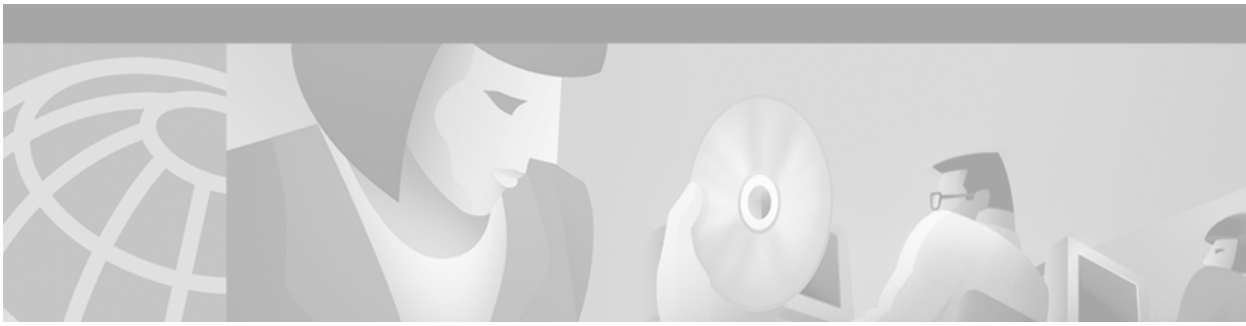

Release Notes for Cisco 2600 Series for Cisco IOS Release 12.2 XA

August 16, 2002

Cisco IOS Release 12.2(2) XA5

78-12680-01 Rev. D2

These release notes for the Cisco 2600 series support Cisco IOS Release 12.2(2) XA5. These release notes are updated as needed.

For a list of the software caveats that apply to Release 12.2(2) XA5, see the *"Caveats for Cisco IOS Release 12.2 XA" section on page 15* and *Caveats for Cisco IOS Release 12.2T*. 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* and *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:

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Introduction

With the Cisco 2600 series modular access router family, Cisco Systems extends enterprise-class and managed services 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 the today branch office needs for applications such as the following:

- 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
- Delivery of high-speed business class DSL access
- Cost effective T1/E1 ATM access

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 evolving enterprise networks of today.

For information on new features and Cisco IOS commands supported by Cisco IOS Release 12.2(2) XA5, see the "New and Changed Information" section on page 10 and the "Related Documentation" section on page 19.

System Requirements

This section describes the system requirements for Release 12.2(2) XA5:

Memory Recommendations

Table 1 Memory Recommendations for the Cisco 2600 Series Routers

Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
IP	c2600-i-mz	8 MB	32 MB	RAM
IP Plus	c2600-is-mz	16 MB	64 MB	RAM
IP Plus IPsec 3DES	c2600-ik9s-mz	16 MB	64 MB	RAM
IP Plus IPsec 56	c2600-ik8s-mz	16 MB	64 MB	RAM
IP/FW/IDS	c2600-io3-mz	8 MB	32 MB	RAM
IP/FW/IDS Plus IPsec 3DES	c2600-ik9o3s-mz	16 MB	64 MB	RAM
IP/FW/IDS Plus IPsec 56	c2600-ik8o3s-mz	16 MB	64 MB	RAM
IP/H.323	c2600-ix-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC	c2600-d-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC Plus	c2600-ds-mz	16 MB	64 MB	RAM
IP/IPX/AT/DEC/FW/IDS Plus	c2600-do3s-mz	16 MB	64 MB	RAM
Enterprise Plus	c2600-js-mz	32 MB	96 MB	RAM
Enterprise Plus IPsec 3DES	c2600-jk9s-mz	32 MB	96 MB	RAM
Enterprise Plus IPsec 56	c2600-jk8s-mz	32 MB	96 MB	RAM
Enterprise Plus/H.323 MCM	c-2600-jsx-mz	32 MB	96 MB	RAM
Enterprise/FW/IDS Plus IPsec 3DES	c2600-jk9o3s-mz	32 MB	96 MB	RAM
Enterprise/FW/IDS Plus IPsec 56	c2600-jk8o3s-mz	32 MB	96 MB	RAM
Enterprise/SNASw Plus	c2600-a3js-mz	32 MB	96 MB	RAM
Enterprise/SNASw Plus IPsec 3DES	c2600-a3jk9s-mz	32 MB	96 MB	RAM
Enterprise/SNASw Plus IPsec 56	c2600-a3jk8s-mz	32 MB	96 MB	RAM
Remote Access Server	c2600-c-mz	8 MB	32 MB	RAM
Telco Feature Set	c2600-telco-mz	16 MB	32 MB	RAM

Hardware Supported

Cisco IOS Release 12.2(2) XA5 supports the following Cisco 2600 series routers:

- 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 10.

