



Release Notes for Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750

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These release notes describe features and functionality of Cisco IOS Release 12.2(8)YM on the Cisco Integrated Communications System (ICS) 7750.



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.

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System Requirements

This section describes the system requirements for Release 12.2(8)YM on the Cisco ICS 7750. It includes the following sections:

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Memory Requirements

[Table 1](#) describes the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Release 12.2(8)YM 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/FW/Voice Plus IPsec 56	ics7700-k8o3sv3y-mz	S77b-k8-x.x.x	16MB	Not applicable	64MB	RAM
	IP/FW/Voice Plus IPsec 3DES	ics7700-k9o3sv3y-mz	S77c-k9-x.x.x	16MB	Not applicable	64MB	RAM
	IP/IPX/AT/IBM/ Voice, Plus	ics7700-bnr2sv3y-mz	S77d-x.x.x	16MB	Not applicable	64MB	RAM
	IP/IPX/AT/IBM/FW/ Voice, Plus IPsec 56	ics7700-bk8no3r2sv3y-mz	S77e-k8-x.x.x	16MB	Not applicable	64MB	RAM
	IP/IPX/AT/IBM/FW/ Voice, Plus IPsec 3DES	ics7700-bk9no3r2sv3y-mz	S77f-k9-x.x.x	16MB	Not applicable	64 MB	RAM
	Reduced-IP/ Analog Voice Plus ⁴	ics7700-sv12y10-mz	ICS-7750-AV	16MB	Not applicable	64 MB	RAM
	Reduced-IP/ Voice Plus ⁴	ics7700-sv3y10-mz	ICS-7750-DV	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 2.4.0, the name of the bundle containing the IP/Voice Plus image would be S77a-2.4.0.
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*.
4. This image comprises one of the new voice-only packages, and does not include data networking support. For more information, see the “New Software Features in Release 12.2(8)YM” section on page 8.

Hardware Supported

Cisco IOS Release 12.2(8)YM 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.	<ul style="list-style-type: none"> • SPE200¹: 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.	<ul style="list-style-type: none"> • 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

Table 2 Cisco ICS 7750 Processor Cards (continued)

Card	Card Description	Port Description
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.	<ul style="list-style-type: none"> 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=

Table 4 Cisco ASI and MRP Card Replacement DIMMs and PVDMs (continued)

Description	Cisco Part Number
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 Installation and Configuration 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 Installation and Configuration Guide](#) and the ICS System Manager online help for configuration instructions.

Table 5 Supported WICs, VICs and VWICs

Card Description	Abbreviated Name	Support in MGCP Mode
1-port serial, asynchronous and synchronous (T1/E1)	WIC-1T	Not applicable
2-port serial, asynchronous and synchronous (T1/E1)	WIC-2T	Not applicable
2-port serial, low speed (up to 128 kbps), asynchronous and synchronous	WIC-2A/S	Not applicable
1-port ISDN ¹ BRI ² (S/T interface)	WIC-1B-ST	Not applicable
1-port ISDN BRI with integrated NT1 (U interface)	WIC-1B-U	Not applicable
1-port, four-wire 56-kbps CSU/DSU ³	WIC-1DSU-56K4	Not applicable
1-port, T1/fractional T1 CSU/DSU	WIC-1DSU-T1	Not applicable
2-port FXS ⁴ voice/fax interface card	VIC-2FXS	Yes
2-port FXO ⁵ voice/fax interface card	VIC-2FXO	Yes
2-port FXO voice/fax interface card with battery reversal detection and caller ID support (for the United States)	VIC-2FXO-M1	No MGCP support if Caller ID or battery reversal detection enabled
4-port FXO voice/fax interface card with battery reversal detection and caller ID support (for the United States)	VIC-4FXO-M1	No MGCP support if Caller ID or battery reversal detection enabled
2-port FXO voice/fax interface card with battery reversal detection and caller ID support (for Europe)	VIC-2FXO-M2	No MGCP support if Caller ID or battery reversal detection enabled
2-port FXO voice/fax interface card with battery reversal detection (for Australia)	VIC-2FXO-M3	No MGCP support if Caller ID or battery reversal detection enabled
2-port E&M ⁶ voice/fax interface card	VIC-2E/M	No
2-port analog DID ⁷ voice/fax interface card	VIC-2DID	FXS mode only
4-port analog FXS/DID voice/fax interface card	VIC-4FXS/DID	FXS mode only
2-port ISDN BRI voice/fax interface card (network and terminal side)	VIC-2BRI-NT/TE	No
1-port T1/fractional T1 multiflex trunk with CSU/DSU	VWIC-1MFT-T1	Yes
2-port T1/fractional T1 multiflex trunk with CSU/DSU	VWIC-2MFT-T1	Yes

