



Release Notes for Cisco 2600 Series for Cisco IOS Release 12.2 XL

August 16, 2002

Cisco IOS Release 12.2(4) XL6

OL-1940-01 Rev. E3

These release notes for the Cisco 2600 series describe the enhancements provided in Cisco IOS Release 12.2(4) XL6. These release notes are updated as needed.

For a list of the software caveats that apply to Cisco IOS Release 12.2(4) XL6, see the [“Caveats for Cisco IOS Release 12.2 XL” section on page 12](#) and *Caveats for Cisco IOS Release 12.2 T*. This caveats document is updated for every maintenance release and is also located on Cisco.com and the Documentation CD-ROM.

Use these release notes with *Cross-Platform Release Notes for Cisco IOS Release 12.2 T* located on Cisco.com and the Documentation CD-ROM.

Cisco recommends that you view the Field Notices for this release to see if your software or hardware platforms are affected. If you have an account with Cisco.com, you can find Field Notices at http://www.cisco.com/warp/customer/tech_tips/index/fn.html. If you do not have a Cisco.com login account, you can find Field Notices at http://www.cisco.com/warp/public/tech_tips/index/fn.html.

Contents

These release notes describe the following topics:

- [Introduction, page 2](#)
- [System Requirements, page 2](#)
- [New and Changed Information, page 8](#)
- [MIBs, page 10](#)
- [Important Notes, page 11](#)
- [Caveats for Cisco IOS Release 12.2 XL, page 12](#)



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- [Related Documentation, page 17](#)
- [Obtaining Documentation, page 23](#)
- [Obtaining Technical Assistance, page 24](#)

Introduction

With the Cisco 2600 series modular access router family, Cisco Systems extends enterprise-class and managed services customer premises equipment (CPE) versatility, integration, and power to branch offices. The widely deployed Cisco 2600 series modular access routers are designed to enable customers to easily adopt future technologies and scale to accommodate network expansion. The Cisco 2600 series shares modular interfaces with the Cisco 1600, Cisco 1700, and Cisco 3600 series, providing a solution to meet today's branch office needs for applications such as:

- Internet/intranet access with firewall security
- Multiservice voice/data integration
- Analog and digital dial access services
- Virtual Private Network (VPN) access
- Inter-VLAN routing
- Routing with bandwidth management

The Cisco 2600 series modular architecture provides the versatility needed to adapt to changes in network technology as new services and applications become available. Driven by a powerful RISC processor, the Cisco 2600 series supports the advanced Quality of Service (QoS), security, and network integration features required in today's evolving enterprise networks.

For information on new features and Cisco IOS commands supported by Cisco IOS Release 12.2(4) XL, see the [“New and Changed Information” section on page 8](#) and the [“Related Documentation” section on page 17](#).

System Requirements

This section describes the system requirements for Cisco IOS Release 12.2(4) XL and includes the following sections:

- [Memory Recommendations, page 3](#)
- [Supported Hardware, page 3](#)
- [Determining the Software Version, page 6](#)
- [Upgrading to a New Software Release, page 6](#)
- [Other Firmware Code, page 6](#)
- [Feature Set Tables, page 7](#)

Memory Recommendations

Table 1 Memory Recommendations for the Cisco 2600 Series

Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
IP PLUS	c2600-is-mz	16 MB Flash	64 MB DRAM	RAM
IP PLUS IPsec 3DES	c2600-ik9s-mz	16 MB Flash	64 MB DRAM	RAM
IP/FW/IDS PLUS IPsec 3DES	c2600-ik9o3s-mz	16 MB Flash	64 MB DRAM	RAM
IP/IPX/AT/DEC Plus	c2600-ds-mz	16 MB Flash	64 MB DRAM	RAM
Enterprise Plus	c2600-js-mz	32 MB Flash	96 MB DRAM	RAM
Enterprise Plus IPsec 3DES	c2600-jk9s-mz	32 MB Flash	96 MB DRAM	RAM
Enterprise/FW/IDS Plus IPsec 3DES	c2600-jk9o3s-mz	32 MB Flash	96 MB DRAM	RAM
Enterprise Plus/H323 MCM	c2600-jsx-mz	32 MB Flash	96 MB DRAM	RAM

Supported Hardware

Cisco IOS Release 12.2(4) XL6 supports the Cisco 2600 series:

- Cisco 2610
- Cisco 2611
- Cisco 2612
- Cisco 2613
- Cisco 2620 and 2621
- Cisco 2650 and 2651

For detailed descriptions of the new hardware features, see the “[New and Changed Information](#)” section on page 8.