Table 2 lists the supported interfaces for the Cisco 2600 series routers for Cisco IOS Release 12.2(2) XA5.

Table 2 Supported Interfaces for the Cisco 2600 Series Routers

Interface, Network Module, or Data Rate[1]	Product Description	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
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
ATM Network Modules[1]	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
	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
	1-port ATM-25 RJ-45 interface	All Cisco 2600 series platforms

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

Interface, Network Module, or Data Rate[1]	Product Description	Platforms Supported
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.[4] 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
Digital T1 Packet Voice Trunk Network Modules and Spare Components (continued)	12-channel packet voice DSP module upgrade spare (PVDM-12)	Digital T1/E1 packet voice trunk network modules spare component
	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
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

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

Interface, Network Module, or Data Rate[1]	Product Description	Platforms Supported
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 (NT-1) interface	All Cisco 2600 series platforms
	8- or 16-port analog modems	All Cisco 2600 series platforms
T1/E1 Multiflex Voice/WAN Interface Cards[5]	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/fax network module (NM-1V and NM-2V)	All Cisco 2600 series platforms
	1-slot high-density T1/E1 voice interface card slots[6]	All Cisco 2600 series platforms
	2-port FXS voice/fax interface card[7]	All Cisco 2600 series platforms with voice/fax network modules
	2-port E&M voice/fax interface card[3] (VIC-2E/M)	All Cisco 2600 series platforms with voice/fax network modules
	2-port FXO voice/fax interface card[3] (VIC-2FXO, VIC-2FXO-M3, and VIC-2FXO-EU)	All Cisco 2600 series platforms with voice/fax network modules
WAN Interface Cards	1-port ISDN BRI S/T interface (requires external NT-1)	All Cisco 2600 series platforms
	1-port ISDN BRI (NT-1) 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 WAN Interface Card (WIC-1DSU-T1)	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) (WIC-2A/S[=]	All Cisco 2600 series platforms

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

Interface, Network Module, or Data Rate[1]	Product Description	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 releases.
3. Cisco 2650 and 2651 routers require Cisco IOS Release 12.1(3a)T1 or later releases.
4. See T1/E1 multiflex voice/WAN interface cards in this table.
5. 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.
6. Uses the VWIC-MFT T1/E1 interface cards.
7. Requires the NM-1V or NM-2V network module.

Determining the Software Version

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

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) 2600 Software (c2600-i-mz), Version 12.2(2) XA5, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, refer to S*oftware 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: Access Servers and Access Routers: **Modular Access Routers**: **Cisco 2600 Series Routers**: **Software Configuration Documents for Cisco 2600 Series: 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**: **Software Configuration Documents for Cisco 2600 Series: 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(2) XA supports the same feature sets as Cisco IOS Release 12.2(2) T, but Cisco IOS Release 12.2(2) XA can include new features supported by the Cisco AS2600.

Note If you have a Cisco.com login account, you can find image and release information regarding features prior to Cisco IOS Release 12.2(2) T by using the Feature Navigator tool at http://www.cisco.com/go/fn.

Caution Cisco IOS images with strong encryption (including, but not limited to 168-bit (3DES) data encryption feature sets) are subject to U.S. 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 U.S. 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 3, Table 4, Table 5, and Table 6 list the features and feature sets supported by the Cisco 2600 series routers in Cisco IOS Release 12.2(2) XA5 and use 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.