Table 5 Supported WICs, VICs and VWICs (continued)

Card Description	Abbreviated Name	Support in MGCP Mode
1-port E1/fractional E1 multiflex trunk with CSU/DSU	VWIC-1MFT-E1	Yes
2-port E1/fractional E1 multiflex trunk with CSU/DSU	VWIC-2MFT-E1	Yes

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

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(8)YM, 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(8)YM supports the same feature sets as Releases 12.2 and 12.2T, but Release 12.2(8)YM 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, FW, Voice, Plus, IPSec 56                  | IP/FW/Voice Plus IPSec 56               | ics7700-k8o3sv3y-mz     |
| Cisco ICS 7750 IOS IP, FW, Voice, Plus, IPSec, 3DES               | IP/FW/Voice Plus IPSec 3DES             | ics7700-k9o3sv3y-mz     |
| Cisco ICS 7750 IOS IP, IPX, AT, IBM, Voice, Plus                  | IP/IPX/AT/IBM/Voice Plus                | ics7700-bnr2sv3y-mz     |
| Cisco ICS 7750 IOS IP, IPX, AT, IBM, FW, Voice, Plus, IPSec 56    | IP/IPX/AT/IBM/FW/ Voice Plus IPSec 56   | ics7700-bk8no3r2sv3y-mz |
| Cisco ICS 7750 IOS IP, IPX, AT, IBM, FW, Voice, Plus, IPSec, 3DES | IP/IPX/AT/IBM/FW/ Voice Plus IPSec 3DES | ics7700-bk9no3r2sv3y-mz |
| Cisco ICS 7750 IOS Reduced IP, Analog Voice, Plus <sup>1</sup>    | Reduced-IP/Analog Voice Plus            | ics7700-sv12y10-mz      |
| Cisco ICS 7750 IOS Reduced IP, Voice, Plus <sup>1</sup>           | Reduced-IP/Voice Plus                   | ics7700-sv3y10-mz       |

1. This image comprises one of the new voice-only packages, and does not include data networking support. For more information, see the [“New Software Features in Release 12.2\(8\)YM”](#) section on page 8.

**Note**

For additional information about feature support for this Cisco IOS release, use the Feature Navigator. See the [“Feature Navigator”](#) section on page 17 for additional information.

## New and Changed Information

The following section lists the new software features supported by the Cisco ICS 7750 for Cisco IOS software Release 12.2(8)YM.

### New Hardware Features in Release 12.2(8)YM

Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750 supports the four-port FXO VIC, as described below.

#### Four-Port Foreign Exchange Office for the United States with Battery Reversal (VIC-4FXO-M1)

The Cisco ICS 7750 now supports an FXO-M1 VIC with four ports, which you can use to connect to PBXs or key systems and to provide off-premise connections in the U.S., Canada and other countries. FXO-M1 is an enhancement of FXO with battery reversal and Caller ID features.

**Note**

You can use H.323 with the Caller ID and battery reversal answer supervision features on the VIC-4FXO-M1. Media Gateway Control Protocol (MGCP) on the VIC-4FXO-M1 is supported, but not with Caller ID or battery reversal detection.

## New Software Features in Release 12.2(8)YM

Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750 supports the following software features:

- [VLAN Support](#)
- [QoS Support](#)
- [Gateway Resource Availability Reporting](#)
- [Cisco ICS 7750 Voice-only Systems](#)

### VLAN Support

The availability of the MRP300, MRP3-8FXS, and MRP3-16FXS cards enables most of the IOS software virtual LAN (VLAN) features on the Cisco ICS 7750.

