



Release Notes for the Cisco 800 and SOHO 90 Series Routers for Cisco IOS Release 12.2(11)YV

July 29, 2003

These release notes describe new features and significant software components for the Cisco 836 router and the Cisco SOHO 96 router that support Cisco IOS Release 12.2 T, up to and including Release 12.2(11)YV2. These release notes are updated as needed to describe new memory requirements, new features, new hardware support, software platform deferrals, microcode or modem code changes, related document changes, and any other important changes. Use these release notes with the [Cross-Platform Release Notes for Cisco IOS Release 12.2 T](#) located on Cisco.com and the Documentation CD.

For a list of the software caveats that apply to Release 12.2(11)YV2, refer to the section “[Caveats](#)” and to the online [Caveats for Cisco IOS Release 12.2 T](#) document. The caveats document is updated for every 12.2 T maintenance release and is located on Cisco.com and the Documentation CD.

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System Requirements

This section describes the system requirements for Release 12.2(11)YV2 and includes the following sections:

- [Memory Requirements, page 2](#)
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Memory Requirements

This section describes the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Release 12.2(11)YV2 on the Cisco 836 and SOHO 96 routers.

Table 1 Recommended Memory for the Cisco 836 and SOHO 96 Routers

Platforms	Image Name	Feature Set	Image	Flash Memory	DRAM Memory
Cisco 836	Cisco 836 IOS IP Plus/FW/3DES/Backup Dial	IP Plus/FW/3DES/Backup Dial	c836-k9o3s8y6-mz	8 MB	32 MB
	Cisco 836 IOS IP PLUS/FW/3DES	IP Plus/FW/3DES	c836-k9o3sy6-mz	8 MB	32 MB
	Cisco 836 IOS IP/FW/3DES	IP/FW/3DES	c836-k9o3y6-mz	8 MB	32 MB
Cisco SOHO 96	Cisco SOHO 96 IOS IP/FW/3DES	IP/FW/3DES	SOHO 96-k9oy1-mz	8 MB	32 MB

Hardware Supported

Cisco IOS Release 12.2(11)YV2 supports the following routers:

- Cisco 836 routers
- Cisco SOHO 96 routers

For detailed descriptions of new hardware features and which features are supported on each router, see the “[New and Changed Information](#)” section on page 7. For descriptions of existing hardware features and supported modules, see the hardware installation guides, configuration and command reference guides, and additional documents specific to Cisco 836 and SOHO 96 routers, which are available on Cisco.com and the Documentation CD at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_fix/800/index.htm

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

Cisco Product Documentation: Access Servers and Access Routers: Fixed Access: Cisco 800 Series Routers: <platform_name>

Determining the Software Version

To determine which version of Cisco IOS software is currently running on your Cisco 836 or SOHO 96 router, log in to the router, and enter the **show version** EXEC command. The following sample output from the **show version** command indicates the version number on the second output line.

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) C836 Software (C836-K9O3SY6-M), Version 12.2(11)YV2, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1) Synched to technology version 12.2(13.1u)T
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, see *Software Installation and Upgrade Procedures* located at http://www.cisco.com/warp/public/130/upgrade_index.shtml.

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. Release 12.2(11)YV2 supports the same feature sets as Releases 12.2 and 12.2(8)T, but Release 12.2(11)YV2 includes new features supported by the Cisco 836 and SOHO 96 routers.



Caution

Cisco IOS images with strong encryption (including, but not limited to 168-bit [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 will likely require an export license. Customer orders can be denied or subject to delay due to United States government regulations. When applicable, the purchaser/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 2 lists the features and feature sets that are supported in Cisco IOS Release 12.2(11)YV2.

The table uses the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In—The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, “12.2(11)YV” means the feature was introduced in 12.2(11)YV. If a cell in this column is empty, the feature was included in a previous release or the initial base release.



Note

These feature set tables only contain a selected list of features, which are cumulative for Release 12.2(8)*nn* early deployment releases only (*nn* identifies each early deployment release). The tables do not list all features in each image—additional features are listed in the [Cross-Platform Release Notes for Cisco IOS Release 12.2 T](#) and Release 12.2 T Cisco IOS documentation.