Table 3 Feature List by Feature Set for the Cisco 2600 Series Routers, Part 1 of 4

Features	In	Software Images by Feature Sets					
		IP	IP Plus	IP Plus IPsec 3DES	IP Plus IPsec 56	IP/FW/IDS	IP/FW/IDS Plus IPsec 3DES
Quality of Service							
Call Admission Control for H.323 VoIP Gateways	12.2(2)XA	No	Yes	Yes	Yes	No	Yes
Voice Services							
Cisco 2600 and 3600 Routers MGCP Voice Gateway Interoperability with Cisco CallManager	12.2(2)XA	No	Yes	Yes	Yes	No	Yes
H.323 Scalability and Interoperability Enhancements	12.2(2)XA	No	Yes	No	No	No	No
Inter-Domain Gatekeeper Security Enhancement (CSCds35228)	12.2(2)XA	No	Yes	No	No	No	No
Location Confirmation Enhancements for Alternate Endpoints	12.2(2)XA	No	No	No	No	No	No

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

Features	In	Software Images by Feature Sets					
		IP/FW/IDS Plus IPsec 56	IP/ H.323	IP/IPX/AT/ DEC	IP/IPX/AT/ DEC Plus	IP/IPX/AT/ DEC/FW IDS/Plus	Enterprise Plus
Quality of Service							
Call Admission Control for H.323 VoIP Gateways	12.2(2)XA	Yes	No	No	Yes	Yes	Yes
Voice Services							
Cisco 2600 and 3600 Routers MGCP Voice Gateway Interoperability with Cisco CallManager	12.2(2)XA	Yes	No	No	Yes	Yes	Yes
H.323 Scalability and Interoperability Enhancements	12.2(2)XA	No	Yes	No	No	No	No
Inter-Domain Gatekeeper Security Enhancement (CSCds35228)	12.2(2)XA	No	Yes	No	No	No	Yes
Location Confirmation Enhancements for Alternate Endpoints	12.2(2)XA	No	Yes	No	No	No	No

Table 5 Feature List by Feature Set for the Cisco 2600 Routers, Part 3 of 4

Features	In	Software Images by Feature Sets				
		Enterprise Plus IPsec 3DES	Enterprise Plus IPsec 56	Enterprise Plus/H.323 MCM	Enterprise FW/IDS Plus IPsec 3DES	Enterprise/ FW/IDS Plus IPsec 56
Quality of Service						
Call Admission Control for H.323 VoIP Gateways	12.2(2)XA	Yes	Yes	Yes	Yes	Yes
Voice Services						
Cisco 2600 and 3600 Routers MGCP Voice Gateway Interoperability with Cisco CallManager	12.2(2)XA	Yes	Yes	Yes	Yes	Yes
H.323 Scalability and Interoperability Enhancements	12.2(2)XA	No	No	No	No	No
Inter-Domain Gatekeeper Security Enhancement (CSCds35228)	12.2(2)XA	No	No	No	No	No
Location Confirmation Enhancements for Alternate Endpoints	12.2(2)XA	No	No	Yes	No	No

Table 6 Feature List by Feature Set for the Cisco 2600 Routers, Part 4 of 4

Features	In	Software Images by Feature Sets				
		Enterprise/ SNASw Plus	Enterprise/ SNASw Plus IPsec 3DES	Enterprise/ SNASw Plus IPsec 56	Remote Access Server	Telco Feature Set
Quality of Service						
Call Admission Control for H.323 VoIP Gateways	12.2(2)XA	Yes	Yes	Yes	No	No
Voice Services						
Cisco 2600 and 3600 Routers MGCP Voice Gateway Interoperability with Cisco CallManager	12.2(2)XA	Yes	Yes	Yes	No	No
H.323 Scalability and Interoperabiity Enhancements	12.2(2)XA	No	No	No	No	No
Inter-Domain Gatekeeper Security Enhancement (CSCds35228)	12.2(2)XA	No	No	No	No	No
Location Confirmation Enhancements for Alternate Endpoints	12.2(2)XA	No	No	No	No	No

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 2600 series for Release 12.2(2) XA5.

New Hardware and Software Features in from Cisco IOS Release 12.2(2)XA1 to Cisco IOS Release 12.2(2)XA5

There are no new hardware or software features supported from Cisco IOS Release 12.2(2)XA1 to Cisco IOS Release 12.2(2)XA5.

New Hardware Features in Cisco IOS Release 12.2(2)XA

There are no new hardware features supported in Cisco IOS Release 12.2(2)XA.

New Software Features in Cisco IOS Release 12.2(2)XA

The following new software features are supported by the Cisco 2600 series for Cisco IOS Release 12.2(2)XA:

Call Admission Control for H.323 VoIP Gateways

Before the call admission control feature, gateways did not have a mechanism to gracefully prevent calls from entering when certain resources were not available to process the call. This causes the new call to fail with unreported behavior, and could potentially cause the calls that are in progress to have quality related problems.