For additional information about supported hardware for this platform and release, please refer to the Hardware/Software Compatibility Matrix in the Cisco Software Advisor at the following location:

<http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswwmatrix.cgi>

Table 2 Supported Interfaces on the Cisco 2600 Series Routers

Interface, Network Module, or Data Rate ¹		Platforms Supported
LAN Interfaces ²	1- or 2-port Ethernet (10BASE-T)	All Cisco 2600 series platforms
	1-port Token Ring (RJ-45)	Cisco 2612, Cisco 2613
	1- or 2-port 10/100-Mbps Ethernet	Cisco 2620, Cisco 2621, Cisco 2650, Cisco 2651 ³
LAN Network Modules	1-port Ethernet	All Cisco 2600 series platforms
	4-port Ethernet	All Cisco 2600 series platforms
	1-port ATM-25 RJ-45 interface	All Cisco 2600 series platforms

Table 2 Supported Interfaces on the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate ¹		Platforms Supported
Serial Network Modules	16- or 32-port asynchronous/synchronous serial low speed (128 kbps max)	All Cisco 2600 series platforms
	4- or 8-port asynchronous/synchronous serial low speed (128 kbps max)	All Cisco 2600 series platforms
Multiport T1/E1 ATM Network Modules with Inverse Multiplexing over ATM (IMA)⁴	4-port T1 ATM network module with IMA (NM-4T1-IMA)	All Cisco 2600 series platforms
	4-port E1 ATM network module with IMA (NM-4E1-IMA)	All Cisco 2600 series platforms
	8-port T1 ATM network module with IMA (NM-8T1-IMA)	All Cisco 2600 series platforms
	8-port E1 ATM network module with IMA (NM-8E1-IMA)	All Cisco 2600 series platforms
ATM Network Modules⁴	1-port ATM T3 network module (NM-1A-T3)	All Cisco 2600 series platforms
	1-port ATM E3 network module (NM-1A-E3)	All Cisco 2600 series platforms
Digital T1 Packet Voice Trunk Network Modules and Spare Components	1-port, 24-channel T1 voice/fax module supports 24 channels of medium-complexity codecs: G.729a/b, G.726, G.711 and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, two PVDM-12s, and one VWIC-1MFT-T1. ⁵ Part number: NM-HDV-1T1-24.	All Cisco 2600 series platforms
	1-port, enhanced 24-channel T1 voice/fax module, supports 24 channels of high- and medium-complexity codecs: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-1MFT-T1. ⁴ Part number: NM-HDV-1T1-24E.	All Cisco 2600 series platforms
	2-port, 48-channel T1 voice/fax module supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs: G.729a/b, G.726, G.711, and fax; or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, four PVDM-12, and one VWIC-2MFT-T1-DI. ⁴ Part number: NM-HDV-2T1-48.	All Cisco 2600 series platforms
	High-density voice/fax network module spare (NM-HDV)	Digital T1/E1 packet voice trunk network modules spare component
	12-channel packet voice DSP module upgrade spare (PVDM-12)	Digital T1/E1 packet voice trunk network modules spare component
Digital T1 Packet Voice Trunk Network Modules and Spare Components (Continued)	1-port RJ-48 multiflex trunk - T1 (VWIC-1MFT-T1) ⁴	Digital T1/E1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk - T1 (VWIC-2MFT-T1) ⁴	Digital T1/E1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk with drop and insert - T1 (VWIC-2MFT-T1-DI) ⁴	Digital T1/E1 packet voice trunk network modules spare component

Table 2 Supported Interfaces on the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate ¹		Platforms Supported
Digital E1 Packet Voice Network Modules	1-port 30 Channel E1 High-Density Voice Network Module (NM-HDV-1E1-30)	All Cisco 2600 series platforms
	1-port Enhanced 30 Channel E1 High-Density Voice Network Module (NM-HDV-1E130E)	All Cisco 2600 series platforms
	2-port 60 Channel High-Density Voice Network Module (NM-HDV-2E1-60)	All Cisco 2600 series platforms
Dial, ISDN and Channelized Serial Network Modules	1- or 2-port channelized T1/ISDN PRI	All Cisco 2600 series platforms
	1- or 2-port channelized T1/ISDN PRI with CSU	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI balanced	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI unbalanced	All Cisco 2600 series platforms
	4-or 8-port ISDN BRI S/T interface	All Cisco 2600 series platforms
	4- or 8-port ISDN BRI U (NT1) interface	All Cisco 2600 series platforms
	8- or 16-port analog modems	All Cisco 2600 series platforms
T1/E1 Multiflex Voice/WAN Interface Cards⁶	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 2600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface (VWIC-2MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface with Drop and Insert (VWIC-2MFT-T1-DI)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface with Drop and Insert (VWIC-2MFT-E1-DI)	All Cisco 2600 series platforms
Voice/Fax Interface Cards	1- or 2- voice interface card slots	All Cisco 2600 series platforms
	1-slot high-density T1/E1 voice interface card slots ⁷	All Cisco 2600 series platforms
	2-port FXS voice/fax interface card ⁸	All Cisco 2600 series platforms with voice/fax network modules
	2-port E&M voice/fax interface card ³	All Cisco 2600 series platforms with voice/fax network modules
	2-port FXO voice/fax interface card ³	All Cisco 2600 series platforms with voice/fax network modules
WAN Interface Cards	1-Port ADSL WAN Interface Card (WIC-1ADSL)	All Cisco 2600 series platforms
	1 Port G.SHDSL WAN Interface Card (WIC-1SHDSL)	All Cisco 2600 series platforms
	1-port ISDN BRI S/T interface (requires external NT1)	All Cisco 2600 series platforms
	1-port ISDN BRI (NT1) U	All Cisco 2600 series platforms
	1-port 56/64-kbps DSU/CSU	All Cisco 2600 series platforms
	1-port T1/Fractional T1 with DSU/CSU	All Cisco 2600 series platforms
	1-port high-speed serial (up to 2.048 Mbps)	All Cisco 2600 series platforms
	2-port dual high-speed serial (up to 2.048 Mbps; asynchronous/synchronous support)	All Cisco 2600 series platforms
	2-port asynchronous/synchronous (up to 128 kbps)	All Cisco 2600 series platforms