Table 2 Feature List by Feature Set for Cisco 836, and SOHO 96 Routers

Feature	In	Feature Set			
		IP/FW/3DES		IP PLUS/FW/ 3DES	IP PLUS/ FW/3DES/ Backup Dial
		Cisco 836 Router	Cisco SOHO 96 Router	Cisco 836 Router	Cisco 836 Router
Hardware Features					
10/100 switch, 4-port, unmanaged	12.2(11)YV	Yes	Yes	Yes	Yes
Switch queuing mechanism to enable QoS, fair queuing with priority queues.	12.2(11)YV	Yes	No	Yes	Yes
Switch PHY to allow auto MDI- MDIX	12.2(11)YV	Yes	Yes	Yes	Yes
Support to boot from any Cisco IOS image in Flash	12.2(11)YV	Yes	Yes	Yes	Yes
Hardware-assisted encryption for 3DES	12.2(11)YV	No	No	Yes	Yes
Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) S/T ¹	12.2(11)YV	Yes	Yes	Yes	Yes
Software Features					
Layer 3 and Encapsulation Support					
IP routing, integrated routing and bridging (IRB)	12.2(11)YV	Yes	Yes	Yes	Yes
Enhanced Interior Gateway Routing Protocol (EIGRP)	12.2(11)YV	No	No	Yes	Yes
Network Address Translation (NAT), Port Address Translation (PAT) with H.323 support	12.2(11)YV	Yes	Yes	Yes	Yes
NAT IPSEC pass-through, single- or multi-user	12.2(11)YV	Yes	Yes	Yes	Yes

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		IP/FW/3DES		IP PLUS/FW/3DES	IP PLUS/FW/3DES/Backup Dial
		Cisco 836 Router	Cisco SOHO 96 Router	Cisco 836 Router	Cisco 836 Router
Transport Control Protocol (TCP) maximum segment size (MSS) intercept and adjustment	12.2(11)YV	Yes	Yes	Yes	Yes
Internet Protocol Control Protocol (IPCP) negotiated address, netmask, Domain Name System (DNS) and Windows Internet Naming Service (WINS)	12.2(11)YV	Yes	Yes	Yes	Yes
IPCP subnet delivery (connecting to Dynamic Host Configuration Protocol [DHCP] and LAN configuration)	12.2(11)YV	Yes	Yes	Yes	Yes
Routing Information Protocol (RIP) version 2	12.2(11)YV	Yes	Yes	Yes	Yes
DHCP client, relay, and server	12.2(11)YV	Yes	Yes	Yes	Yes
Policy-based routing	12.2(11)YV	Yes	Yes	Yes	Yes
Generic Routing Encapsulation (GRE)	12.2(11)YV	Yes	Yes	Yes	Yes
Quality of Service (QoS)					
Low Latency Queueing (LLQ)	12.2(11)YV	Yes	No	Yes	Yes
Weighted Random Early Detection (WRED)	12.2(11)YV	No	No	Yes	Yes
Class-based traffic shaping (CBTS)	12.2(11)YV	No	No	Yes	Yes
Committed access rate (CAR)	12.2(11)YV	No	No	Yes	Yes
Security and Connectivity					
Full syslog support	12.2(11)YV	No	No	Yes	Yes
Lock and key	12.2(11)YV	No	No	Yes	Yes
Authentication, Authorization, and Accounting (AAA) with Radius and Terminal Access Controller Access Control System Plus (TACACS+)	12.2(11)YV	No	No	Yes	Yes
AAA with TACACS+	12.2(11)YV	No	Yes	No	No
Easy Virtual Private Network (VPN) Phase 1	12.2(11)YV	Yes	No	Yes	Yes
Easy VPN Phase 2	12.2(11)YV	Yes	No	Yes	Yes
Secure shell (SSH) for secure remote management (no port mapping support required)	12.2(11)YV	Yes	No	Yes	Yes