### Understanding VLANs

A VLAN is a switched network that is logically segmented on an organizational basis, by functions, project teams, or applications rather than on a physical or geographical basis. For example, all workstations and servers used by a particular workgroup team can be connected to the same VLAN, regardless of their physical connections to the network or the fact that they might be intermingled with other teams. Reconfiguration of the network can be done through software rather than by physically unplugging and moving devices or wires.

A VLAN can be thought of as a broadcast domain that exists within a defined set of switches. A VLAN consists of a number of end systems, either hosts or network equipment (such as bridges and routers), connected by a single bridging domain. The bridging domain is supported on various pieces of network equipment; for example, LAN switches that operate bridging protocols between them with a separate bridge group for each VLAN.

VLANs are created to provide the segmentation services traditionally provided by routers in LAN configurations. VLANs address scalability, security, and network management. Routers in VLAN topologies provide broadcast filtering, security, address summarization, and traffic flow management. None of the switches within the defined group will bridge any frames, not even broadcast frames, between two VLANs.

**Note**

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For more information about VLANs, refer to the “Routing Between VLANs Overview” chapter in the [Cisco IOS Switching Services Configuration Guide](#).

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## Cisco ICS 7750 VLAN Guidelines

When configuring multiple VLANs on the Cisco ICS 7750, follow the guidelines below:

- All system cards in the chassis must be a member of the management VLAN (VLAN 1).
- At least one flash-based MRP must be configured to be on all VLANs. This is necessary to route data between VLANs.
- Outside the chassis, the SSP can support a maximum of 250 VLANs and 64 STP instances. The maximum number of VLANs the MRP300 can support is 300.
- The management VLAN (VLAN 1) IP address of the MRP300 must be configured via ICSSconfig, and therefore must reside on the primary fast Ethernet interface (0/0) of the MRP300.
- Do not add a native VLAN sub-interface on the MRP300.
- Do not configure the primary Fast Ethernet interface on the MRP300 to have "no ip address."

## QoS Support

The availability of the MRP300, MRP3-8FXS, and MRP3-16FXS cards also enables the IOS software Quality of Service (QoS) features on the Cisco ICS 7750.

### Configuring Quality of Service

Separating voice and data packets onto different VLANs will not, by itself, ensure voice quality. You need to have a well-engineered, end-to-end network for running delay-sensitive applications such as Voice over IP (VoIP). Voice traffic is much more sensitive to timing variations than data traffic. For good voice performance, you need to configure the data network so that voice packets are not lost or delayed. Fine-tuning the network to adequately support VoIP involves selecting a series of protocols and features to improve QoS. Cisco IOS software provides many tools for enabling QoS on the backbone, such as random early detection (RED), weighted random early detection (WRED), Fancy Queuing (that is, custom, priority, or weighted fair queuing), and IP precedence. To configure your IP network for real-time voice traffic, you must take into consideration the entire scope of your network and then select the appropriate QoS tool or tools.



#### Note

QoS measures the level of network performance. It does not directly measure the quality of the voice signal.

The important thing to remember is that QoS must be configured throughout your network—not just on the MRP running VoIP—in order to improve voice network performance.



#### Note

For additional information about configuring QoS, refer to the [Cisco IOS Quality of Service Solutions Configuration Guide](#).

## Gateway Resource Availability Reporting

Cisco H.323 Version 2 support enables gatekeepers, gateways, and proxies to send and receive all the required fields in H.323 v2 messages. One of features in H.323 Version 2 is the Resource Availability Indicator (RAI).

## Understanding RAI

RAI is a resource-based call admission control (CAC) mechanism which is sent from the terminating gateway to the gatekeeper to provide information about the gateway's ability to take more calls. Because it is a gateway/gatekeeper indication, RAI CAC applies only to H.323 voice networks that utilize a gatekeeper design.

The gateway reports its resource status to the gatekeeper using the RAI. When a monitored resource falls below a configurable threshold, the gateway sends an RAI to the gatekeeper indicating that the gateway is almost out of resources. When another configurable threshold is reached, the gateway sends an RAI indicating that the resource depletion condition no longer exists. Resources that are monitored are DS0 channels and digital DSP channels. Analog DSP channels, analog voice ports, BRI voice ports, and router CPU and memory are not monitored.