Table 2 *Supported Interfaces on the Cisco 2600 Series Routers (continued)*

Interface, Network Module, or Data Rate ¹		Platforms Supported
Advanced Integration Module	Data compression AIM (up to 8.192 Mbps)	All Cisco 2600 series platforms
	Hardware Encryption AIM	All Cisco 2600 series platforms

1. The voice/fax and ATM-25 network modules require Cisco IOS Plus feature sets.
2. The 1- or 2-port 10/100 Ethernet LAN interface for the Cisco 2620 and Cisco 2621 series routers is only available in Cisco IOS Release 12.0 XC and later.
3. Cisco 2650 and 2651 routers require Cisco IOS Release 12.1(3a)T1 or later.
4. Requires the Cisco IOS Plus feature sets.
5. See T1/E1 multiflex voice/WAN interface cards in this table.
6. T1 multiflex voice/WAN interface cards can be used in a chassis slot or installed in a digital T1 packet voice trunk module. E1 multiflex voice/WAN interface cards can be installed in a chassis slot.
7. Uses the VWIC-MFT T1/E1 interface cards.
8. Requires the NM-1V or NM-2V network module.

Determining the Software Version

To determine the version of Cisco IOS software running on your Cisco 2600 series, log in to the Cisco 2600 series and enter the **show version EXEC** command:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.2 XL Software c2600-jsx-mz, Version 12.2(4) XL6, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, refer to *Software Installation and Upgrade Procedures* located at the following URL:

http://www.cisco.com/warp/public/130/upgrade_index.shtml

Other Firmware Code

The latest version of analog modem firmware for the Cisco 2600 series supports the internal analog modems (both NM-16AM and NM-8AM) in a wide range of countries, starting with Cisco IOS Release 11.3(5)T and later releases. The latest firmware (version 1.2.0) also supports dial-out and fax-out.

Additional information can be found on Cisco.com, beginning under the **Service & Support** heading:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers: Analog Modem Firmware

This information is also available on the Documentation CD-ROM at:

Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers: Analog Modem Firmware

Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features.

Cisco IOS Release 12.2(4) XL6 supports the same feature sets as Cisco IOS Release 12.2(4) T, but Cisco IOS Release 12.2(4) XL6 can include new features supported by the Cisco 2600 series. Feature information for 12.2(4) T is located in the *Cross-Platform Release Notes for Cisco IOS Release 12.2 T*.



Caution

Cisco IOS images with strong encryption (including, but not limited to, 168-bit Triple Data Encryption Standard [3DES] data encryption feature sets) are subject to United States government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay because of United States government regulations. When applicable, purchaser and user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

[Table 3](#) and [Table 4](#) list the new features supported by the Cisco 2600 series in Cisco IOS Release 12.2(4) XL6 and uses the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.



Note

These release notes are not cumulative and list only features that are new to Cisco IOS Release 12.2(4)XL5. The parent release for Cisco IOS Release 12.2(4)XL5 is Cisco IOS Release 12.2(4)XL. For information about inherited features, refer to Cisco.com or Feature Navigator. For Cisco.com, go to <http://www.cisco.com/univercd/home/index.htm>, select the appropriate software release under **Cisco IOS Software**, and click **Release Notes**. If you have a Cisco.com login account, you can use the Feature Navigator tool at <http://www.cisco.com/go/fn>.

