Release Notes for Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750

May 28, 2002

These release notes describe features and functionality of Cisco IOS Release 12.2(4)YH that are supported on analog station interface (ASI) cards and multiservice route processor (MRP) cards in the Cisco Integrated Communications System (ICS) 7750, including the new MRP300, MRP3-8FXS, and MRP3-16FXS cards which feature onboard flash memory.

⚠ **Caution**   Software upgrades for the Cisco ICS 7750 are delivered in packaged system software bundles that are distributed on Cisco.com and/or on CD-ROM. Each Cisco ICS 7750 system software bundle is certified with a specific Cisco IOS release. Appropriate consideration must be given to the other software in the bundle when installing Cisco IOS software in the Cisco ICS 7750. Contact your sales representative for ordering instructions.

These release notes are updated as needed to describe new memory requirements, new features, new hardware support, software platform deferrals, microcode changes, related document changes, and any other important changes. Use these release notes with the *Cross-Platform Release Notes for Cisco IOS 12.2T* located on CCO and the Documentation CD-ROM.

Contents

These release notes discuss the following topics:

CISCO SYSTEMS

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

System Requirements

This section describes the system requirements for Release 12.2(4)YH on the Cisco ICS 7750. It includes the following sections:

Memory Requirements

Table 1 describes the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Release 12.2(4)YH on ASIs and MRPs in a Cisco ICS 7750 chassis.

Table 1   Available Software Images and Memory Requirements for ASIs and MRPs

Platform	Image Name	Image	Software Bundles[1]	Required Flash Memory for the MRP300, MRP3-8FXS, MRP3-16FXS	Required Flash Memory for the MRP200, ASI81, ASI160[2]	Required DRAM Memory[3]	Runs From
Cisco ICS 7750	IP/Voice Plus	ics7700-sv3y-mz	S77a-x.x.x	16MB	Not applicable	64 MB	RAM
	IP/IPX/AT/IBM/ Voice, Plus	ics7700-bnr2sv3y-mz	S77d-x.x.x	16MB	Not applicable	64 MB	RAM

1. In addition to the Cisco IOS software listed above, each software bundle contains the following software: Cisco IOS software for the system switch processor (SSP) card, ICS System Manager, ICS Core Software, and system alarm processor (SAP) software. The x.x.x in the system software bundle name represents the release number. For example, for release 2.3.0, the name of the bundle containing the IP/Voice Plus image would be S77a-2.3.0.

2. Flash memory is not used for the Cisco IOS image on ASIs and MRP200s. Since onboard flash is not available on ASIs and MRP200s, a Cisco IOS compressed image resides on the system processing engine (SPE) and is downloaded to the RAM of each ASI or MRP200 before image decompression.

3. You can upgrade ASI or MRP card memory to 80 MB, 96 MB, or 128MB by installing a dual in-line memory module (DIMM) in the card DIMM slot. For memory upgrade instructions, refer to *Installing Memory, PVDM, and VPN Modules in ASI Cards, MRP Cards, and SPE Cards in the Cisco ICS 7750*.

Hardware Supported

Cisco IOS Release 12.2(4)YH supports ASIs and MRPs in a Cisco ICS 7750. See Table 2 for a description of the processor cards which are supported in the Cisco ICS 7750.

Processor Cards

Table 2 lists the processor cards in the Cisco ICS 7750.

Table 2   Cisco ICS 7750 Processor Cards

Card	Card Description	Port Description
SPE	A single-board computer that runs system software applications such as ICS System Manager and Cisco CallManager.	• SPE200[1]: No front-panel ports. • SPE310: Front-panel ports for video, keyboard, and universal serial bus (USB).
MRP200 MRP300	A voice-and-data-capable router that can carry voice traffic over an IP network and can link remote Ethernet LANs to central offices over WAN links. The multiservice route processor has two slots that support combinations of WAN interface cards (WICs), voice WAN interface cards (VWICs), and Voice interface cards (VICs). It also has two slots to support Packet Voice Data modules (PVDMs). Five versions of PVDMs are available. The MRP 300 has onboard flash memory.	Supports the data and voice interface port types listed in Table 5.
ASI 81 MRP3-8FXS	A voice-and-data-capable router that can carry voice traffic over an IP network and can link small-to- medium-size remote Ethernet LANs to central offices over WAN links (depending on the type of card installed in its WIC/VIC/VWIC slot) and can support connections to analog telephones, fax machines, and polycoms. It also has two PVDM slots. The MRP3-8FXS has onboard flash memory.	• Eight FXS ports • One slot that supports the data and voice interface port types listed in Table 5
ASI 160 MRP3-16FXS	An analog gateway that supports connections to telephones, fax machines, and polycoms. It also has two PVDM slots. The MRP3-16FXS has onboard flash memory.	Sixteen FXS ports
System alarm processor (SAP)	A module that monitors the status of the chassis, power supply modules, and fans, and feeds real-time data to the system processing engines. The SAP card delivers its data to the SPE running System Manager.	• Two COM ports • One console port
System switch processor (SSP)	An Ethernet switch that passes data between all system cards and to any other Ethernet switches connected to the system.	Two Ethernet 10/100 ports