Resource reporting thresholds are configured by entering the **resource threshold** command. The upper and lower thresholds are separately configurable to prevent the gateway from operating sporadically due to the availability or lack of resources.

When you are calculating utilization, you should calculate based on available channels (disabled channels are not counted). Entering the command **show call resource voice stats** displays these details for both DSP and DS0 resources.

## RAI Limitations on the Cisco ICS 7750

Unlike other platforms which support RAI, which allow a voice call to be made using any supported codec whenever one DSP channel is free, on the Cisco ICS 7750, even when there is one DSP channel available, only G.711 voice calls will be successful. Requests for higher complexity codecs in this scenario will fail.

## Cisco ICS 7750 Voice-only Systems

The Cisco ICS 7750 Voice-only Systems are IP telephony product bundles that include the Cisco ICS 7750 hardware and software components for Cisco CallManager support (up to 50 IP phones), PSTN connectivity, analog business device connectivity and Cisco Unity Voice Mail (for 25 voice mail boxes). They are designed for customers with 50 or fewer IP phones who need standalone voice functionality and want the flexibility to add more advanced data routing and voice over the WAN networking functionality as their business needs change. There are currently two Cisco ICS 7750 Voice-only systems:

- ICS-7750-AV—Includes Cisco CallManager and Cisco Unity support as described above, and support for analog VICs as shown in [Table 7](#).
- ICS-7750-DV—Includes Cisco CallManager and Cisco Unity support as described above, and support for both analog VICs and digital VWICs as shown in [Table 7](#).

**Table 7** *Interface Card Support for Cisco ICS 7750 Analog and Digital Voice-Only Systems*

| Interface Card | Supported on ICS-7750-AV | Supported on ICS-7750-DV |
|----------------|--------------------------|--------------------------|
| VIC-2FXO       | Yes                      | Yes                      |
| VIC-2FXO-M1    | Yes                      | Yes                      |
| VIC-4FXO-M1    | Yes                      | Yes                      |
| VIC-2FXO-M2    | Yes                      | Yes                      |
| VIC-2FXO-M3    | Yes                      | Yes                      |

**Table 7** Interface Card Support for Cisco ICS 7750 Analog and Digital Voice-Only Systems

| Interface Card             | Supported on ICS-7750-AV | Supported on ICS-7750-DV |
|----------------------------|--------------------------|--------------------------|
| VIC-2FXS                   | Yes                      | Yes                      |
| VIC-4FXS/DID               | Yes                      | Yes                      |
| VIC-2FXO-EU                | Yes                      | Yes                      |
| VIC-2DID                   | Yes                      | Yes                      |
| VIC-2E/M                   | Yes                      | Yes                      |
| VIC-4DID/FXS               | Yes                      | Yes                      |
| VIC-2BRI-NT/TE             | Yes                      | Yes                      |
| VWIC-1MFT-T1               | No                       | Yes                      |
| VWIC-2MFT-T1               | No                       | Yes                      |
| VWIC-1MFT-E1               | No                       | Yes                      |
| VWIC-2MFT-E1               | No                       | Yes                      |
| WIC-1DSU-T1 <sup>1</sup>   | No                       | No                       |
| WIC-1T <sup>1</sup>        | No                       | No                       |
| WIC-2T <sup>1</sup>        | No                       | No                       |
| WIC-2A/S <sup>1</sup>      | No                       | No                       |
| WIC-1DSU-56K4 <sup>1</sup> | No                       | No                       |
| WIC-1B-S/T <sup>1</sup>    | No                       | No                       |
| WIC-1B-U <sup>1</sup>      | No                       | No                       |

1. To use WICs on a voice-only system, a Data Networking system upgrade is required. A Data Networking system upgrade is not required for routing data over a LAN.

## Upgrading the ICS 7750 Voice-only Systems With IOS Feature Licenses

This section describes the upgrade options available for voice-only systems.