Table 3 Feature List by Feature Set for the Cisco 2600 Series Routers, Part 1 of 2

Features	Software Images by Feature Sets			
	IP Plus	IP Plus IPsec 3DES	IP/FW/IDS Plus IPsec 3DES	IP/IPX/AT/ DEC Plus
Multiservice Applications - Broadband DSL				
1 Port G.SHDSL WAN Interface Card	Yes	Yes	Yes	Yes
Quality of Service				
Voice and IP Quality of Service Features on the ADSL and G.SHDSL WAN Interface Cards	Yes	Yes	Yes	Yes

Table 4 Feature List by Feature Set for the Cisco 2600 Series Routers, Part 2 of 2

Features	Software Images by Feature Sets			
	Enterprise Plus	Enterprise Plus IPsec 3DES	Enterprise/FW/IDS Plus IPsec 3DES	Enterprise Plus/H323 MCM
Multiservice Applications - Broadband DSL				
1 Port G.SHDSL WAN Interface Card	Yes	Yes	Yes	Yes
Quality of Service				
Voice and IP Quality of Service Features on the ADSL and G.SHDSL WAN Interface Cards	Yes	Yes	Yes	Yes

New and Changed Information

New Hardware and Software Features from Cisco IOS Release 12.2(4) XL1 to Cisco IOS Release 12.2(4) XL5

No new hardware and software features are supported by the Cisco 2600 series for Cisco IOS Release 12.2(4) XL1 to Cisco IOS Release 12.2(4) XL5.

New Hardware Features in Cisco IOS Release 12.2(4) XL

The following new hardware feature is supported by the Cisco 2600 series for Cisco IOS Release 12.2(4) XL:

1 Port G.SHDSL WAN Interface Card

G.SHDSL is ATM-based, multirate, high-speed (up to 2.3 MB), symmetrical digital subscriber line digital data transfer between a single customer premises equipment (CPE) subscriber and a central office.

G.SHDSL is supported on the G.SHDSL WAN interface card, a 1-port WAN interface card (WIC) for Cisco 2600 series routers.

The G.SHDSL WIC is compatible with the Cisco 6015, Cisco 6130, Cisco 6160, and Cisco 6260 Digital Subscriber Line Access Multiplexers (DSLAMs). The DSLAM must be equipped with G.SHDSL line cards that are compatible with the DSL service to be configured.

The G.SHDSL WIC supports ATM Adaptation Layer 2 (AAL2), ATM Adaptation Layer 5 (AAL5), and various classes of quality of service (QoS) for both voice and data service.

Refer to the following document for further information:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xl/122xl14/ft_gdsl4.htm

New Software Features in Cisco IOS Release 12.2(4) XL

The following new software feature is supported by the Cisco 2600 series for Cisco IOS Release 12.2(4) XL:

Voice and IP Quality of Service Features on the ADSL and G.SHDSL WAN Interface Cards

This feature was initially released in Cisco IOS Release 12.2(4) XK. In Cisco IOS Release 12.2(4) XL, this feature further expands voice and QoS features for ADSL on Cisco 2600 and Cisco 3600 and provides full support for single-pair, high-bit-rate digital subscriber lines (G.SHDSL) on Cisco 2600 series routers.

The following voice and QoS features are supported by this feature in the 12.2(4)XL release:

- Classification and marking
 - Class-based packet marking with DSCP
 - Committed access rate
 - Dial-peer DSCP and IP precedence marking
- Queuing and scheduling
 - Class-based weighted fair queuing
 - Low latency queuing
 - Driver per-VC queuing
- Congestion avoidance
 - Class-based WRED and DSCP (egress)
- Policing and traffic shaping
 - Class-based policing
 - Per-ATM VC shaping for VBR-NRT
- Link latency
 - Selectable transmit ring
- Other (IP QoS)
 - IP QoS map to ATM CoS

- Additional features
 - Multiple PVC support
 - RFC1483 routing
 - Local policy routing
 - Policy-based routing
 - Access lists
 - H.323 VoIP
 - Multilink Point-to-Point Protocol (MLP)
 - Integrated Local Management Interface (ILMI)
 - F5 OAM CC segment functionality

Refer to the following document for additional information:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xl/122x14/ft_qgdsl.htm

MIBs

Current MIBs

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

Deprecated and Replacement MIBs

Old Cisco MIBs will be replaced in a future release. Currently, OLD-CISCO-* MIBs are being converted into more scalable MIBs without affecting existing Cisco IOS products or network management system (NMS) applications. You can update from deprecated MIBs to the replacement MIBs as shown in [Table 5](#).

Table 5 *Deprecated and Replacement MIBs*

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	To be determined
OLD-CISCO-DECNET-MIB	To be determined
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB CISCO-QUEUE-MIB
OLD-CISCO-IP-MIB	To be determined

Table 5 Deprecated and Replacement MIBs (continued)

Deprecated MIB	Replacement
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBs)
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB
OLD-CISCO-TS-MIB	To be determined
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	To be determined

Important Notes

The following sections contain important notes about Cisco IOS Release 12.2(4) XL6 that can apply to the Cisco 2600 series.

