



Text Part Number: 78-6990-03 Rev. A0

Release Notes for Cisco AS5300 Universal Access Servers for Cisco IOS Release 12.0 XR

February 27, 2002

These release notes for Cisco AS5300 universal access servers support Cisco IOS Release 12.0(7)XR4, which is an early deployment release based on Cisco IOS Release 12.0 T. These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, and changes to the microcode or modem code and related documents.

For a list of the software caveats that apply to Release 12.0(7)XR4, see “Caveats” on page 16 and *Caveats for Cisco IOS Release 12.0 T*. The caveats document is updated for every maintenance release and is located on Cisco Connection Online (CCO) and the Documentation CD-ROM.

Use these release notes with *Cross-Platform Release Notes for Cisco IOS Release 12.0* located on CCO and the Documentation CD-ROM.

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Introduction

This section contains information about the Cisco AS5300 universal access servers and Early Deployment (ED) releases for the Cisco AS5300.

Note The AS5300/Voice Gateway is primarily supported with voice specific IOS releases, namely 12.0(2)XH and 12.0(4)XH. The first planned General Deployment (GD) release for these key Voice over IP (VoIP) features is 12.0(7)T.

The Cisco AS5300 is a versatile data communications platform that performs two functions in a single modular chassis depending on the installed feature cards and IOS images:

- Remote Access Server
- Voice Gateway

The remote access server is intended for Internet service providers (ISPs), telecommunications carriers, and other service providers that offer managed Internet connections, as well as medium to large sites that provide both digital and analog access to users on an enterprise network. By terminating both analog and digital calls on the same chassis simultaneously, the access server provides a clear, simple, and easy migration path from analog dial access services to digital dial access services.

The Cisco AS5300/Voice Gateway is a versatile data communications platform that provides the functions of an access server, router, and digital modem(s) in a single modular chassis. The AS5300 includes three feature card slots: one holds a T1/E1/PRI feature card, and the other two support modem feature cards or voice digital signal processor (DSP) feature cards. When equipped with modem cards, the AS5300 serves as a remote access concentrator for dial-up (modem or ISDN) Internet access. When equipped with voice feature cards and Voice IOS, the AS5300/Voice Gateway serves as a voice (VoIP) gateway. By using one slot for modems and the other for voice DSPs, the AS5300 can serve in both capacities. Modem, voice, or fax calls are routed to the appropriate cards/resources via Dialed Number Identification Service (DNIS).

For information on new features and Cisco IOS commands supported by Release 12.0(7)XR4, see the “New and Changed Information” section on page 13 and the “Related Documentation” section on page 21.

Early Deployment Releases

These release notes describe the Cisco AS5300 universal access servers for Cisco IOS Release 12.0(7)XR4. Release 12.0(7)XR4 is an early deployment (ED) release based on Release 12.0 T that contains fixes to software caveats and support for new Cisco hardware and software features. Other early deployment releases of the Cisco AS5300 are shown in Table 1; unless otherwise indicated, feature support is cumulative from release to release.

Table 1 Early Deployment Releases for the Cisco AS5300 Universal Access Servers

ED Release	Maintenance Release	Additional Software Features	Additional Hardware Features	Availability
Release 12.0 XR1	(7)XR1	<ul style="list-style-type: none"> • Cisco H.323 VoIP w/ SS7 • Media Gateway Control Protocol (MGCP) 	None	Now
Release 12.0 XH	(4)XH3	<ul style="list-style-type: none"> • Debit Card Accounting and New RADIUS Attributes for IP Telephony • H.323 Version 2 Support • Interactive Voice Response (IVR) • Open Settlements Protocol (OSP) for IP Telephony 	<ul style="list-style-type: none"> • Single Density Voice Support with DSPM-542 • High Density Voice Support with DSPM-549 	Now
Release 12.0 XJ	(4)XJ4	Cisco Store and Forward Fax	None	Now

System Requirements

This section describes the system requirements for Release 12.0(7)XR4:

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Memory Recommendations

Memory recommendations for the Cisco AS5300 are presented in Table 2.

Table 2 Memory Recommendations for the Cisco AS5300 Series

Feature Sets	Image Name	Software Image	Flash Memory Required	DRAM Memory Required	Runs from
IP Standard	IP Plus	c5300-is-mz	16 MB	64 MB	RAM
Enterprise Standard	Enterprise Plus	c5300-js-mz	16 MB	64 MB	RAM
	Enterprise Plus IPsec 56	c5300-js56i-mz	16 MB	64 MB	RAM

Hardware Supported

Cisco IOS Release 12.0(7)XR4 supports the Cisco AS5300 universal access servers.

