 3500 XL switches by copying the combined .tar file to the switch. You copy the files to the switch from a TFTP server and extract the files by entering the **tar** command.



Note If you want to copy the IOS image file or HTML files separately to the switch, follow the upgrade procedure in the release notes that came with your switch, or refer to the 2900 XL documentation for IOS Release 11.2(8)SA4 on CCO.

Follow these steps to upgrade the switch software by using a TFTP transfer:

Step 1 If your PC or workstation cannot act as a TFTP server, copy the file to a TFTP server to which you have access.

Step 2 Access the CLI by starting a Telnet session or by connecting to the console port via the RS-232 connector.

To start a Telnet session on your PC or workstation, enter the following command:

```
server% telnet switch_ip_address
```

Step 3 Enter privileged EXEC mode:

```
switch> enable  
switch#
```

Step 4 Display the name of the current (default) image file. The following example shows the current name in italic:

```
switch# show boot  
BOOT path-list:    flash:current_image  
Config file:      flash:config.text  
Enable Break:     1  
Manual Boot:      no  
HELPER path-list:  
NVRAM/Config file  
buffer size: 32768
```

Step 5 If there is no file defined in the BOOT path-list, enter **dir flash:** to display the contents of Flash memory.

- Step 6** Using the name of the combined .tar file that you downloaded, rename the current image file to that name, and replace the .tar extension with .bin. The current image filename is then the same as the downloaded filename but with a .bin extension. This step does not affect the operation of the switch.

```
switch# rename flash:current_image flash:new_image.bin  
Source filename [current_image]?  
Destination filename [new_image]?
```

For example:

```
switch# rename c2900XL-hs-mz-112.8-SA4.bin c2900XL-c3h2s-mz-112.8.5-SA6.bin
```

- Step 7** Display the contents of Flash memory to verify the renaming of the file:

```
switch# dir flash:  
Directory of flash:  
-rwx      910426   Mar 06 1993 23:47:28  new_image.bin  
-rwx      80971   Sep 14 1998 03:10:38  c3500XL-diag-mz-112.0.0.11-SA6  
-rwx       4800   Mar 01 1993 00:04:14  html  
-rwx        159   Jan 01 1970 00:00:34  env_vars  
-rwx       1121   Mar 01 1993 18:46:01  config.text
```

- Step 8** Enter global configuration mode:

```
switch# config terminal  
Enter configuration commands, one per line. End with CNTL/Z.
```

- Step 9** Disable access to the switch HTML pages:

```
switch(config)# no IP http server
```

- Step 10** If you entered the **boot** command with the name of the image file, enter this command to change it to the new name.

```
switch(config)# boot system flash:new_image.bin
```



Note

If you have not entered the **boot** command with the name of the image, you do not need to enter this command; the switch automatically finds the correct file to use when it resets.

- Step 11** Return to privileged EXEC mode:

```
switch(config)# end
```

- Step 12** Remove the CVSM HTML files:

```
switch# delete flash:html/*
```

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.

- Step 13** Remove the files in the Snmp directory:

```
switch# delete flash:html/Snmp/*
```

Make sure the *S* in *Snmp* is uppercase.

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.



Caution

In the following step, the **tar** command copies the combined .tar file that contains both the image and the HTML files. You do *not* need to copy an HTML.tar file in this procedure.

Step 14 Enter the following command to copy the new image and HTML files to the switch Flash memory:

```
switch# tar /x tftp://server_ip_address//path/filename.tar flash:
Loading /path/filename.tar from server_ip_address (via VLAN1):!
extracting info (110 bytes)
extracting c3500XL-c3h2s-mz-112.0.66-SA6.bin (1271095 bytes)!!!!!!!!!!!!!!!!!!!!!!
html/ (directory)
extracting html/Detective.html.gz (1134 bytes)!
extracting html/ieGraph.html.gz (553 bytes)
extracting html/DrawGraph.html.gz (760 bytes)
extracting html/GraphFrame.html.gz (774 bytes)!
. . .
```

Depending on the TFTP server being used, you might need to enter only one slash (/) after the *server_ip_address* in the **tar** command.