Field Notices and Bulletins

For general information about the types of documents listed in this section, refer to the following document:

http://www.cisco.com/warp/customer/cc/general/bulletin/software/general/1654_pp.htm

- **Field Notices**—Cisco recommends that you view the field notices for this release to see if your software or hardware platforms are affected. If you have an account with Cisco.com, you can find Field Notices at http://www.cisco.com/warp/customer/tech_tips/index/fn.html. If you do not have a Cisco.com login account, you can find Field Notices at http://www.cisco.com/warp/public/tech_tips/index/fn.html.
- **Product Bulletins**—If you have an account on Cisco.com, you can find product bulletins at <http://www.cisco.com/warp/customer/cc/general/bulletin/index.shtml>. If you do not have a Cisco.com login account, you can find product bulletins at <http://www.cisco.com/warp/public/cc/general/bulletin/iosw/index.shtml>.
- *What's Hot for IOS Releases: Cisco IOS 12.2—What's Hot for IOS Releases: Cisco IOS 12.2* provides information about caveats that are related to deferred software images for Cisco IOS Release 12.2. If you have an account on Cisco.com, you can access *What's Hot for IOS Releases: Cisco IOS 12.2* at <http://www.cisco.com/kobayashi/sw-center/sw-ios.shtml> or by logging in and selecting **Software Center: Cisco IOS Software: What's Hot for IOS Releases: Cisco IOS 12.2**.
- *What's New for IOS* — *What's New for IOS* lists recently posted Cisco IOS software releases and software releases that have been removed from Cisco.com. If you have an account on Cisco.com, you can access *What's New for IOS* at <http://www.cisco.com/kobayashi/sw-center/sw-ios.shtml> or by logging in and selecting **Software Center: Cisco IOS Software: What's New for IOS**.

Important Notes in Cisco IOS Release 12.2 XL

Addition of squeeze Command for Cisco 2600 and Cisco 3600 Series Routers

The **squeeze** command, which is used to erase all files marked for deletion on a Flash file system, is now available on Cisco 2600 and Cisco 3600 series routers.

Changes to output attenuation Command

In Cisco IOS Release 12.2(2), the range of the **output attenuation** command for voice ports has changed from 0-14 to -6-14.

Caveats for Cisco IOS Release 12.2 XL

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. Severity 3 caveats are moderate caveats, and only select severity 3 caveats are included in the caveats document.

This section contains only open and resolved caveats for the current Cisco IOS maintenance release.

All caveats in Cisco IOS Release 12.2 T are also in Cisco IOS Release 12.2(4) XL6.

For information on caveats in Cisco IOS Release 12.2 T, see *Caveats for Cisco IOS Release 12.2 T*, which lists severity 1 and 2 caveats and select severity 3 caveats and is located on Cisco.com and the Documentation CD-ROM.



Note

If you have an account on Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in to Cisco.com and click **Service & Support: Software Center: Cisco IOS Software: BUG TOOLKIT**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Open Caveats—Cisco IOS Release 12.2(4) XL6

There are no open caveats specific to Cisco IOS Release 12.2(4) XL6 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release 12.2(4) XL6

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(4) XL6. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdx12295

On G.SHDSL, the upstream and downstream data rates do not match with auto mode, hence RADSL feature works only for limited line rates.

Workaround: There is no workaround.

- CSCdx32547

ADSL line with alcatel fw 3.8.129 does not train

With 3.8.129 alcatel firmware for ADSL WICs, for few loop lengths with significant cross talk, the line is failing to train. The workaround is to configure “dsl operating-mode ansi” on the CPE. The new firmware 3.8.131 released by alcatel has the fix for this problem.

Open Caveats—Cisco IOS Release 12.2(4) XL5

There are no open caveats specific to Cisco IOS Release 12.2(4) XL5 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release 12.2(4) XL5

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(4) XL5. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCds80112

Router may reload while running DLSw+ Ethernet Redundancy Feature

Symptoms: A Cisco router that is running Cisco IOS Release 12.1 may reload when the data-link switching plus (DLSw+) Ethernet Redundancy feature is used. This condition occurs only when the **dls w transparent map** interface configuration command is configured.

Workaround: There is no workaround.

- CSCds82696

ignore-hw-local-loopback not configurable on WIC-2A/S

On WIC-2A/S, cannot configure "ignore-hw-local-loopback" when DCE cable is attached.

- CSCdw57301

TPLUS: Select Error Invalid argument; intermittent authen failure

Intermittent TACACS+ authentication failures may occur, and the following message may be displayed in the debug output when the **debug tacacs EXEC** command is issued on a router: TPLUS(xxxx): Select Error Invalid argument

Workaround: Reload the router.

- CSCdv04922

Spurious memory access made @ dlsar_encaps

Symptoms: Spurious memory access message might be displayed on the console with ADSL/GSHDSL interfaces. There are no known consequences of these messages.

Workaround: There is no work around

- CSCdv51360

TCP session stuck in SYNSENT, TCB appears hung

Symptoms: A data-link switching (DLSw) peer may be stuck in the AB_PEND state and a TCP session may be stuck in the SYNSENT state after an IP outage occurs between two DLSw routers.

Workaround: Use the **show tcp brief EXEC** command to determine the Transmission Control Block (TCB) of the hung TCP session. Enter the **clear tcp tcb address** privileged EXEC command to clear the TCB of the hung TCP session. The DLSw peers will reconnect as long as there is IP connectivity between the DLSw peers.