For detailed descriptions of the new hardware features, see *New and Changed Information*, page 13.

Table 3 Supported Interfaces for the Cisco AS5300

Interface Cards	Modem Cards
Ethernet RJ-45 (included w/ unit)	MICA modems
Ethernet/Fast Ethernet (RJ-45) (included w/ unit)	Microcom 56K modems
ISDN PRI	
E1-G.703/G.704	
Channelized T1 (4 ports) without serial support	
Channelized T1 (4 ports) with 4 serial ports	
Channelized T1 (8 ports) with 4 serial ports	
Channelized E1 (4 ports) without serial support	
Channelized E1 (4 ports) with 4 serial ports	
Channelized E1 (8 ports) with 4 serial ports	
HMM/48 channel	MICA
HMM/60 channel	MICA
DMM/96 channel	MICA
DMM/120 channel	MICA
48 Channel, TI C549-based VoIP feature card (Uses High Density AS53-VOXD DSP modules)	
60 Channel, TI C549-based VoIP feature card (Uses High Density AS53-VOXD DSP modules)	
24 Channel, TI C542-based VoIP feature card (First generation, uses AS53-6VOX DSP modules)	
48 Channel, TI C542-based VoIP feature card (First generation, uses AS53-6VOX DSP modules)	

Determining the Software Version

To determine the version of Cisco IOS software running on your Cisco AS5300, log in to the Cisco AS5300 and enter the **show version EXEC** command:

```
router>show version
Cisco Internetwork Operating System Software
IOS (tm) AS5300 Software (c5300-is-mz), Version 12.0(7)XR4, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For information on upgrading to a new software release, see the product bulletin *Cisco IOS Software Release 12.0 T Upgrade Paths and Packaging Simplification (#819: 1/99)* located at:

<http://www.cisco.com/warp/public/cc/pd/iosw/iore/iomjre12/prodlit/index.shtml>

Note You must have a CCO account to access the above path.

If you do not have an account on CCO and want general information about upgrading to a new software release, see the product bulletin *Cisco IOS Upgrade Instructions* on CCO at:

Software Center: Cisco IOS Software: Product Bulletins: Software

VCWare Requirements

Use the Cisco AS5300 universal access servers in Cisco IOS Release 12.0 XR4 with VCWare Version 5.09. Previous versions will not work. Please refer to the *Release Notes for Cisco VCWare Version 5.xx for Cisco AS5300/Voice Gateway*.

Note VCWare/DSPWare is not imbedded in IOS. It is only stored in the Voice Feature Card (VFC) Flash.

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 12.0 XR4 supports the same feature sets as Release 12.0 T, but Release 12.0 XR4 can include new features supported by the Cisco AS5300 universal access servers.

Table 4 Feature Sets Supported by the Cisco AS5300 Series

Feature Sets	Image Names	Feature Set Matrix Term	Software Image
IP Standard	IP Plus	Plus ¹	c5300-is-mz,
Enterprise Standard	Enterprise Plus	Plus	c5300-js-mz, c5300-js56i-mz

¹ This feature set is offered in the Plus feature set.



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

Table 5 lists the features and feature sets supported by the Cisco AS5300 universal access servers in Cisco IOS Release 12.0(7)XR4 and uses the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In—The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, (7) means a feature was introduced in 12.0(7)T. If a cell in this column is empty, the feature was included in the initial base release.

Note This feature set table only contains a selected list of features. This table is not cumulative—nor does it list all the features in each image.

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
IBM Support				
APPN High-Performance Routing		No	No	No
APPN MIB Enhancements		No	No	No