Step 15 Enter global configuration mode:

```
switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 16 Re-enable access to the switch HTTP pages:

```
switch(config)# IP http server
```

Step 17 Return to privileged EXEC mode:

```
switch(config)# end
```

Step 18 Reload the new software with the following command:

```
switch# reload
System configuration has been modified. Save? [yes/no]:y
Proceed with reload? [confirm]
```

Step 19 Press **Return** to confirm the reload.

Your Telnet session ends when the switch resets.

Step 20 After the switch reboots, you can Telnet back into the switch and enter the **show version** command in privileged EXEC mode to verify the upgrade procedure.

Upgrading 4-MB Catalyst 2900 Series XL Switches

This procedure is for upgrading the 4-MB switches that run the original edition of IOS Release 11.2(8.5)SA6. The 4-MB models that run the original edition software are WS-C2908-XL, WS-C2924-XL, WS-C2924C-XL, and WS-C2916M-XL. You upgrade the switches by extracting the IOS image file and the HTML files from a combined .tar file. You copy the files to the switch from a TFTP server and extract the files by entering the **tar** command.

- If you want to copy the IOS image file or HTML files separately to the switch, follow the upgrade procedure in the release notes that came with your switch, or refer to the Catalyst 2900 series XL release notes for IOS Release 11.2(8)SA4 on CCO.

If you are unsure whether your switch has 4 MB or 8 MB of memory, you can verify memory capacity at Step 4.

Follow these steps to upgrade the switch software by using the **tar** command and a TFTP transfer:

Step 1 If your PC or workstation cannot act as a TFTP server, copy the file to a TFTP server to which you have access.

Step 2 Access the CLI by starting a Telnet session or by connecting to the console port via the RS-232 connector.

To start a Telnet session on your PC or workstation, enter the following command:

```
server% telnet switch_ip_address
```

Step 3 Enter privileged EXEC mode:

```
switch> enable
switch#
```

Step 4 Confirm that you have a 4-MB switch:

```
switch# show version
Cisco Internetwork Operating System Software
IOS (tm) C2900XL Software (C2900XL-HS-M), Version 11.2(0.0.65)SA2,
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Fri 09-Apr-98 13:55 by jchristy
Image text-base: 0x00003000, data-base: 0x0020C740

ROM: Bootstrap program is C2900XL boot loader

pacifica-165 uptime is 1 day, 20 hours, 5 minutes
System restarted by reload
System image file is "flash:c2900XL-hs-mz-112.0.0.65-SA6.bin", booted via

----> WS-C2924C-XL (PowerPC403GA) processor (revision 0x11) with 4096K/640K bytes of
memory.
Processor board ID 0x09, with hardware revision 0x00
```

Step 5 Display the name of the current (default) image file. The following example shows the current name in italic:

```
switch# show boot
BOOT path-list: flash:current_image
Config file: flash:config.text
Enable Break: 1
Manual Boot: no
HELPER path-list:
NVRAM/Config file
buffer size: 32768
```

Step 6 If there is no file defined in the BOOT path-list, enter **dir flash:** to display the contents of Flash memory. The file named `c2900XL-h-mz_current_version` is your current image file.

Step 7 Using the name of the combined .tar file that you downloaded, rename the current image file to that name, and replace the .tar extension with a .bin extension. The current image file name is then the same as the downloaded file name but with a .bin extension. This step does not affect the operation of the switch.

```
switch# rename flash:current_image flash:new_image.bin
Source filename [current_image]?
Destination filename [new_image]?
```

For example:

```
switch# rename flash:c2900XL-hs-mz-112.8-SA4.bin flash:c2900XL-hs-mz-112.8.5-SA6.bin
Source filename [c2900XL-hs-mz-112.8-SA4.bin]?
Destination filename [c2900XL-hs-mz-112.8.5-SA6.bin]?
switch#
```

Step 8 Display the contents of Flash memory to verify the renaming of the file:

```
switch# dir flash:
Directory of flash:
-rwx      910426   Mar 06 1993 23:47:28  new_image.bin
-rwx       80971   Sep 14 1998 03:10:38  c2900XL-diag-mz-112.0.0.11-SA2
-rwx       4800   Mar 01 1993 00:04:14  html
-rwx        159   Jan 01 1970 00:00:34  env_vars
-rwx       1121   Mar 01 1993 18:46:01  config.text
```

Step 9 If a file starting with the character string *c2900XL-diag-mz* appears in the Flash directory, you should remove it. This diagnostics file has a name in the following format: *c2900XL-diag-mz-version_name*. The string *version_name* depends on the switch and software you are running.

Display the diagnostics file:

```
switch# dir flash:c2900XL-diag-mz*
Directory of flash:
-rwx       80971   Sep 14 1998 03:10:38  c2900XL-diag-mz-112.0.0.11-SA2
```

Delete the diagnostics file:

```
Switch# delete flash:c2900XL-diag-mz-112.0.0.11-SA2
Delete filename [c2900XL-diag-mz-112.0.0.11-SA2]?
Delete flash:c2900XL-diag-mz-112.0.0.11-SA2? [confirm]
Switch#
```

Step 10 Enter global configuration mode:

```
switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 11 Disable access to the switch HTML pages:

```
switch(config)# no IP http server
```

Step 12 Change the name of the default image file:

```
switch(config)# boot system flash:new_image.bin
```

Step 13 Return to privileged EXEC mode:

```
switch(config)# end
```

Step 14 Verify that the name of the default image file is correct:

```
switch# show boot
BOOT path-list:    flash:new_image
Config file:      flash:config.text
Enable Break:     1
Manual Boot:      no
HELPER path-list:
NVRAM/Config file
buffer size: 32768
```

Step 15 Remove the CVSM HTML files:

```
switch# delete flash:html/*
```

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.

Step 16 If you are running IOS Release 11.2(8)SA3 or later, remove the files in the Snmp directory:

```
switch# delete flash:html/Snmp/*
```

Make sure the *S* in *Snmp* is uppercase.

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.

Step 17 If you are running IOS Release 11.2(8)SA2 or previous releases, create a directory on the switch Flash memory to be used for the HTML files:

```
switch# mkdir flash:html/Snmp
```

Make sure the *S* in *Snmp* is uppercase.



Caution

In the following step, the **tar** command copies the combined .tar file that contains both the image and the HTML files. You do *not* need to copy an HTML.tar file in this procedure.

Step 18 Enter the following command to copy the new image and HTML files to the switch Flash memory:

```
switch# tar /x tftp://server_ip_address//path/filename.tar flash:
Loading /path/filename.tar from server_ip_address (via VLAN1):!
extracting info (110 bytes)
extracting c2900XL-c3h2s-mz-112.0.66-SA6.bin (1271095 bytes)!!!!!!!!!!!!!!!!!!!!!!
html/ (directory)
extracting html/Detective.html.gz (1134 bytes)!
extracting html/ieGraph.html.gz (553 bytes)
extracting html/DrawGraph.html.gz (760 bytes)!
. . .
```

Depending on the TFTP server being used, you might need to enter only one slash (/) after the *server_ip_address* in the **tar** command.

Step 19 Enter global configuration mode:

```
switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 20 Re-enable access to the switch HTTP pages:

```
switch(config)# IP http server
```

Step 21 Return to privileged EXEC mode:

```
switch(config)# end
```

Step 22 Reload the new software with the following command:

```
switch# reload
System configuration has been modified. Save? [yes/no]:y
Proceed with reload? [confirm]
```

Step 23 Press **Return** to confirm the reload.

Your Telnet session ends when the switch resets.

Step 24 After the switch reboots, you can Telnet back into the switch and enter the **show version** command in privileged EXEC mode to verify the upgrade procedure.

Upgrading 8-MB Catalyst 2900 Series XL Switches

This procedure is for upgrading 2900 XL switches with 8 MB of DRAM. You upgrade a switch by extracting the IOS image file and the HTML files from a combined .tar file. You copy the files to the switch from a TFTP server and extract the files by entering the **tar** command.



Note

If you want to copy the IOS image file or HTML files separately to the switch, follow the upgrade procedure in the release notes that came with your switch, or refer to the Catalyst 2900 series XL release notes for IOS Release 11.2(8)SA4 on CCO.

If you are unsure whether your switch has 4 MB or 8 MB of memory, you can verify memory capacity at Step 4.

Follow these steps to upgrade the switch software by using the **tar** command to start a TFTP transfer:

Step 1 If your PC or workstation cannot act as a TFTP server, copy the file to a TFTP server to which you have access.

Step 2 Access the CLI by starting a Telnet session or by connecting to the console port via the RS-232 connector.

To start a Telnet session on your PC or workstation, enter the following command:

```
server% telnet switch_ip_address
```

Step 3 Enter privileged EXEC mode:

```
switch> enable  
switch#
```

Step 4 Confirm that you have an 8-MB switch:

```
2900XL-EN-84.3# show version  
Cisco Internetwork Operating System Software IOS (tm)  
C2900XL Software (C2900XL-HS-M), Version 11.2(8)SA4, RELEASE SOFTWARE (fc1)  
Copyright (c) 1986-1998 by cisco Systems, Inc.  
Compiled Mon 23-Nov-98 20:59 by paulines  
Image text-base: 0x00003000, data-base: 0x00202144
```

```
ROM: Bootstrap program is C2900XL boot loader
```

```
2900XL-EN-84.3 uptime is 1 day, 22 hours, 23 minutes  
System restarted by power-on  
Running default software
```

```
cisco WS-C2924-XL (PowerPC403GA) processor (revision 0x11)  
-----> 8192K/1024K bytes of memory.  
Processor board ID 0x0E, with hardware revision 0x01  
Last reset from power-on
```

Processor is running Enterprise Edition Software
24 Ethernet/IEEE 802.3 interface(s)

32K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address: 00:50:80:39:EC:40
Motherboard assembly number: 73-3382-04
Power supply part number: 34-0834-01
Motherboard serial number: FAA02499G7X
Model number: WS-C2924-XL-EN
System serial number: FAA0250U03P
Configuration register is 0xF

Step 5 Display the name of the current (default) image file. The following example shows the current name in italic:

```
switch# show boot
BOOT path-list:   flash:current_image
Config file:     flash:config.text
Enable Break:    1
Manual Boot:     no
HELPER path-list:
NVRAM/Config file
buffer size: 32768
```

Step 6 If there is no file defined in the BOOT path-list, enter **dir flash:** to display the contents of Flash memory. The file named c2900XL-h-mz_current_version is your current image file.

```
2900XL-EN-84.3# dir flash:
Directory of flash:

  2  -rwx      1707   Mar 05 1993 01:18:21  config.text
  4  drwx       256   Mar 01 1993 00:13:43   html
 27  -rwx       270   Mar 01 1993 00:04:44   env_vars
214  -rwx      4424   Mar 01 1993 23:52:06   vlan.dat
215  -rwx     1047019  Mar 01 1993 00:11:11  c2900XL-hs-mz-112.8-SA4.bin

3612672 bytes total (1232384 bytes free)
2900XL-EN-84.3#
```

Step 7 Using the name of the combined .tar file that you downloaded, rename the current image file to that name, and replace the .tar extension with a .bin extension. The current image file name is then the same as the downloaded file name but with a .bin extension. This step does not affect the operation of the switch.

```
switch# rename flash:current_image flash:new_image.bin
Source filename [current_image]?
Destination filename [new_image]?
```

For example:

```
switch# rename flash:c2900XL-hs-mz-112.8-SA4.bin flash:c2900XL-c3h2s-mz-112.8.5-SA6.bin
Source filename [c2900XL-hs-mz-112.8-SA4.bin]?
Destination filename [c2900XL-c3h2s-mz-112.8.5-SA6.bin]?
switch#
```

Step 8 Enter global configuration mode:

```
switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 9 Disable access to the switch HTML pages:

```
switch(config)# no IP http server
```

Step 10 If you entered the **boot** command with the name of the image file, enter this command to change it to the new name.

```
switch(config)# boot system flash:new_image.bin
```



Note

If you did not previously enter the **boot** command with the name of the image, you do not need to enter this command; the switch automatically finds the correct file to use when it resets.