- Digital voice system upgrade—To upgrade your ICS 7750-AV System with a digital voice image, you must purchase a digital voice image feature license (Part No. SW-ICS-DV-UPGD=). This feature license entitles you to download the digital voice IOS image (ics7700-sv3y10-mz) from Cisco Connection Online (CCO) and load the image to your ICS 7750-AV System. This upgrade enables digital voice interface cards to function in an analog voice system. Load the digital voice image to the ICS 7750 Voice-only system and add the desired digital voice interface cards along with the appropriate Digital Signal Processor (DSP) modules.

A digital voice image upgrade entitles you to connect to the Public Switch Telephone Network (PSTN) using digital voice trunks. It does not entitle you to use that digital voice interface card for data channel groups. To add data channel group support to a digital voice interface card, you must purchase a data networking feature license.

- **Data networking system upgrade**—Data networking image upgrades are authorized only for an ICS 7750-DV System or for an ICS 7750-AV System that has been already upgraded with a digital voice image feature license. To upgrade your ICS 7750 Voice-only System with data networking, you must purchase a data networking feature license (Part No. SW-ICS-DN-UPGD=). This feature license entitles you to download the data networking IOS image (ics7700-sv3y-mz) from CCO and load the image to your Cisco ICS 7750. With a data networking IOS image upgrade, you are entitled to route voice and data traffic over the WAN. You are also authorized to configure data channel groups on a Voice/WAN Interface Card (VWIC).

To enable the data networking image, load the image to the Cisco ICS 7750 and add the desired WAN interface cards (WICs). For a complete list of WICs, see the WICS denoted with a footnote in [Table 7](#).

- **Security and legacy protocol image upgrades**—In order to upgrade to an IOS image with data encryption (that is, IP SEC 56 or IP SEC 3DES) and/or legacy protocols (that is, IBM SNA or Apple Talk), you must first upgrade your ICS 7750 Voice-only System with data networking under the terms and conditions outlined in the Data Networking System Upgrade section. The data networking system upgrade contains the base IP/VOICE PLUS IOS image (ics7700-sv3y-mz).

For example, if you would like to route encrypted data traffic between two sites that have ICS-7750 voice-only systems, you must upgrade both systems with the data networking system upgrade. To add data encryption, purchase one of the IP SEC images listed in [Table 1](#).

Upgrading directly to an IP SEC and/or legacy protocol IOS image from a voice-only IOS image is unauthorized without first purchasing a data networking system upgrade. In addition, a spare IP VOICE PLUS image may not be loaded to your voice-only system in place of purchasing the data networking system upgrade (Part No. SW-ICS-DN-UPGD=).

- **Upgrading the Cisco CallManager user license on ICS 7750 voice-only systems**—The Cisco CallManager in the ICS 7750 Voice-only Systems contain full-featured CallManager support for up to 50 IP phones. The Cisco CallManager in the ICS 7750 Voice-only System should not be used with more than 50 IP Phones, unless a CallManager License upgrade has been purchased. You must purchase a Cisco CallManager License upgrade (Part No. SW-CCM-VO-UPGD=) if more than 50 IP phones are running on your ICS 7750 Voice-only System.

## 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 MRPs and ASIs 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(8)YM. 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 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](http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl).

## Open Caveats - Release 12.2(8)YM

This section describes unexpected behavior in Release 12.2(8)YM.

### CSCdz23298

If FXO channel associated signaling (CAS) is used on an MRP300, the MRP300 might reload sporadically.

**Workaround**—Use E&M signaling instead of FXO signaling, or downgrade to Release 12.2(4)YH.

### CSCdy06510

In rare cases, it is possible that when performing load testing, certain ports on the MRP3-16FXS might stay in an off-hook state after the testing is complete.

There is no workaround.

### CSCdy18325

In rare cases, when a call is made through an FXO-M1 interface, the call is successful, but the Caller ID information might be lost, and the following error message might be generated:

```
%SYS-5-TABLEERR: VTSP table active calls damaged: node added twice?
```

There is no workaround.

### CSCdy19867

When a call to the PSTN is being made through MRP FXS and FXO interfaces on which the **forward-digits all** command has been entered, it is possible that the DTMF tones might be echoed back to the call originator, due to a suspected problem with the echo canceller.