- CSCdw59420

freq. GSHDSL-6-INVALIDADDR: invalid EOC address, line flaps

Symptoms: A Cisco 2600 router that has a 1-port G.shdsl WAN interface card (WIC-1SHDSL) and that is running Cisco IOS Release 12.2(7.5)T or Release 12.2(4)XL and that is connected to a vendor-specific digital subscriber line access multiplexer (DSLAM) device may experience line flapping about once an hour. The line usually regains its normal function within a minute. This condition appears to occur because of interoperability issues between the WIC-1SSHDSL interface card and the vendor-specific DSLAM device. The WIC-1SHDSL interface card works normally when it is tested with other DSLAM devices.

Workaround: There is no workaround.

- CSCdx11089

Change password sequence broken: 12.2T + CS Unix

It may not be possible to activate the change password sequence through a Telnet session to a router that is using TACACS+ user authentication. This symptom is observed on a Cisco router that is using a CiscoSecure UNIX (CSUNIX) TACACS+ server and that is running Cisco IOS Release 12.2 T.

Workaround: There is no workaround.

- CSCdx17146

RDI cells are not transmitted after stopping to receive CC cells

Symptoms: A router that is in the alarm indication signal (AIS) state does not transmit remote defect identification (RDI) cells after the router stops receiving AIS and continuity check (CC) cells.

Conditions: This symptom is observed on a Cisco router that has CC enabled and that is running Cisco IOS Release 12.2(4). The router responds by sending RDI cells even though CC cells are not activated on the permanent virtual circuit (PVC) card and the router is receiving AIS cells. The router stops sending RDI cells after it stops receiving AIS and CC cells.

Workaround: There is no workaround.

- CSCdx38151

ATM periodic timer should not bring up the oam down pvcs

- CSCdx40218

ignore-dcd command is missing under serial interface for WIC modules

In Cisco 2600 series routers equipped with WIC-1T, WIC-2T, or WIC-2A/S, the configuration command 'ignore-dcd' under serial interface is missing. This command is available for NM-4A/S or NM-8A/S modules.

Open Caveats—Cisco IOS Release 12.2(4) XL4

There are no open caveats specific to Cisco IOS Release 12.2(4) XL4 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release 12.2(4) XL4

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(4) XL4. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdw08197

A virtual-access configured with encapsulation ppp under virtual-template over a ADSL/G.SHDSL interface may go down and come back up immediately under stress. This kind of flapping is observed once in 2 hours or once in 3 hours. The work around is to disable keepalives by configuring no keepalive under the virtual-template.

- CSCdv45229

aal2 is not working - rx aal2 not increasing

Symptom: aal2 is broken on Voice and Quality of Service Features for ADSL on Cisco 2600 and 3600 Series Routers.

Workaround: There is no work-around for this problem

- CSCdv48631

Crash with stress traffic = line rate & second ethernet port

When 20 or more PVCs are configured AND data is sent such that the PVCs are congested, the router is crashing. However, when the data is sent at less than the line rate, there is no crash. It has been verified that 3 PVCs, carrying data upto the line rate and with these 3 PVCs congested, the router is working fine. So, it is not advised to configure more than 3 PVCs carrying data to a level where each PVC gets congested.

The crash is platform specific and happens only on 2611 with 2 ethernet ports .And it only happens when data is send on eth0/1 .It does not happen on 2610. Number of PVCs that are supported is currently 5 VBR-NRT and 5 UBR with the exception of the problem that is specific to 2611 on data sending to eth0/1. Other platforms are ok with 5/5 PVCs.

The same crash is also seen on 3640 with XL images when data is passed close to line rate and traffic is stopped suddenly. It happens when traffic is sent on the same NM 1FE-2W . It does not happen when traffic is sent on a different NM.

- CSCdv69684

Configuring OAM on PVC brings down PVC under stress When OAM is configured over a pvc carrying MLPPP traffic and traffic reaches line rate, OAM cells may be dropped which might bring down the virtual access and causes MLPPP link flapping. It is not recommended to configure OAM over MLPPP link over ADSL/G.SHDSL.

- CSCdv79919

Traceback may appear when the router which is fully populated is coming up. These tracebacks indicate that the initialization process is consuming more CPU time during the router bring up. There are not any known consequences of these tracebacks on either the functionality or the performance of the router with ADSL/G.SHDSL interfaces.

- CSCdv84596

When G.SHDSL wic is placed in one of the wic slots on an FECPM and a second WIC slot is also having a WIC (either serial or ADSL or G.SHDSL or any other WIC), and when the router is running at about 85% of the CPU, the TX path of the G.SHDSL wic may fail. The root cause for this problem is that the clock rate programmed for the G.SHDSL wic is exceeding the maximum aggregate clock

an FECPM network module can support. There is already an automatic recovery mechanism in place. If the lockup happens, the traffic will be affected for about 1 second to 2 seconds before the recovery mechanism comes into play.