1.   System software release 2.1.0 or later is supported only on SPE 310s.

Table 3 lists the number of processor cards supported by a Cisco ICS 7750.

Table 3   Number of Cards Supported in a Cisco ICS 7750 Chassis

Card	Minimum Required	Maximum Allowed
SAP	1	1
SSP	1	1
MRP	0	5
ASI	0	5
SPE 310	1	5
200W power supply module	1	2

MRP and ASI Card Upgrades

You can upgrade MRP and ASI cards as follows:

- Memory. MRP and ASI cards ship with 64 MB of dynamic RAM (DRAM). You can upgrade MRP and ASI card memory to 80 MB, 96, or 128 MB by installing a dual in-line memory module (DIMM) in the card DIMM slot.

- Voice and data processing power. VICs, VWICs, and FXS modules installed in MRP or ASI cards might require additional digital signal processors (DSPs) for processing heavier volumes of voice traffic. You can install Packet Voice/Data Modules (PVDMs) in one or both of the card PVDM slots to give MRP and ASI cards more processing power.

Note See *Installing Memory, PVDM, and VPN Modules in ASI Cards, MRP Cards, and SPE Cards in the Cisco ICS 7750* for instructions on how to upgrade ASI and MRP cards.

Table 4 provides information about the modules that you can install in ASI and MRP cards

Table 4   Cisco ASI and MRP Card Replacement DIMMs and PVDMs

Description	Cisco Part Number
16-MB SDRAM DIMM	MEM-MRP-16D=
32-MB SDRAM DIMM	MEM-MRP-32D=
64-MB SDRAM DIMM	MEM-MRP-64D=
4-channel packet voice/fax data DSP module	PVDM-256K-4=
8-channel packet voice/fax data DSP module	PVDM-256K-8=
12-channel packet voice/fax data DSP module	PVDM-256K-12=
16-channel packet voice/fax data DSP module	PVDM-256K-16=[1]
20-channel packet voice/fax data DSP module	PVDM-256K-20=

1. The PVDM-256K-16 is the recommended DSP module for ASI cards. Refer to the "PVDM Requirements" appendix in the *Cisco ICS 7750 Hardware Installation Guide*.

Wide Area Network Interface Cards, Voice Interface Cards, and Voice WAN Interface Cards

Table 5 lists the WICs, VICs, and VWICs that you can order in Cisco ICS 7750 MRP and ASI 81 cards. Refer to the *Cisco ICS 7750 Software Configuration Guide* and the ICS System Manager online help for configuration instructions.

Table 5   Supported WICs, VICs and VWICs

Card Description	Abbreviated Name
1-port serial, asynchronous and synchronous (T1/E1)	WIC-1T
2-port serial, asynchronous and synchronous (T1/E1)	WIC-2T
2-port serial, low speed (up to 128 kbps), asynchronous and synchronous	WIC-2A/S
1-port ISDN[1] BRI[2] (S/T interface)	WIC-1B-ST
1-port ISDN BRI with integrated NT1 (U interface)	WIC-1B-U
1-port, four-wire 56-kbps CSU/DSU[3]	WIC-1DSU-56K4

Table 5   Supported WICs, VICs and VWICs (continued)