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		IP/FW/3DES		IP PLUS/FW/ 3DES	IP PLUS/ FW/3DES/ Backup Dial
		Cisco 836 Router	Cisco SOHO 96 Router	Cisco 836 Router	Cisco 836 Router
Firewall features phase 1 and 2 excluding intrusion detection system (IDS)	12.2(11)YV	Yes	Yes	Yes	Yes
Firewall features phase 1	12.2(11)YV	No	Yes	No	No
Payload PPP compression	12.2(11)YV	Yes	Yes	Yes	Yes
Access Resilience and Redundancy					
Dial backup over ISDN BRI S/T port	12.2(11)YV	No	No	No	Yes
Hot Standby Routing Protocol (HSRP)	12.2(11)YV	No	No	Yes	Yes
Remote Management ISDN BRI S/T Port	12.2(11)YV	Yes	Yes	Yes	Yes
Interface Support					
Numbered and unnumbered interfaces	12.2(11)YV	Yes	Yes	Yes	Yes
Ethernet support	12.2(11)YV	Yes	Yes	Yes	Yes
Static routes	12.2(11)YV	Yes	Yes	Yes	Yes
Multicast					
IP multicast proxy	12.2(11)YV	Yes	Yes	Yes	Yes
PIM sparse mode	12.2(11)YV	No	No	Yes	Yes
Management Functions					
Remote upgrade ability of IOS	12.2(11)YV	Yes	Yes	Yes	Yes
Service Agent (SA) agent support	12.2(11)YV	Yes	Yes	Yes	Yes
Named access lists	12.2(11)YV	Yes	Yes	Yes	Yes
Telnet client and server	12.2(11)YV	Yes	Yes	Yes	Yes
Ability to manage Cisco IOS and Cisco Router Web Setup (CRWS) upgrade separately	12.2(11)YV	Yes	Yes	Yes	Yes
Management Information Bases (MIBs)					
Chassis MIB	12.2(11)YV	Yes	Yes	Yes	Yes
SNMP MIB 2	12.2(11)YV	Yes	Yes	Yes	Yes
Cisco IOS protocols MIB	12.2(11)YV	Yes	Yes	Yes	Yes
Interface MIBs	12.2(11)YV	Yes	Yes	Yes	Yes
Entity MIB, Syslog MIB, Queue MIB, Mempool MIB, Image MIB	12.2(11)YV	Yes	Yes	Yes	Yes
Support for all existing MIBs for ADSL models	12.2(11)YV	Yes	Yes	Yes	Yes
ISDN MIB	12.2(11)YV	Yes	Yes	Yes	Yes

Table 2 Feature List by Feature Set for Cisco 836, and SOHO 96 Routers

Feature	In	Feature Set			
		IP/FW/3DES		IP PLUS/FW/3DES	IP PLUS/FW/3DES/Backup Dial
		Cisco 836 Router	Cisco SOHO 96 Router	Cisco 836 Router	Cisco 836 Router
Call History MIB	12.2(11)YV	Yes	Yes	Yes	Yes
Installation/Configuration					
CRWS support	12.2(11)YV	Yes	Yes	Yes	Yes
Config Express	12.2(11)YV	Yes	Yes	Yes	Yes
CiscoView, Cisco Resource Manager Essentials	12.2(11)YV	Yes	Yes	Yes	Yes
IE2100 support	12.2(11)YV	Yes	Yes	Yes	Yes

1. This feature is available only in the Cisco 836 router running Cisco IOS backup image (c836-k9o3s8y6-mz).

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 836 and SOHO 96 routers for Release 12.2(11)YV2.

New Hardware Features in Release 12.2(11)YV

The Cisco 836 and SOHO 96 routers have the following additional features. These features are not available on existing broadband routers.

- A 4-port Ethernet switch
- Hardware encryption coprocessor
- ISDN BRI S/T WAN interface
- A newer MPC857T processor

New Software Features in Release 12.2(11)YV

The following sections describe the new software features supported by the Cisco 836 and SOHO 96 routers for Release 12.2(11)YV2.

4-Port 10/Base 100-T Ethernet LAN Switch Interface

The 4-port 10/Base 100-T Ethernet LAN switch interface is implemented using the MPC857T FEC and the Marvell 88E6052 switch chip. The 10/100 Mbps switching among the 4 ports is supported by the Marvell 88E6052 switch chip. The Cisco IOS Ethernet LAN interface is implemented as a 10-Mbps Ethernet interface. The MPC857T is connected to the 88E6052 port 5 via the MII. The MII signal lines reside in the PCMCIA port instead of the dedicated pins of I/O port D.

ADSL WAN Interface

The asymmetric digital subscriber line (ADSL) provides high-speed digital data transfer between a single customer premises equipment (CPE) subscriber and the central office.

The ADSL WAN interface supports both annexb-ur2mode and ETSI mode on the Alcatel 7300, Alcatel A1000, Lucent, ECI, and Siemens Digital Subscriber Line Access Multiplexers (DSLAMs). It also supports Asynchronous Transfer Mode (ATM) Adaptation Layer 5 (AAL5) and various classes of quality of service (QoS) for both voice and data service.

Hardware Encryption Support

The hardware encryption is implemented using the Hifn7902 security processor with a 64Kx16 SRAM chip to enhance the encryption speed.

Flash Memory Access

The Cisco 836 and SOHO 96 routers each provide 12 MB onboard flash memory. Each router has an expansion slot to allow an additional 4-, 8-, or 16-MB of Flash memory module. The Flash memory is used to store the ROMMON, the compressed Cisco IOS image integrated with the decompressor, the Cisco Router Web Support (CRWS) data and the current router configuration data.