This feature set provides the ability to support resource-based call admission control processes. These resources include system resources such as CPU, memory, and call volume, and interface resources such as call volume.

If system resources are not available to admit the call, two kinds of actions are provided: system denial (which busyouts all of T1 or E1) or per call denial (which disconnects, hairpins, or plays a message or tone). If the interface-based resource is not available to admit the call, the call is dropped from the session protocol (such as H.323).

User Selected Threshold

This feature allows a user to configure call admission thresholds for local resources as well as memory and CPU resources. The list of local resources that are configured for call admission are described in the command description of "call threshold poll-interval".

With the call admission command, a user is allowed to configure two thresholds, high and low, for each resource. Call treatment is triggered when the current value of a resource goes beyond the configured high. The call treatment remains in effect until current resource value falls below the configured low. Having high and low thresholds prevents call admission flapping and provides hysteresis in call admission decision making.

With the **call spike** command, a user is allowed to configure the limit for incoming calls during a specified time period. A call spike is the term for when a large number of incoming calls arrive from the PSTN in a very short period of time (for example:100 incoming calls in 10 milliseconds).

Configurable Call Treatment

With the call treatment command, users are allowed to select how the call should be treated when local resources are not available to handle the call. For example, when the current resource value for any one of the configured triggers for call admission has reached beyond the configured threshold, the call treatment choices are as follows:

- TDM hairpinning — Hairpins the calls through the POTS dial peer.
- Reject — Disconnects the call.
- Play message or tone — Plays a configured message or tone to the user.

Resource Unavailable Signaling

This feature set supports the autobusyout feature where channels are busied out when local resources are not available to handle the call.

Autobusyout is supported on both channel associated signaling (CAS) and Primary Rate Interface (PRI) channels.

- CAS — Uses busyout to signal "local resources are unavailable."
- PRI — Uses either service messages or disconnect with correct cause-code to signal "resources are unavailable."

PSTN Fallback

The goal of PSTN fallback is to monitor congestion in the IP network and either redirect calls to the PSTN or reject calls based on the network congestion. Calls can be re-routed to an alternate IP destination or to the PSTN if the IP network is found unsuitable for voice traffic at that time. The user defines the congestion thresholds based on the configured network. This functionality enables the service provider to give a reasonable guarantee about the quality of the conversation to their VoIP users at the time of call admission.

Note PSTN fallback does not provide assurances that a VoIP call that proceeds over the IP network is protected from the effects of congestion. This is the function of the other Quality of Service (QoS) mechanisms such as IP Real-Time Transport Protocol (RTP) priority or low latency queuing (LLQ).

PSTN fallback includes the following features:

- Offers flexibility to define the congestion thresholds based on the network.
  - Defines a threshold based on Calculated Planning Impairment Factor (ICPIF), which is derived as part of International Telecommunication Union (ITU) G.113.
  - Defines a threshold based solely on packet delay and loss measurements.
- Uses Response Time Reporter (RTR) probes to provide packet delay, jitter, and loss information for the relevant IP addresses. Based on the packet loss, delay, and jitter encountered by these probes, an ICPIF or delay and loss values are calculated.
- Is supported by calls of any codec. Only G.729 and G.711 have accurately simulated probes. Calls of all other codecs are emulated by a G.711 probe.

For further details, please see http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xa/122xa_2/ft_pfavb.htm.

H.323 Scalability and Interoperabiity Enhancements

The Cisco H.323 Scalability and Interoperability Enhancements feature upgrades the Cisco H.323 Gatekeeper (GK) and Cisco H.323 Gateway to comply with H.323 Version 3. The enhancements in this release include:

- Support for mandatory H.323 Version 3 elements in the gateway and GK, including:
  - multipleCalls
  - maintainConnection
  - alternateTransportAddresses
  - useSpecifiedTransport
- Support for H.225 call signalling over UDP.
- Address resolution using border elements (BE).

- Support for bandwidth request (BRQ) messages.
- Support for concurrent calls over a single H.225 call signalling channel.

For further details, please see http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xa/122xa_2/ft323sca.htm.

Inter-Domain Gatekeeper Security Enhancement (CSCds35228)

The Inter-Domain Gatekeeper Security Enhancement provides a means of authenticating and authorizing H.323 calls between the administrative domains of Internet Telephone Service Providers (ITSPs). For further details, please see http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xa/122xa_2/ft_ctoke.htm.