Card Description	Abbreviated Name
1-port, T1/fractional T1 CSU/DSU	WIC-1DSU-T1
2-port FXS[4] voice/fax interface card	VIC-2FXS
2-port FXO[5] voice/fax interface card	VIC-2FXO
2-port FXO voice/fax interface card with battery reversal detection and caller ID support (for the United States)	VIC-2FXO-M1
2-port FXO voice/fax interface card with battery reversal detection and caller ID support (for Europe)	VIC-2FXO-M2
2-port FXO voice/fax interface card with battery reversal detection (for Australia)	VIC-2FXO-M3
2-port E&M[6] voice/fax interface card	VIC-2E/M
2-port analog DID[7] voice/fax interface card	VIC-2DID
4-port analog FXS/DID voice/fax interface card	VIC-4FXS/DID
2-port ISDN BRI voice/fax interface card (network and terminal side)	VIC-2BRI-NT/TE
1-port T1/fractional T1 multiflex trunk with CSU/DSU	VWIC-1MFT-T1
2-port T1/fractional T1 multiflex trunk with CSU/DSU	VWIC-2MFT-T1
1-port E1/fractional E1 multiflex trunk with CSU/DSU	VWIC-1MFT-E1
2-port E1/fractional E1 multiflex trunk with CSU/DSU	VWIC-2MFT-E1

1. ISDN = Integrated Services Digital Network

2. BRI = Basic Rate Interface

3. CSU/DSU = channel services unit/data services unit

4. FXS = Foreign Exchange Station

5. FXO = Foreign Exchange Office

6. E&M = Ear and Mouth

7. DID = Direct Inward Dial

SPE Card Support

Release 2.1.0 or later is supported only on SPE 310s. The SPE 310 offers a keyboard port, a video port, and two universal serial bus (USB) ports supporting standard USB devices such as mice, keyboards, and CD-ROM drives.

The SPE 310 also features a 700-MHz Pentium III processor, a 20.4-GB hard disk drive, and 512 MB of onboard memory. You can upgrade SPE 310 memory to a maximum of 1536 MB by installing 256-MB or 512-MB dual in-line memory modules (DIMMs) in one or both of the SPE card DIMM slots.

For instructions on how to upgrade the memory on SPE 310 cards, refer to *Installing Memory, PVDM, and VPN Modules in ASI Cards, MRP Cards, and SPE Cards in the Cisco ICS 7750*.

Determining Your Software Release

Complete the following steps to determine the Cisco IOS software version running on Cisco ICS 7750 ASI, MRP, or SSP cards:

Step 1 On a PC, choose **Start > Run**.

Step 2 Enter the following command to open a Telnet session, where *IP address* is the IP address of the card that you wish to verify:

```
telnet IP address
```

Step 3 Enter your login password.

Step 4 Enter the **show version** command:

```
card> show version
```

The following is some of the output that is displayed after entering the command **show version** on an ASI or MRP card:

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) ICS7700 Software (ICS7700-SV3Y-M), Version 12.2(4)YH, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
```

Additional output lines from the **show version** command include information such as the processor revision numbers, amount of available memory, hardware IDs, and partition information.

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(4)YH supports the same feature sets as Releases 12.2 and 12.2T, but Release 12.2(4)YH can include new features supported by the Cisco ICS 7750 platform. Table 6 lists the feature sets supported by the Cisco ICS 7750.

Table 6   Feature Sets Supported by the Cisco ICS 7750

Image Name	Feature Set Matrix Terms	Software Image
Cisco ICS 7750 IOS IP, Voice, Plus	IP/Voice Plus	ics7700-sv3y-mz
Cisco ICS 7750 IOS IP, IPX, AT, IBM, Voice, Plus	IP/IPX/AT/IBM/Voice Plus	ics7700-bnr2sv3y-mz

Table 7 lists the features and feature sets supported by the Cisco ICS 7750 in Cisco IOS Release 12.2(4)YH. 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.

Note These feature set tables only contain a selected list of features. These tables are not cumulative—nor do they list all the features in each image. For additional information about new feature support, refer to the *Release Notes for the Cisco ICS 7750 for System Software Release 2.x.x*.

Table 7   Feature List by Feature Set for the Cisco ICS 7750 Series

Features	Feature Sets	
	IP/Voice Plus	IP/IPX/AT/IBM/FW/ Voice Plus
MRP300, MRP3-8FXS, MRP3-16FXS support	Yes	Yes
Multicast music-on-hold	Yes	Yes
Digital MGCP support—ISDN PRI backhaul	Yes	Yes
Digital MGCP support—T1 CAS	Yes	Yes
Single point MGCP configuration	Yes	Yes

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco ICS 7750 for Cisco IOS software Release 12.2(4)YH.

New Hardware Features in Release 12.2(4)YH

Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750 supports the following flash-based router/gateway cards:

- MRP300
- MRP3-8FXS
- MRP3-16FXS

New Software Features in Release 12.2(4)YH

Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750 supports the new software features described in this section.

Multicast Music-on-Hold Support

The multicast music-on-hold (MOH) feature enables you to subscribe to a music-streaming service when using an MRP or ASI as a Cisco IOS Media Gateway Control Protocol (MGCP) voice gateway. By means of a preconfigured multicast address on a gateway, the gateway can "listen for" Real-Time Transport Protocol (RTP) packets that are broadcast from a default router in the network and that can relay the packets to designated voice interfaces in the network.

RTP is the Internet-standard protocol for transporting real-time data, including audio and video information, across a network. Thus, RTP is well suited for media on demand and for interactive services such as IP telephony.

The default router in the network for handling MOH functions must have the following enabled:

- Multicast routing
- A multicast routing protocol, for example Protocol Independent Multicast (PIM) or Distance Vector Multicast Routing Protocol (DVMRP)
- An IP routing protocol, for example Routing Information Protocol (RIP) or Open Shortest Path First (OSPF)

When you configure a multicast address on a voice interface of a gateway, the gateway sends an Internet Gateway Management Protocol (IGMP) "join" message to the default router, indicating to the default router that the gateway is to receive RTP multicast packets.

Thus, the MOH feature provides the functionality to stream music from an MOH server to the voice interfaces of on-net and off-net callers that have been placed on hold.

The integrated multicast capability of Cisco CallManager 3.1 is implemented through the H.323 signaling plane in Cisco CallManager.

In an MOH environment, whenever caller A places caller B on hold, Cisco CallManager requests the MOH server to stream RTP packets to the "on-hold" interface through the preconfigured multicast address. In this way, RTP packets can be relayed to appropriately configured voice interfaces in a VoIP network that have been placed on hold.

Multiple MOH servers can be present in the same network, but each server must have a different Class D IP address, and the address must be preconfigured in Cisco CallManager and the Cisco IOS MGCP voice gateways.

Note For information about how to configure digital MGCP on the Cisco ICS 7750, refer to *Using Media Gateway Control Protocol with the Cisco ICS 7750*.

MGCP Support for T1/E1 ISDN PRI

Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750 adds support for Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) backhaul, for both T1 and E1 interfaces. PRI backhaul provides a method for transporting complete IP telephony signaling information from the ISDN PRI interface of an MRP or ASI to Cisco CallManager through a highly reliable TCP connection.

This feature works by terminating all the ISDN PRI Layer 2 (Q.921) signaling functions in the Cisco IOS code on the MGCP voice gateway (typically the MRP or ASI) while, at the same time, packaging all the ISDN PRI Layer 3 (Q.931) signaling information into packets for transmission to the Cisco CallManager through an IP tunnel over a highly reliable TCP connection. This methodology ensures the integrity of the Q.931 signaling information being passed through the network for managing IP telephony devices.

A rich set of user-side and network-side ISDN PRI calling functions is supported by the ISDN PRI backhaul feature. The gateway uses a single TCP connection for backhauling all the ISDN D channels to Cisco CallManager. The "SAP/Channel ID" parameter in the header of each message identifies individual D channels. In addition to carrying the backhaul traffic, the inherent TCP keepalive mechanism is also used to determine MGCP voice gateway connectivity to an available call agent.

The MGCP voice gateway also establishes a TCP link to the backup (secondary) Cisco CallManager server (typically an SPE). In the event of Cisco CallManager switchover, the ISDN PRI backhaul functions are assumed by the secondary Cisco CallManager server. During this switchover, all active ISDN PRI calls are preserved, and the affected MGCP gateway is registered with the new Cisco CallManager server through a Restart-in-Progress (RSIP) message to ensure continued gateway operation.

Note For information about how to configure ISDN PRI backhaul on the Cisco ICS 7750, refer to *Using Media Gateway Control Protocol with the Cisco ICS 7750*.

MGCP Support for T1 CAS

Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750 adds MGCP support for Channel Associated Signaling (CAS) for T1 interfaces.

Various types of CAS signaling are available for T1, including loop-start, ground-start, and recEive and transMit (E&M). CAS allows the device to provide the automatic number identification/dialed number identification service (ANI/DNIS) delimiter on incoming T1/CAS trunk lines. The digit collection logic in the call switching module (CSM) for incoming T1 CAS calls in dual tone multifrequency (DTMF) is modified to process the delimiters, the ANI digits, and the DNIS digits.

As part of the configuration, a CAS signaling class with the template to process ANI/DNIS delimiters has to be defined. This creates a signaling class structure which can be referred to by its name.

This feature is only functional in a T1 CAS configured for E&M-feature group b (wink start). E&M signaling is typically used for trunks. It is normally the only way that a central office (CO) switch can provide two-way dialing with direct inward dialing. In all the E&M protocols, off-hook is indicated by A=B=1, and on-hook is indicated by A=B=0. If dial pulse dialing is used, the A and B bits are pulsed to indicate the addressing digits.

Note For information about how to configure T1 CAS on the Cisco ICS 7750, refer to *Using Media Gateway Control Protocol with the Cisco ICS 7750*.

Single Point MGCP Configuration

Cisco IOS Release 12.2(4)YH on the Cisco ICS 7750 adds single point configuration of MGCP gateways.

When you use a voice gateway (such as an MRP) with MGCP and Cisco CallManager Release 3.1 or later, the gateway can use the Trivial File Transfer Protocol (TFTP) to automatically download and configure most of the configuration information it requires to operate. You configure MGCP using Cisco CallManager Administration, using the instructions provided in the on-line help and documentation provided with Cisco CallManager. On the gateway, you complete basic Cisco IOS configuration and identify the TFTP download server with the following commands:

```
ccm config server <tftp_server>
ccm config
```

With this feature, you do not have to manually synchronize MGCP voice gateway configuration between the gateway and Cisco CallManager. Whenever you change the gateway configuration on Cisco CallManager, restarting the gateway enables the new configuration. This feature makes it easy to ensure consistent configuration for all the voice gateways of a specific type or function.

Note This feature supports only IOS CLI commands which begin with `mgcp` or `ccm`.

Note When you use MGCP with Cisco CallManager Release 3.0, you need to complete MGCP configuration using Cisco IOS command line interface (CLI) commands on the local gateway. You must still complete the Cisco CallManager configuration using Cisco CallManager Administration. The configuration on each local gateway must match the configuration on Cisco CallManager for that gateway.

For more information about using this functionality with Cisco CallManager, refer to *Interworking of Cisco MGCP Voice Gateways and Cisco CallManager Version 3.1*, at this URL:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122x/122xn/122xn2/ft_ccm.htm

Important Notes

The following sections contain important notes about Cisco IOS-related issues that can apply to the Cisco ICS 7750.

Software Images on MRP and ASI Cards

All of the MRP and ASI cards in a Cisco ICS 7750 must run the same Cisco IOS image.

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(4)YH. 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 CCO 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 toCisco.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.

Open Caveats - Release 12.2(4)YH

This section describes unexpected behavior in Release 12.2(4)YH.

CSCdx53212

If an MRP is connected directly to a Cisco 3660 Series router, some time slots might be seized for T1 lines which use E&M signaling. As a result, calls on the seized time slots will not succeed. This problem has been observed intermittently, and only in this specific configuration (MRP to Cisco 3660 Series router connection). This problem will not occur if the MRP is connected to a PSTN T1 interface using E&M signaling.

There is no workaround.

CSCdx42259

In rare cases, it is possible that if an MRP FXS interface is being used, following the termination of a call (when the called party hangs up), if the caller does not hang up until after the fast busy signal ends (fast busy lasts approximately 30 seconds), a loud hissing sound will be heard.

Workaround—Hanging up the phone will solve the problem.

CSCdx44650

If an MRP FXO-M1 interface is being used, and if the **connection trunk** command is used to create a "virtual trunk" between the MRP FXO-M1 interface and an MRP FXS interface, the connection will fail.

Workaround—Configure the connection to use PLAR or a standard dial-peer configuration. Refer to Configuring Connection Trunk for more information about this type of configuration.

CSCdx42384

If an MRP FXO-M1 interface is being used, in rare cases calls being placed through that port will not be connected, and when the calling phone hangs up, the MRP FXO-M1 interface will change to an off-hook status.

Workaround—Enter a **shut** and a **no shut** command on the MRP FXO-M1 interface.

CSCdx17004

If you attempt to configure channel-groups and PRI-groups on the same MRP T1 or E1 controller, the configuration might fail, due to a computational error that will cause the time slot numbering to be off by one. (Configuring multiple channel-groups on the same MRP T1 or E1 controller will still succeed.)

For example, if time slots 1-8 are used for the channel-group, when a PRI-group is configured on time slots 9-31, the configuration will fail:

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#controller e1 1/1
Router(config-controller)#channel-group 1 timeslots 1-8
Router(config-controller)#pri-group timeslots 9-31
%Channel-group 8 is already defined
Router(config-controller)#
```

In this example, configuring the PRI-group time slots from 10-31, instead of from 9-31, will succeed.