Open Caveats—Cisco IOS Release 12.2(4) XL3

There are no open caveats specific to Cisco IOS Release 12.2(4) XL3 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release 12.2(4) XL3

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(4) XL3. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- 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>

Open and Resolved Caveats—Cisco IOS Release 12.2(4) XL1

Cisco IOS Release 12.2(4) XL1 does not support the Cisco 2600.

Open Caveats—Cisco IOS Release 12.2(4) XL

This section documents possible unexpected behavior by Cisco IOS Release 12.2(4) XL4 and describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdv84596

The G.SHDSL WAN interface card in the NM-2FE2W, NM-1FE1R2W, NM-1FE2W, and NM-2W on the Cisco 3600 (the Cisco 2600 with g.shdsl is unaffected by this bug) with 12.2(4)XL is not working properly and should not be used.

There is no workaround.

- CSCdv45229

AAL2 is not working on the G.SHDSL WAN interface card.

There is no workaround.

- CSCdv48631

When 20 or more PVCs are configured, and data is sent such that the PVCs are congested, the router crashes. However, when the data is sent at less than the line rate, there is no crash. It has been verified that three “congested” PVCs can carry data up to line rate. It is recommended that customers do not configure more than three PVCs to carry data to a level where each PVC can become congested.

The crash happens only on a Cisco 2611 with two ethernet ports and when data is sent on eth0/1.

Number of PVCs that are supported is currently 5 VBR-NRT and 5 UBR, with the exception of the problem that is specific to the Cisco 2611 on data sending to eth0/1. Other platforms do not exhibit this problem with 5/5 PVCs. The same crash is also seen on the Cisco 3640 when data is passed close to line rate and traffic is stopped suddenly.

- CSCdv71585

When making Analog (FXS) or Digital Calls (T1) with MLP/LFI configuration, a DSP-TIMEOUT error is shown, making voice calls unsuccessful.

There is no workaround.

- CSCdv79919

Traceback is seen for SYS-3-CPUHOG in initial booting.

There is no workaround.

- CSCdv83291

The router crashes when stressing it with the MLP/LFI configuration.

There is no workaround.

Resolved Caveats—Cisco IOS Release 12.2(4)XL

There are no resolved caveats specific to Cisco IOS Release 12.2(4) XL that require documentation in the release notes.

Related Documentation

The following sections describe the documentation available for the Cisco 2600 series. These documents consist of hardware and software installation guides, Cisco IOS configuration guides and command references, system error messages, feature modules, and other documents.

Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online on Cisco.com and the Documentation CD-ROM.

Use these release notes with these documents:

- [Release-Specific Documents, page 18](#)
- [Platform-Specific Documents, page 18](#)
- [Feature Modules, page 19](#)
- [Feature Navigator, page 19](#)
- [Cisco IOS Software Documentation Set, page 19](#)

Release-Specific Documents

- *Cross-Platform Release Notes for Cisco IOS Release 12.2 T*

On Cisco.com at:

Technical Documents: Cisco IOS Software: Cisco IOS Release 12.2: Release Notes: Cross-Platform Release Notes

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: Cross-Platform Release Notes

- Product bulletins, field notices, and other release-specific documents on Cisco.com at:

Technical Documents

- The [“Caveats for Cisco IOS Release 12.2 XL” section on page 12](#)

As a supplement to the caveats listed in [“Caveats for Cisco IOS Release 12.2 XL”](#) in these release notes, see *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2 T*, which contain caveats applicable to all platforms for all maintenance releases of Cisco IOS Release 12.2 and Cisco IOS Release 12.2 T.

On Cisco.com at:

Technical Documents: Cisco IOS Software: Cisco IOS Release 12.2: Release Notes: Caveats

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Caveats



Note

If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, log in to Cisco.com and click **Service & Support: Technical Assistance Center: Select & Download Software: Jump to a software resource: Software Bug Toolkit/Bug Watcher**. Another option is to go to <http://www.cisco.com/support/bugtools/bugtool.shtml>.

Platform-Specific Documents

These documents are available for the Cisco 2600 series on Cisco.com and the Documentation CD-ROM:

- *Cisco 2600 Series Modular Routers Quick Start Guide*
- Hardware Installation Documents for Cisco 2600 Series
- Software Configuration Documents for Cisco 2600 Series
- Regulatory Compliance and Safety Documents for Cisco 2600 Series

On Cisco.com at:

Technical Documents: Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers

On the Documentation CD-ROM at:

Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers

Feature Modules

Feature modules describe new features supported by Cisco IOS Release 12.2(4) XL6 and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On Cisco.com at:

Technical Documents: Cisco IOS Software: Cisco IOS Release 12.2: New Feature Documentation

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: New Feature Documentation

Feature Navigator

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

Cisco Feature Navigator is available 24 hours a day, 7 days a week. To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

Cisco IOS Software Documentation Set

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents. The Cisco IOS software documentation set is shipped with your order in electronic form on the Documentation CD-ROM—unless you specifically ordered the printed versions.