Location Confirmation Enhancements for Alternate Endpoints

TheLocation Confirmation (LCF) Enhancements for Alternate Endpoints feature allows the Cisco IOS Gatekeeper (GK) to collect alternate routes to endpoints indicated by multiple LCF responses and convey the routes to the requesting (calling) endpoint. Currently, the GK sends LRQ messages to multiple remote zones. Endpoints in the zones return LCF responses to the GK. The LCF responses indicate an alternate route to that endpoint. The GK determines the best route to an endpoint based on which route has the lowest cost and the highest priority. The GK then forwards that route information to the requesting endpoint. However, the GK does not provide to the requesting endpoint all of the route information it received in LCF messages from the endpoints; it only provides the best routes.

The LCF Enhancements for Alternate Endpoints feature allows the GK to present more route information to the requesting endpoint, therefore providing alternate routes to endpoints that can be used if the best route is busy or does not provide any alternate routes. The LCF Enhancements for Alternate Endpoints feature can be used on GKs that originate LRQs as well as directory GKs that forward LRQ messages.

The LCF Enhancements for Alternate Endpoints feature provides a new timer that you can configure to choose the number of alternate routes you want the GK to collect. Upon the timer expiration, the resolved address and alternate endpoints from all the LCFs received by the GK will be consolidated in a single list and sent as alternate endpoints in the ACF or LCF messages from the GK. If this feature is not enabled, the GK stops collecting routes if the best response is received before the LRQ timer window expires. After you enable the feature, the GK only stops collecting routes after the best response is received and the configured number of alternate routes have been gathered.

For further details, please see http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xa/122xa_2/ftlcfep1.htm.

Cisco 2600 and 3600 Routers MGCP Voice Gateway Interoperability with Cisco CallManager

This feature provides MGCP support to IOS gateway to furnish supplementary services with CallManager.

For further details, please see http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xa/122xa_2/ft_mgccm.htm.

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 7.

Table 7 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
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

Note Note Cisco Management Information Base (MIB) User Quick Reference is no longer published. If you have an account with CCO, you can find the current list of MIBs supported by Cisco. To reach the Cisco Network Management Toolkit, go to CCO, press Login, and click to Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB.

Important Notes

The following sections contain important notes about Cisco IOS Release 12.2(2) XA5 that can apply to the Cisco AS2600.

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 XA

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.

All caveats in Cisco IOS Release 12.2 and Cisco IOS Release 12.2 T are also in Cisco IOS Release 12.2(2)XA5.

For information on caveats in Cisco IOS Release 12.2, see *Caveats for Cisco IOS Release 12.2*.

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.

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

Caveat numbers and brief descriptions for Cisco IOS Release 12.2(2)XA5 are listed in Table 8. For details about a particular caveat, go to Bug Toolkit at:

http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl

To access this location, you must have an account on Cisco.com. If you have forgotten or lost your account information, e-mail the Contact Database Administration group at cdbadmin@cisco.com. If you do not have an account on Cisco.com, go to http://www.cisco.com/register and follow the directions to establish an account

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, l**og in** to Cisco.com and click **Service and 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/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Open Caveats—Cisco IOS Release12.2(2)XA5

There are no open caveats specific to Cisco IOS Release 12.2(2)XA5 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release12.2(2) XA5

All the caveats listed in Table 8 are resolved in Cisco IOS Release 12.2(2) XA5. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- SNMP

Table 8 Resolved Caveats for Release 12.2(2) XA5

Caveat ID Number	Description
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 Caveats—Cisco IOS Release 12.2(2) XA4

All the caveats listed in Table 9 are resolved in Cisco IOS Release 12.2(2) XA4. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 9 Open Caveats for Release 12.2(2) XA4

Caveat ID Number	Description
CSCdu10973	2600 router hangs during NBAR performance test with high CPU usage

Resolved Caveats—Cisco IOS Release 12.2(2) XA4

All the caveats listed in Table 10 are resolved in Cisco IOS Release 12.2(2) XA4. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 10 Resolved Caveats for Release 12.2(2) XA4

Caveat ID Number	Description
CSCdv39711	Outbound modem calls fail with %CSM-1-NO_VDEV: No modems associated:
CSCdu06427	Cleanup fix for CSCdt11503
CSCdv56410	Incorrect DiscwithPI handling causes memory leak and crash
CSCdv65099	OLI-SIP:5400 platform fails to pass valid FG-D oli information
CSCdu81936	Received gratuitous ARP overwrites interface MAC address in ARP tbl
CSCdv42346	all DSLs except primary advertised as OOS in GSM after RLM reinit
CSCdv43578	SIP: Incorrect Timestamps in SIP msgs