SDRAM Memory Access

The Cisco 836 and SOHO 96 routers each provide 32 MB on-board SDRAM memory. Each router has an expansion slot to allow an additional 16- or 32-MB of SDRAM memory module. The SDRAM memory is used to store the decompressed Cisco IOS image and to provide memory for various buffer pools, data, heap, and stacks for running the Cisco IOS image.

ISDN BRI S/T Interface as Backup WAN Interface

The Cisco 836 router allow ISDN BRI S/T WAN interface to be configured as dial-on-demand routing (DDR) backup for the ATM over ADSL WAN interface. This means the ISDN BRI S/T interface configured as a dialer interface with the required parameters for dialing remote site using the selected protocol such as PPP and the related authentication such as Password Authentication Protocol (PAP) or Challenge Handshake Authentication Protocol (CHAP). The configured backup ISDN BRI S/T interface is in standby mode as long as the ADSL interface is up and running. If the ADSL interface goes down, and there are packets that need to be sent to the remote site, the ISDN BRI S/T interface will be brought up and the connection made to the remote site. Traffic will continue to flow between the router and the remote site using the ISDN BRI S/T interface as long as the ADSL interface remains down. When the ADSL interface is brought up again, the ISDN BRI S/T interface returns to previous standby mode.

This feature is available only in the Cisco 836 router.

Form more information on configuring backup dial feature, refer to the Cisco 836 router software guide.

Flash File System Squeeze Utility

When a Flash memory device is full, the files must be rearranged so that the space used by the deleted files can be reclaimed. The squeeze feature erases all the deleted files from the router's file system and copies all the valid files from the beginning of the Flash memory. The squeeze operation can take as long as several minutes because it involves erasing and rewriting almost an entire Flash memory space. To enable this feature, the entire Flash device, including any partitions, has to be completely erased. There is a provision in the **erase** command to disable this squeeze utility.

New Software Features in Release 12.2(11)T

For information regarding the features supported in Cisco IOS Release 12.2 T, refer to the Cross-Platform Release Notes and New Feature Documentation links at the following location on Cisco.com:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122relnt/xprn122t/index.htm>

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

Service & Support: Technical Documents: Cisco IOS Software: Release 12.2: Release Notes: Cross-Platform Release Notes (Cisco IOS Release 12.2T)

Caveats

Caveats describe unexpected behavior or defects in Cisco IOS software releases. Severity 1 caveats are the most serious caveats, severity 2 caveats are less serious, and severity 3 caveats are the least serious of these three severity levels.

Caveats in Release 12.2 T are also in Release 12.2(11)YV2. For information on caveats in Cisco IOS Release 12.2 T, refer to the *Caveats for Cisco IOS Release 12.2 T* document. For information on caveats in Cisco IOS Release 12.2, refer to the *Caveats for Cisco IOS Release 12.2* document. These documents list severity 1 and 2 caveats, and are located on Cisco.com and the Documentation CD.



Note

If you have an account with 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: Technical Assistance Center: Tool Index: Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Resolved Caveats - Release 12.2(11)YV2

Cisco IOS Release 12.2(11)YV2 is a rebuild release for Cisco IOS Release 12.2(11)YV. This section describes unexpected behavior that is fixed in Release 12.2(11)YV2.

CSCdz71127

Cisco routers and switches running Cisco IOS software and configured to process Internet Protocol version 4 (IPv4) packets are vulnerable to a Denial of Service (DoS) attack. A rare sequence of crafted IPv4 packets sent directly to the device may cause the input interface to stop processing traffic once the

input queue is full. No authentication is required to process the inbound packet. Processing of IPv4 packets is enabled by default. Devices running only IP version 6 (IPv6) are not affected. A workaround is available.

Cisco has made software available, free of charge, to correct the problem.

This advisory is available at

<http://www.cisco.com/warp/public/707/cisco-sa-20030717-blocked.shtml>

CSCea02355

Cisco routers and switches running Cisco IOS software and configured to process Internet Protocol version 4 (IPv4) packets are vulnerable to a Denial of Service (DoS) attack. A rare sequence of crafted IPv4 packets sent directly to the device may cause the input interface to stop processing traffic once the input queue is full. No authentication is required to process the inbound packet. Processing of IPv4 packets is enabled by default. Devices running only IP version 6 (IPv6) are not affected. A workaround is available.

Cisco has made software available, free of charge, to correct the problem.

This advisory is available at

<http://www.cisco.com/warp/public/707/cisco-sa-20030717-blocked.shtml>

Resolved Caveats - Release 12.2(11)YV1

This section describes unexpected behavior that is fixed in Release 12.2(11)YV1.

CSCea19412

This is a fix for short loop problem.

Workaround

Transmit the board serial number to DSLAM through the Embedded Operations Channel (EOC). Firmware 4.10.200 is also required.