Step 11 Return to privileged EXEC mode:

```
switch(config)# end
```

Step 12 Remove the HTML files:

```
switch# delete flash:html/*
```

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.

Step 13 Remove the files in the Snmp directory:

```
switch# delete flash:html/Snmp/*
```

Make sure the *S* in *Snmp* is uppercase.

Press **Enter** to confirm the deletion of each file. Do not press any other keys during this process.



Caution

In the following step, the **tar** command copies the combined .tar file that contains both the image and the HTML files. You do *not* need to copy an HTML.tar file in this procedure.

Step 14 Enter the following command to copy the new image and HTML files to the switch Flash memory:

```
switch# tar /x tftp://server_ip_address//path/filename.tar flash:
Loading /path/filename.tar from server_ip_address (via VLAN1):!
extracting info (110 bytes)
extracting c2900XL-c3h2s-mz-112.0.66-SA6.bin (1271095 bytes)!!!!!!!!!!!!!!!!!!!!!!
html/ (directory)
extracting html/Detective.html.gz (1134 bytes)!
extracting html/ieGraph.html.gz (553 bytes)
extracting html/DrawGraph.html.gz (760 bytes)!
. . .
```

Depending on the TFTP server being used, you might need to enter only one slash (/) after the *server_ip_address* in the **tar** command.

Step 15 Enter global configuration mode:

```
switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

Step 16 Re-enable access to the switch HTTP pages:

```
switch(config)# IP http server
```

Step 17 Return to privileged EXEC mode:

```
switch(config)# end
```

Step 18 Reload the new software with the following command:

```
switch# reload
System configuration has been modified. Save? [yes/no]:y
Proceed with reload? [confirm]
```

Step 19 Press **Return** to confirm the reload.

Your Telnet session ends when the switch resets.

Step 20 After the switch reboots, you can Telnet back into the switch and enter the **show version** command in privileged EXEC mode to verify the upgrade procedure.

Current Caveats

This section describes possible unexpected activity by IOS Release 11.2(8.5)SA6.

- When you try to access a switch by entering the IP address in the location field while using CVSM, the switch displays the Cisco Access page for the new switch. However, you cannot access CVSM for the new switch from this page. The switch refreshes the Cisco Access page without displaying the switch home page.

The workaround is to start a new browser session and enter the IP address of the new switch in the Location field of the new browser session. (CSCdm27401)

- When upgrading a switch from the CVSM System page, the switch renames the existing filename even if **Retain Current IOS Image File Name** field is selected. After the upgrade, the image is not changed to the current image name.

The workaround is to delete the current IOS image before the upgrade so that the new image file can be renamed correctly. (CSCdm32685)

- If you use Telnet or a browser to access a member switch without an IP address from the CVSM CDP page, the switch starts a session with the command switch.

The workaround for Telnet is to first display the cluster-member number by entering the privileged EXEC command **show cluster member**. Note the number of the member you want to access, and then Telnet to the switch by entering the following command: **rcommand switch_number**.

The workaround for the browser is to start Cluster Management from the switch home page and start Cluster Manager. Right-click on the chassis of the switch that you want to access, and select **Switch Manager**. (CSCdm34868)

- The Device Report and Bandwidth Graph menu items for candidate switches without IP addresses do not work.

The workaround is to add candidates to the cluster and then right-click the device and select **Device Report** or **Bandwidth Graph** from the pop-up menu. (CSCdm31724)

- The Link Graph between members and non-members does not work.

The workaround is to display the Device Report for the member switch, select **Port Information** from the drop-down menu in the right corner of the page, and click the appropriate port. Click **Graph**. (CSCdm32226)

- Adding trap managers using the SNMP Manager dialog box in Cluster Manager only adds the trap managers to the command switch, and it does not propagate them to cluster members. As a result, only traps that are generated by the command switch are received by the trap managers.

The workaround is to add the trap managers for the member switches by using the CVSM SNMP Configuration page. This must be done for every member in the cluster. Note that if the member switches do not have assigned IP addresses, you need to assign unique community strings for each trap manager. The community strings are the only means for determining which switch generated the trap. (CSCdm32763)

- Device reports and graphs give “SNMP Unavailable” messages.

First make sure that the switch is reachable via the network and that the SNMP agent is enabled. Also verify that you are using the correct community string. There should be only one read-only SNMP community string. If you change the community string while using cluster manager or CVSM, you must reload your browser to display the changes. (CSCdm32367)

- Links between members sometimes do not display in Cluster Builder or Cluster View.

The workaround is to display the Device Links Report from the Cluster Builder window. (CSCdm27668)

- Link Graphs for the Catalyst 3512 XL and Catalyst 3524 XL do not work.

The workaround is to right-click the switch icon, select **Device Report** from the pop-up menu, and select **Port Information** from the drop-down menu. Click the appropriate port, and click **Graph**. (CSCdm35346)

- Some dialog boxes in the Cluster Management application do not appear properly formatted in Solaris.

Use Windows 95, Windows 98, or Windows NT to avoid this problem. (CSCdm23953)

- In Internet Explorer 5.0, the tab key does not work properly. It does not highlight the editable fields as it should.

Use the mouse to click on the field, or use Netscape 4.5, Netscape 4.5.1, or Internet Explorer 4.01. (CSCdm24761)

- When using Internet Explorer 5.0 and CVSM to change the configuration, the changes are not updated by the browser but are applied to the switch.

The workaround is to click the browser **Refresh** button to display the new settings. (CSCdm27546)

- IP access lists can interfere with creating clusters. If you filter VTY connections based on an IP access list, clustering can fail, and users cannot use the privileged EXEC mode **recommand** to access a member switch CLI.

The workaround is to not use access lists if you want to cluster switches. The access class 199 that is created when a device is configured as the command switch is an exception. (CSCdm39364)

- If you enter the interface configuration mode **no ip address** command to remove the IP address from a member switch, it disables the switch IP protocol stack.

The workaround is to enter the EXEC mode **clear ip address vlan 1** command instead. (CSCdm39373)

- Network Address Translation (NAT) commands are added to the configuration file of a command switch when a cluster is created.

No workaround is necessary, but the commands should not be removed. (CSCdm39380)

- A laptop computer that goes to sleep while it has an open serial port session to a Catalyst 3500 series XL switch can cause the switch to reset when the laptop wakes up.

The workaround is to disconnect the serial cable from the console port when it is not in use. (CSCdm37220)

- When you configure more than 64 VLANs and you do not save the running configuration, the switch can assign STP instances to the wrong VLANs the next time it reloads.

If you configure more than 64 VLANs on a 2900 or 3500 XL switch, enter a privileged EXEC **save running-config** command after exiting VLAN configuration mode. (CSCdm33358)

Related Documentation

The product documentation for the 3500 and 2900 XL switches and modules is as follows:

- *Catalyst 2900 Series XL Installation Guide*
- *Quick Start: Catalyst 2900 Series XL Cabling and Setup*
- *Catalyst 3500 Series XL Installation Guide*
- *Quick Start: Catalyst 3500 Series XL Cabling and Setup*
- *Cisco IOS Desktop Switching Enterprise Edition Software Configuration Guide*
- *Cisco IOS Desktop Switching Software Configuration Guide*
- *Cisco IOS Desktop Command Reference (online only)*
- *Catalyst 2900 Series XL Modules Installation Guide*
- *Catalyst 2900 Series XL Gigabit Ethernet Module Installation Guide*
- *Release Notes for the Catalyst 2900 Series XL Modules*
- *Catalyst 2900 Series XL ATM Modules Installation and Configuration Guide*
- *Release Notes for the Catalyst 2900 Series XL ATM Modules*
- *Catalyst GigaStack Gigabit Interface Converter Installation Guide.*
- *Release Notes for Catalyst GigaStack Gigabit Interface Converter*

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

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Technical Assistance Center

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Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

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

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

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

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

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

Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

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



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