Table 10 Resolved Caveats for Release 12.2(2) XA4 (continued)

Caveat ID Number	Description
CSCdv48261	improvements to dynamic acls for ios fw
CSCdu88605	SLT interpret Si bits as E bit and report FEBE in non-crc mode
CSCdu63185	Distorted digits with dtmf-relay cisco-rtp
CSCdu62738	PRI calls fail unless routers power cycled
CSCdv61397	SLT does not send SLTM after remote processor outage
CSCdv05733	GW assigns a current used callID for null Facility Q.SIG messages.
CSCds39776	Wrong entPhysicalContainedIn and entPhysicalChildIndex for AIM card
CSCdv68263	h323 slowstart fragmented h245 TCS may cause delayed audio cutover

Open and Resolved Caveats—Cisco IOS Release 12.2(2) XA3

Cisco IOS Release 12.2(2) XA3 does not support the Cisco 2600 series.

Open and Resolved Caveats—Cisco IOS Release 12.2(2) XA2

Cisco IOS Release 12.2(2) XA2 does not support the Cisco 2600 series.

Open Caveats—Cisco IOS Release 12.2(2) XA1

All the caveats listed in Table 11 are open in Cisco IOS Release 12.2(2)XA1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 11 Open Caveats for Release 12.2(2) XA1

DDTS Number	Description
CSCdu44402	ISDN holding CCBs and call confirm err after interface shut/noshut
CSCdu87761	SIP: Gateway adds visual separator + to Request URI causing 404 err
CSCdu61792	Router crashing + tracebacks Process= CC-API_VCM
CSCdu84589	Call Manager / 2651 not interoperating correctly
CSCdv14134	*TS* 2600 crashes on applying map-class to frame-relay interface
CSCdu71583	Get no response to the ISDN Setup msg after a while

Resolved Caveats—Cisco IOS Release 12.2(2)XA1

All the caveats listed in Table 12 are resolved in Cisco IOS Release 12.2(2)XA1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 12 Resolved Caveats for Release 12.2(2) XA1

DDTS Number	Description
CSCdu46942	NU tone is not heard on ivr calls
CSCdt59455	vty-async virtual-template doesnt work with no peer default ip addr
CSCuk21553	Telnet client fails to perform DNS lookup of hostname
CSCdu70661	All channels except 24th channel stay busied out after configuration
CSCdu08214	Calltracker MIB returns NULL for userid when DNIS/ANI is not present
CSCdt93862	Access level issue while using Web interface
CSCdu62721	Candidate fails to bring up B-channels (not du42219)
CSCdu59975	Glare Conditions are not detected in vtsp
CSCdu57066	CONN_LOST event needs to be handled in ACC_FASTSTART_PROGRESS state
CSCdu56186	H323 GW:RSVP and Signal only call cleared by TGW after ACF receieved
CSCdu82224	V120 calls were mis-identified as PIAFS calls
CSCdu87080	Attach domain name to TGCP
CSCdv01493	NAS Send MLP bundle ID for non-MLP VPDN call.
CSCdu09342	ISDN network-side continuously sends RESTART after user-side reloads
CSCdu30345	DSP stopped collection digits - phone # with 0 length
CSCdu04555	Incorrect bearer capability on BRI for calls from netmeeting
CSCdu56329	SIP: Gateway issue with 606 Not Acceptable response to Forked INVITE
CSCdu86477	SIP: CANCEL without 487 renders voice ports unusable for 35 secs.
CSCdu09342	ISDN network-side continuously sends RESTART after user-side reloads
CSCdu30345	DSP stopped collection digits - phone # with 0 length

Open Caveats—Cisco IOS Release 12.2(2) XA

All the caveats listed in Table 13 are open in Cisco IOS Release 12.2(2) XA. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 13 Open Caveats for Release 12.2(2) XA

DDTS Number	Description
CSCdu10973	2600 router hangs during NBAR performance test with high CPU usage

Resolved Caveats—Cisco IOS Release 12.2(2) XA

All the caveats listed in Table 14 are resolved in Cisco IOS Release 12.2(2) XA. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 14 Resolved Caveats for Release 12.2(2) XA