Documentation Modules

Each module in the Cisco IOS documentation set consists of one or more configuration guides and one or more corresponding command references. Chapters in a configuration guide describe protocols, configuration tasks, and Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On Cisco.com at:

Technical Documents: Cisco IOS Software: Cisco IOS Release 12.2: Configuration Guides and Command References

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

Cisco IOS Release 12.2 Documentation Set Contents

[Table 6](#) lists the contents of the Cisco IOS Release 12.2 software documentation set, which is available in electronic form and in printed form if ordered.



Note

You can find the most current Cisco IOS documentation on Cisco.com and the Documentation CD-ROM. These electronic documents may contain updates and modifications made after the hard-copy documents were printed.

On Cisco.com at:

Technical Documents: Cisco IOS Software: Cisco IOS Release 12.2

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2

Table 6 Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
<i>Cisco IOS Configuration Fundamentals Configuration Guide</i> <i>Cisco IOS Configuration Fundamentals Command Reference</i>	Cisco IOS User Interfaces File Management System Management
<i>Cisco IOS Bridging and IBM Networking Configuration Guide</i> <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2</i> <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2</i>	Transparent Bridging SRB Token Ring Inter-Switch Link Token Ring Route Switch Module RSRB DLSW+ Serial Tunnel and Block Serial Tunnel LLC2 and SDLC IBM Network Media Translation SNA Frame Relay Access NCIA Client/Server Airline Product Set DSPU and SNA Service Point SNA Switching Services Cisco Transaction Connection Cisco Mainframe Channel Connection CLAW and TCP/IP Offload CSNA, CMPC, and CMPC+ TN3270 Server

Table 6 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• <i>Cisco IOS Dial Technologies Configuration Guide: Dial Access</i> • <i>Cisco IOS Dial Technologies Configuration Guide: Large-Scale Dial Applications</i> • <i>Cisco IOS Dial Technologies Command Reference, Volume 1 of 2</i> • <i>Cisco IOS Dial Technologies Command Reference, Volume 2 of 2</i>	- Dial Access - Modem and Dial Shelf Configuration and Management - ISDN Configuration - Signaling Configuration - Point-to-Point Protocols - Dial-on-Demand Routing - Dial Backup - Dial Related Addressing Service - Network Access Solutions - Large-Scale Dial Solutions - Cost-Control Solutions - Internetworking Dial Access Scenarios
• <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Reference</i>	- LAN Interfaces - Serial Interfaces - Logical Interfaces
• <i>Cisco IOS IP Configuration Guide</i> • <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> • <i>Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols</i> • <i>Cisco IOS IP Command Reference, Volume 3 of 3: Multicast</i>	- IP Addressing - IP Services - IP Routing Protocols - IP Multicast
• <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i> • <i>Cisco IOS AppleTalk and Novell IPX Command Reference</i>	- AppleTalk - Novell IPX
• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i>	- Apollo Domain - Banyan VINES - DECnet - ISO CLNS - XNS
• <i>Cisco IOS Voice, Video, and Fax Configuration Guide</i> • <i>Cisco IOS Voice, Video, and Fax Command Reference</i>	- Voice over IP - Call Control Signaling - Voice over Frame Relay - Voice over ATM - Telephony Applications - Trunk Management - Fax, Video, and Modem Support
• <i>Cisco IOS Quality of Service Solutions Configuration Guide</i> • <i>Cisco IOS Quality of Service Solutions Command Reference</i>	- Packet Classification - Congestion Management - Congestion Avoidance - Policing and Shaping - Signaling - Link Efficiency Mechanisms

Table 6 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• <i>Cisco IOS Security Configuration Guide</i> • <i>Cisco IOS Security Command Reference</i>	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options Supported AV Pairs
• <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i>	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
• <i>Cisco IOS Wide-Area Networking Configuration Guide</i> • <i>Cisco IOS Wide-Area Networking Command Reference</i>	ATM Frame Relay SMDS X.25 and LAPB
• <i>Cisco IOS Mobile Wireless Configuration Guide</i> • <i>Cisco IOS Mobile Wireless Command Reference</i>	General Packet Radio Service
• <i>Cisco IOS Terminal Services Configuration Guide</i> • <i>Cisco IOS Terminal Services Command Reference</i>	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
• <i>Cisco IOS Configuration Guide Master Index</i> • <i>Cisco IOS Command Reference Master Index</i> • <i>Cisco IOS Debug Command Reference</i> • <i>Cisco IOS Software System Error Messages</i> • <i>New Features in 12.2-Based Limited Lifetime Releases</i> • <i>New Features in Release 12.2 T</i> • <i>Release Notes</i> (Release note and caveat documentation for 12.2-based releases and various platforms)	

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

If you are reading Cisco product documentation on Cisco.com, you can submit technical comments electronically. Click **Leave Feedback** at the bottom of the Cisco Documentation home page. After you complete the form, print it out and fax it to Cisco at 408 527-0730.

You can e-mail your comments to bug-doc@cisco.com.

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

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

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 on page 17](#).

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