Open Caveats - Release 12.2(11)YV

The following sections lists the open caveats for the Cisco IOS release 12.2(11)YV.

CSCin30095

The **vpdn enable** command is not required to configure Point-to-Point Protocol over Ethernet (PPPoE) client on the router.

Workaround

Execute **no vpdn enable**, issue **write mem** command, and then reload the router.

CSCdz56458

clear atm command is supported, however, help is not available.

CSCdz63458

ip urlfilter alert will be automatically configured when router is booted.

CSCdz41733

Configuring **aaa new-model** automatically adds **radius-server authorization permit missing Service-Type** configuration.

Workaround

Enable **radius-server deny authorization missing Service-Type** or **no radius-server deny authorization missing Service-Type** command.

CSCdz78592

The Cisco 836 router with firewall 4.101 does not meet the DT UR-2 Loop 7 requirements. Loop 7 requirements mandate that 6.016 Mbps downstream and 576 Kbps must be achieved at a minimum loop length of 1600 m.

CSCdz78631

The upstream noise margin displayed by **sh dsl int atm0** with ECI DSLAM with line card A indicates erroneous value due to an interoperability issue with the DSLAM.

CSCdz73950

write erase does not erase a non-default IO memory value from the configuration.

Workaround

Configure the IO memory value to the default value and save the configuration.

CSCdz80707

Traceback is generated when the router's logging console is enabled by using **radius-server host ip address of radius server auth-port 1645 acct-port 1646**.

Workaround

Disable logging the console to eliminate the traceback message.

CSCdy79645

When the LAN interface of Cisco 836 is connected to another Cisco router, and **cdp** is enabled on both the routers, a **cdp duplex mismatch** is displayed.

Workaround

Enable **no cdp advertise-v2** and **no cdp run** commands.

CSCin08502

tftp fails with NAT overload when the router listens for **tftp** traffic on a non-standard port.

CSCin11192

Dial-on-demand routing (DDR) is normally triggered by traffic going in the direction opposite the direction for which it is enabled. When DDR is enabled on the Cisco 806 router for inbound traffic, one does not expect DDR to activate upon detecting incoming traffic. However, dial-on-demand router does activate, and the router is assigned an IP address.

CSCdz01412

A Cisco 827-4V router configured for traffic shaping with constant bit rate (CBR) and variable bit rate-non real-time (VBR-nrt) permanent virtual circuits (PVCs) will have the traffic over the CBR PVC affecting throughput on the VBR-nrt PVC. The CBR PVC will also not be shaped and will be sent at line rate.

CSCdz61900

Cisco 827-4V router reloads when **debug vtsp all** is enabled for T.38 fax relay with Cisco Fallback option and when a Cisco fax-relay call is received.

Related Documentation

The following sections describe the documentation available for the Cisco 836 and SOHO 96 routers. Typically, these documents consist of hardware and software installation guides, Cisco IOS configuration 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.

Use these release notes with the documents listed in the following sections:

- [Release-Specific Documents](#)
- [Platform-Specific Documents](#)

Release-Specific Documents

The following documents are specific to Release 12.2 and apply to Release 12.2(11)YV2. They are located on Cisco.com and the Documentation CD (under the heading Service & Support):

- To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2 T*, click this path:
Technical Documents: Cisco IOS Software: Release 12.2: Release Notes: Cisco IOS Release 12.2 T

- To reach product bulletins, field notices, and other release-specific documents, click this path:

Technical Documents: Product Bulletins

- To reach the *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2 T* documents, which contain caveats applicable to all platforms for all maintenance releases of Release 12.2, click this path:

Technical Documents: Cisco IOS Software: Release 12.2: Caveats



Note

If you have an account with 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: Technical Assistance Center: Tool Index: Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Platform-Specific Documents

Hardware installation guides, configuration and command reference guides, and additional documents specific to Cisco 836 and SOHO 96 routers are available on Cisco.com and the Documentation CD at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_fix/800/index.htm

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

Cisco Product Documentation: Access Servers and Access Routers: Fixed Access Routers: Cisco 800 Series Routers: <platform_name>

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

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

<http://www.cisco.com>

Translated documentation is available at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

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

Ordering Documentation

You can order Cisco documentation in these ways:

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

Documentation Feedback

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

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

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

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

We appreciate your comments.

Obtaining Technical Assistance

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

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- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages

- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

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

<http://www.cisco.com>

Technical Assistance Center

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

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

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

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

Cisco TAC Web Site

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

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

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

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

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

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

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

Cisco TAC Escalation Center

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

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

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

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

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

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