**Workaround**—Tuning the echo canceller settings and disabling the forward all digits functionality on the necessary FXS and FXO interfaces should help solve this problem. Refer to the following documentation for more information:

- [Cisco IOS Voice, Video, and Fax Configuration Guide](#)
- [IP Telephony Solution Guide](#)
- [Voice Parameters and Tuning Guide](#)

**CSCdy24276**

If all of the interfaces are being used on an MRP3-16FXS, it possible that an error message similar to the following will be displayed for each interface:

```
2w1d: %IPM_C54X-1-TOOBIG: DSP 3, packet(size 65151) too big.
```

There is no workaround.

**CSCdx88902**

If 2 Mbps of data is sent over a 2 Mbps link when there are 24 voice calls already in process on an MRP or ASI, the CPU utilization on the MRP or ASI will increase and will cause some data packets to be dropped. For a brief period, some calls might be dropped during call setup, but the system will automatically recover. Calls in progress will not be affected.

One or more of the following syslog messages might be generated in response to this condition:

```
%IPM_C54X-1-TOOBIG: DSP 6, packet (size 16460) too big.
%IPM_C54X-3-HOST_XMIT_BLOCKED: Host is unable to transmit packets to DSP 6
%VTSP-3-DSP_TIMEOUT: DSP timeout on event 0x6: DSP ID=0x1: DSP Disc (call mode=0)
%IPM_C54X-3-NO_BUFFERS: No buffers available for DSP buffer pool
%IPM_C54X-1-DSP_TIMEOUT: dsp 1 NOT RESPONDING.
```

**Workaround**—Reduce the data traffic to the extent required to reduce or eliminate dropped data packets.

**CSCdx81837**

If you are configuring T1 PRI or E1 PRI on an ASI81 or MRP, the total number of channels shown when you enter the **show run** command might not correspond to the actual number of usable PRI channels.

**Workaround**—Always enter the **show voice dsp** command to determine how many DSPs are available before attempting to configure T1 PRI or E1 PRI on ASI81 or MRP.

**Note**

If you encounter this problem, you can use either of the following approaches to solve it: enter the **isdn service** command to take individual channels out of service (refer to the documentation for the **isdn service** command), or enter the **isdn busy** command to set a false busy signal on individual channels (refer to the documentation for the **isdn busy** command).

**CSCdy02040**

If you are using an MRP or ASI with an E1 or T1 CAS trunk, if you change the TDM clocking on an E1 or T1 controller from an export clock configuration to an import clock configuration, and if the E1 or T1 controller is shut down when its clocking is changed, then configuring a DS0 group and entering a **no shut** command on that controller will cause intermittent call failures on some time slots.

For example, if interface T1 0/0 is configured as an export clock and interface T1 0/1 is also configured as an export clock, the following sequence of commands will cause intermittent call failures on T1 0/1:

```
controller T1 0/0
shutdown
no ds0-group 0 timeslots 1-24
no tdm clock T1 0/0
```

```

controller T1 0/1
shutdown
no ds0-group 1 timeslots 1-24
no tdm clock T1 0/1

tdm clock T1 0/0 voice export line
tdm clock T1 0/1 voice import T1 0/0 internal

controller T1 0/0
ds0-group 0 timeslots 1-24 type e&m-wink-start
no shutdown

controller T1 0/1
ds0-group 1 timeslots 1-24 type e&m-wink-start
no shutdown

```

**Workaround**—Do not shut down the E1 or T1 controller before changing its tdm clock configuration. Based on the example shown above, the following configuration will work:

```

controller T1 0/0
no ds0-group 0 timeslots 1-24
no tdm clock T1 0/0

controller T1 0/1
no ds0-group 1 timeslots 1-24
no tdm clock T1 0/1

tdm clock T1 0/0 voice export line
tdm clock T1 0/1 voice import T1 0/0 internal

controller T1 0/0
ds0-group 0 timeslots 1-24 type e&m-wink-start

controller T1 0/1
ds0-group 1 timeslots 1-24 type e&m-wink-start

```

## 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(8)YM. They are located on Cisco.com and the Documentation CD-ROM:

- [Release Notes for Cisco IOS Release 12.2\(8\)YM](#)
  - To reach the *Release Notes for Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750* from Cisco.com, click this path:  
**Products & Services: IOS Software: Cisco IOS Software Releases 12.2: Cisco IOS Software Releases 12.2 YN: Instructions & Guides: Release Notes: Cisco ICS 7750 - Cisco IOS Release 12.2(8)YN**
  - To reach the *Release Notes for Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750* on the Documentation CD-ROM, click this path:  
**Product Documentation: Cisco IOS Software: Release 12.2: Release Notes: Cisco Integrated Communications System 7750: Release Notes for Cisco IOS Release 12.2(8)YM on the Cisco ICS 7750**
- [Release Notes for Cisco IOS Release 12.2 T](#)
  - To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2 T* from Cisco.com, click this path:  
**Products & Services: IOS Software: Cisco IOS Software Releases 12.2: Cisco IOS Software Releases 12.2 T: Instructions and Guides: Release Notes: Cisco IOS Software Releases 12.2 T**
  - To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2* on the Documentation CD-ROM, click this path:  
**Product Documentation: Cisco IOS Software: Cisco IOS Release 12.2: Release Notes: Cisco IOS Release 12.2 T**
- [Caveats for Cisco IOS Release 12.2 and 12.2 T](#)

The *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2 T* documents contain caveats applicable to all platforms for all maintenance releases of Release 12.2.

  - To reach the caveats document from Cisco.com, click this path:  
**Products & Services: IOS Software: Cisco IOS Software Releases 12.2: Cisco IOS Software Releases 12.2 T: Instructions and Guides: Release Notes: Cisco IOS Software Releases 12.2 T**
  - To reach the caveats document on the Documentation CD-ROM, click this path:  
**Product Documentation: Cisco IOS Software: Cisco IOS Release 12.2: Caveats**



### Note

If you have an account with Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in to Cisco.com and click **Technical Support: Tools & Utilities: Software Bug Toolkit**. Another option is to go to [http://www.cisco.com/cgi-bin/Support/Bugtool/launch\\_bugtool.pl](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](mailto: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.

On Cisco.com:

**Products & Services: IOS Software: Cisco IOS Software Releases 12.2: Instructions and Guides: Master Indices**

On the Documentation CD-ROM at:

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

## 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Cisco IOS Configuration Fundamentals Configuration Guide</li> <li>• Cisco IOS Configuration Fundamentals Command Reference</li> </ul>                                                                                                    | Cisco IOS User Interfaces<br>File Management<br>System Management                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• Cisco IOS Bridging and IBM Networking Configuration Guide</li> <li>• Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2</li> <li>• Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2</li> </ul> | Transparent Bridging<br>SRB<br>Token Ring Inter-Switch Link<br>Token Ring Route Switch Module<br>RSRB<br>DLSW+<br>Serial Tunnel and Block Serial Tunnel<br>LLC2 and SDLC<br>IBM Network Media Translation<br>SNA Frame Relay Access<br>NCIA Client/Server<br>Airline Product Set<br>DSPU and SNA Service Point<br>SNA Switching Services<br>Cisco Transaction Connection<br>Cisco Mainframe Channel Connection<br>CLAW and TCP/IP Offload<br>CSNA, CMPC, and CMPC+<br>TN3270 Server |