DDTS Number	Description
CSCdt39366	E1R2 non-compelled configuration does not work
CSCdu33021	Spurious memory access error in BRI

Related Documentation

The following sections describe the documentation available for the Cisco AS2600. 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 19
- Platform-Specific Documents, page 20
- Feature Modules, page 20
- Cisco IOS Software Documentation Set, page 21

Release-Specific Documents

The following documents are specific to Cisco IOS Release 12.2 and are located on Cisco.com and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.2* and *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 XA" section on page 15

  As a supplement to the caveats listed in Caveats for Cisco IOS Release 12.2 XA 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/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Platform-Specific Documents

These documents are available for the Cisco AS2600 on Cisco.com and the Documentation CD-ROM:

- *Cisco 2600 Series Modular Routers Quick Start Guide*
- Hardware Installation Documents for Cisco 2600 Series
- Software Configuraton 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 that are supported in Cisco IOS Release 12.2(2) XA5 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 into 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**

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.

The Cisco IOS software documentation set is available on Cisco.com and on the Documentation CD-ROM.

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

Table 15 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 15 Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
• *Cisco IOS Configuration Fundamentals Configuration Guide* • *Cisco IOS Configuration Fundamentals Command Reference*	Cisco IOS User Interfaces File Management System Management
• *Cisco IOS Bridging and IBM Networking Configuration Guide* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2*	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
• *Cisco IOS Dial Technologies Configuration Guide* • *Cisco IOS Dial Technologies Command Reference*	Preparing for Dial Access Modem and Dial Shelf Configuration and Management ISDN Configuration Signaling Configuration Dial-on-Demand Routing Configuration Dial Backup Configuration Dial Related Addressing Service Virtual Templates, Profiles, and Networks PPP Configuration Callback and Bandwidth Allocation Configuration Dial Access Specialized Features Dial Access Scenarios
• *Cisco IOS Interface Configuration Guide* • *Cisco IOS Interface Command Reference*	LAN Interfaces Serial Interfaces Logical Interfaces
• *Cisco IOS IP Configuration Guide* • *Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services* • *Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols* • *Cisco IOS IP Command Reference, Volume 3 of 3: Multicast*	IP Addressing and Services IP Routing Protocols IP Multicast
• *Cisco IOS AppleTalk and Novell IPX Configuration Guide* • *Cisco IOS AppleTalk and Novell IPX Command Reference*	AppleTalk Novell IPX

Table 15 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide* • *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference*	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
• *Cisco IOS Voice, Video, and Fax Configuration Guide* • *Cisco IOS Voice, Video, and Fax Command Reference*	Voice over IP Call Control Signaling Voice over Frame Relay Voice over ATM Telephony Applications Trunk Management Fax, Video, and Modem Support Debit Card Applications TCL IVR Applications Configuring Media Gateway Control Protocol and Related Protocols Dial Plans, Dial Peers, and Digit Manipulation SIP
• *Cisco IOS Quality of Service Solutions Configuration Guide* • *Cisco IOS Quality of Service Solutions Command Reference*	Packet Classification Congestion Management Congestion Avoidance Policing and Shaping Signaling Link Efficiency Mechanisms
• *Cisco IOS Security Configuration Guide* • *Cisco IOS Security Command Reference*	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
• *Cisco IOS Switching Services Configuration Guide* • *Cisco IOS Switching Services Command Reference*	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
• *Cisco IOS Wide-Area Networking Configuration Guide* • *Cisco IOS Wide-Area Networking Command Reference*	ATM Broadband Access Frame Relay SMDS X.25 and LAPB
• *Cisco IOS Mobile Wireless Configuration Guide* • *Cisco IOS Mobile Wireless Command Reference*	General Packet Radio Service

Table 15 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• *Cisco IOS Terminal Services Configuration Guide* • *Cisco IOS Terminal Services Command Reference*	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
• *Cisco IOS Configuration Guide Master Index* • *Cisco IOS Command Reference Master Index* • *Cisco IOS Debug Command Reference* • *Cisco IOS Software System Error Messages* • *New Features in 12.2 T-Based Limited Lifetime Releases* • *New Features in Release 12.2 T T* • *Release Notes* (Release note and caveat documentation for 12.2 T-based releases and various platforms)	

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

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships 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 as 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, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

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:

Attn Document Resource Connection
Cisco Systems, Inc.
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. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

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 with the documents listed in the "Related Documentation" section on page 19.