Workaround—Use one of the following approaches to solve this problem:

- Do not configure channel-groups and PRI-groups on the same T1 or E1 controller. Configure channel-groups on one controller and PRI-groups on another controller.

- When configuring channel-groups and PRI-groups on the same T1 or E1 controller, do not use the time slot immediately following the last time slot on which the channel-groups are configured.

CSCdx53509

If you enter the command **ip rsvp bandwidth** or **no ip rsvp bandwidth** on an MRP serial interface, 270K of MRP memory will be lost. If you enter either of these commands multiple times, the MRP will run out of available memory.

Workaround—Do not enter the i**p rsvp bandwidth** or **no ip rsvp bandwidth** commands an the same MRP serial interface more than once.

CSCdv24253

If the primary instance of Cisco CallManager goes out of service, when the primary Cisco CallManager returns to service, any installed ASI cards might respond to a query sent by the primary Cisco CallManager with an outdated connection ID.

There is no impact on system functionality.

Related Documentation

The following sections describe the documentation available for the Cisco ICS 7750. 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-ROM.

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

- Release-Specific Documents
- Cisco ICS 7750 Documents
- Cisco IOS Software Documentation Set

Release-Specific Documents

The following documents are specific to Release 12.2 and apply to Release 12.2(4)YH. They are located on Cisco.com and the Documentation CD-ROM:

- *Release Notes for Cisco IOS Release 12.2(4)YH*
- *Release Notes for Cisco IOS Release 12.2 T*
- *Caveats for Cisco IOS Release 12.2 and 12.2 T*

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 **Technical Support**: **Tools & Utilities: Software Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Cisco ICS 7750 Documents

The documents described in this section are available on Cisco.com and on CD:

On Cisco.com:

Products & Services: Voice Application Systems: Cisco ICS 7700 Series Integrated Communications Systems: Instructions and Guides

On the Documentation CD-ROM (order number DOC-CONDOCCD=) at:

Product Documentation: Voice/Telephony: Cisco ICS 7750

Documentation Set

Printed versions of many of the platform-specific documents can be ordered as a boxed set (order number DOCS-7750=).

Feature Navigator

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a particular set of features and which features are supported in a particular Cisco IOS image. Feature Navigator is available 24 hours a day, 7 days a week.

To access Feature Navigator, 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 set up an account.

To use Feature Navigator, you must have a JavaScript-enabled web browser such as Netscape 3.0 or later, or Internet Explorer 4.0 or later. Internet Explorer 4.0 always has JavaScript enabled. To enable JavaScript for Netscape 3.x or Netscape 4.x, follow the instructions provided with the web browser. For JavaScript support and enabling instructions for other browsers, check with the browser vendor.

Feature Navigator is updated when major Cisco IOS software releases and technology releases occur. You can access Feature Navigator 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 that are shipped with your order in electronic form on the Documentation CD-ROM—unless you specifically ordered 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.

Release 12.2 Documentation Set

Table 8 describes the contents of the Cisco IOS Release 12.2 software documentation set, which is available in both electronic and printed form.

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.

Note   Some aspects of the complete Cisco IOS Release 12.2 software documentation set might not apply to the Cisco ICS 7750.

Table 8   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: Dial Access* • *Cisco IOS Dial Technologies Configuration Guide: Large-Scale Dial Applications* • *Cisco IOS Dial Technologies Command Reference, Volume 1 of 2* • *Cisco IOS Dial Technologies Command Reference, Volume 2 of 2*	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
• *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 IP 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 8   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
• *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 Frame Relay SMDS X.25 and LAPB
• *Cisco IOS Mobile Wireless Configuration Guide* • *Cisco IOS Mobile Wireless Command Reference*	General Packet Radio Service

Table 8   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-Based Limited Lifetime Releases • New Features in Release 12.2T • Release Notes (Release note and caveat documentation for 12.2-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 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 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, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
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.