**Table 8** Cisco IOS Release 12.2 Documentation Set (continued)

| Books                                                                                                                                                                                                                                                                                                                                                      | Major Topics                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Cisco IOS Dial Technologies Configuration Guide: Dial Access</li> <li>• Cisco IOS Dial Technologies Configuration Guide: Large-Scale Dial Applications</li> <li>• Cisco IOS Dial Technologies Command Reference, Volume 1 of 2</li> <li>• Cisco IOS Dial Technologies Command Reference, Volume 2 of 2</li> </ul> | Dial Access<br>Modem and Dial Shelf Configuration and Management<br>ISDN Configuration<br>Signaling Configuration<br>Point-to-Point Protocols<br>Dial-on-Demand Routing<br>Dial Backup<br>Dial Related Addressing Service<br>Network Access Solutions<br>Large-Scale Dial Solutions<br>Cost-Control Solutions<br>Internetworking Dial Access Scenarios |
| <ul style="list-style-type: none"> <li>• <i>Cisco IOS Interface Configuration Guide</i></li> <li>• <i>Cisco IOS Interface Command Reference</i></li> </ul>                                                                                                                                                                                                 | LAN Interfaces<br>Serial Interfaces<br>Logical Interfaces                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li>• Cisco IOS IP Configuration Guide</li> <li>• Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</li> <li>• Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols</li> <li>• Cisco IOS IP Command Reference, Volume 3 of 3: Multicast</li> </ul>                                     | IP Addressing<br>IP Services<br>IP Routing Protocols<br>IP Multicast                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• Cisco IOS AppleTalk and Novell IPX Configuration Guide</li> <li>• Cisco IOS AppleTalk and Novell IPX Command Reference</li> </ul>                                                                                                                                                                                 | AppleTalk<br>Novell IPX                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>• Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</li> <li>• Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</li> </ul>                                                                                                                     | Apollo Domain<br>Banyan VINES<br>DECnet<br>ISO CLNS<br>XNS                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>• Cisco IOS Voice, Video, and Fax Configuration Guide</li> <li>• <i>Cisco IOS Voice, Video, and Fax Command Reference</i></li> </ul>                                                                                                                                                                                | Voice over IP<br>Call Control Signaling<br>Voice over Frame Relay<br>Voice over ATM<br>Telephony Applications<br>Trunk Management<br>Fax, Video, and Modem Support                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>• Cisco IOS Quality of Service Solutions Configuration Guide</li> <li>• <i>Cisco IOS Quality of Service Solutions Command Reference</i></li> </ul>                                                                                                                                                                  | Packet Classification<br>Congestion Management<br>Congestion Avoidance<br>Policing and Shaping<br>Signaling<br>Link Efficiency Mechanisms                                                                                                                                                                                                              |

**Table 8 Cisco IOS Release 12.2 Documentation Set (continued)**

| Books                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Major Topics                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Cisco IOS Security Configuration Guide</li> <li><i>Cisco IOS Security Command Reference</i></li> </ul>                                                                                                                                                                                                                                                                                                                               | AAA Security Services<br>Security Server Protocols<br>Traffic Filtering and Firewalls<br>IP Security and Encryption<br>Passwords and Privileges<br>Neighbor Router Authentication<br>IP Security Options<br>Supported AV Pairs |
| <ul style="list-style-type: none"> <li>Cisco IOS Switching Services Configuration Guide</li> <li>Cisco IOS Switching Services Command Reference</li> </ul>                                                                                                                                                                                                                                                                                                                  | Cisco IOS Switching Paths<br>NetFlow Switching<br>Multiprotocol Label Switching<br>Multilayer Switching<br>Multicast Distributed Switching<br>Virtual LANs<br>LAN Emulation                                                    |
| <ul style="list-style-type: none"> <li>Cisco IOS Wide-Area Networking Configuration Guide</li> <li><i>Cisco IOS Wide-Area Networking Command Reference</i></li> </ul>                                                                                                                                                                                                                                                                                                       | ATM<br>Frame Relay<br>SMDS<br>X.25 and LAPB                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Cisco IOS Mobile Wireless Configuration Guide</li> <li>Cisco IOS Mobile Wireless Command Reference</li> </ul>                                                                                                                                                                                                                                                                                                                        | General Packet Radio Service                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>Cisco IOS Terminal Services Configuration Guide</li> <li>Cisco IOS Terminal Services Command Reference</li> </ul>                                                                                                                                                                                                                                                                                                                    | ARA<br>LAT<br>NASI<br>Telnet<br>TN3270<br>XRemote<br>X.28 PAD<br>Protocol Translation                                                                                                                                          |
| <ul style="list-style-type: none"> <li><i>Cisco IOS Configuration Guide Master Index</i></li> <li><i>Cisco IOS Command Reference Master Index</i></li> <li>Cisco IOS Debug Command Reference</li> <li>Cisco IOS Software System Error Messages</li> <li>New Features in 12.2-Based Limited Lifetime Releases</li> <li>New Features in Release 12.2T</li> <li>Release Notes (Release note and caveat documentation for 12.2-based releases and various platforms)</li> </ul> |                                                                                                                                                                                                                                |

## 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](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](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](mailto: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.

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

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