APPN over Ethernet LAN Emulation		No	No	No
APPN Scalability Enhancements		No	No	No
Bisync Enhancements: — Bisync 3780 Support — BSC Extended Addressing — Block Serial Tunneling (BSTUN) over Frame Relay		Yes	Yes	Yes
Cisco MultiPath Channel (CMPC)		No	No	No

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
DLSw+ Enhancements:		Yes	Yes	Yes
— Backup Peer Extensions for Encapsulation Types				
— DLSw+ Border Peer Caching				
— DLSw+ MIB Enhancements				
— DLSw+ SNA Type of Service				
— LLC2-to-SDLC Conversion between PU4 Devices				
— NetBIOS Dial-on-Demand Routing				
— UDP Unicast Enhancement				
FRAS Enhancements:		Yes	Yes	Yes
— FRAS Boundary Network Node Enhancement				
— FRAS Dial Backup over DLSw+				
— FRAS DLCI Backup				
— FRAS Host				
— FRAS MIB				
— SRB over Frame Relay				
RIF Passthru in DLSw+		Yes	Yes	Yes
TN3270 LU Nailing		No	No	No
TN3270 Server Enhancements		No	No	No
Token Ring LANE		No	No	No
Tunneling of Asynchronous Security Protocols		Yes	Yes	Yes
Internet				
DRP Server Agent		Yes	Yes	Yes
DRP Server Agent Enhancements		Yes	Yes	Yes
Store and Forward Fax	(5)	Yes	Yes	Yes
IP Routing				
Easy IP (Phase 1)		Yes	Yes	Yes

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
Easy IP (Phase 2) DHCP Server	(1)	Yes	Yes	Yes
Hot Standby Router Protocol (HSRP) over ISL in Virtual LAN Configurations		No	Yes	Yes
IP Enhanced IGRP Route Authentication		Yes	Yes	Yes
PIM Version 2		Yes	Yes	Yes
TCP Enhancements: — TCP Selective Acknowledgment — TCP Timestamp		Yes	Yes	Yes
LAN Support				
AppleTalk Access List Enhancements		No	Yes	Yes
DECnet Accounting		No	Yes	Yes
IPX Named Access Lists		No	Yes	Yes
IPX SAP-after-RIP		No	Yes	Yes
NLSP Enhancements		No	Yes	Yes
NLSP Multicast Support		No	Yes	Yes
Subnetwork Bandwidth Manager	(5)	Yes	Yes	Yes
Management				
Cisco Call History MIB Command-Line Interface		Yes	Yes	Yes
Cisco IOS Internationalization		Yes	Yes	Yes
CNS Client for Cisco IOS Software	(4)	No	Yes	Yes
CNS client for IOS 12.05(t) (aka IPsec Policy Agent II)	(5)	No	Yes	Yes
Entity MIB, Phase 1		Yes	Yes	Yes
Process MIB	(3)	Yes	Yes	Yes
ISDN MIB RFC 2127	(1)	Yes	Yes	Yes
OS_IFSS Featurette	(1)	Yes	Yes	Yes
SNMPv2C		Yes	Yes	Yes
SNMPv3	(3)	Yes	Yes	Yes
SNMP Inform Requests		No	Yes	Yes
Time-Based Access Lists	(1)	Yes	Yes	Yes
Virtual Profiles		Yes	Yes	Yes

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
VPDN MIB		Yes	Yes	Yes
VPDN MIB and Syslog Facility		Yes	Yes	Yes
Multimedia				
IP Multicast Load Splitting across Equal-Cost Paths		Yes	Yes	Yes
IP Multicast over ATM Point-to-Multipoint Virtual Circuits		No	No	No
PIM Version 2		Yes	Yes	Yes
IP Multicast over Token Ring LANs		Yes	Yes	Yes
Stub IP Multicast Routing		Yes	Yes	Yes
Quality of Service				
CLI String Search	(1)	Yes	Yes	Yes
Multicast Routing Monitor	(5)	Yes	Yes	Yes
RTP Header Compression		Yes	Yes	Yes
BERT/TDM	(3)	Yes	Yes	Yes
TDM Hairpinning	(4)	Yes	Yes	Yes
Security				
Automated Double Authentication		Yes	Yes	Yes
Certificate Authority Interoperability		No	No	Yes
Double Authentication		Yes	Yes	Yes
Encrypted Kerberized Telnet		No	No	Yes
HTTP Security		Yes	Yes	Yes
Internet Key Exchange Security Protocol		No	No	Yes
IPSec Network Security		No	No	Yes
IPSec with Triple-DES	(2)	No	No	No
MS-CHAP Support		No	Yes	Yes
Named Method Lists for AAA Authentication and Accounting		Yes	Yes	Yes
Parse Bookmarks	(1)	Yes	Yes	Yes
Per-User Configuration		Yes	Yes	Yes
Reflexive Access Lists		Yes	Yes	Yes
TCP Intercept		No	Yes	Yes

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
Vendor-Proprietary RADIUS Attributes		Yes	Yes	Yes
Vendor-Proprietary RADIUS —Additional Attributes		Yes	Yes	Yes
Switching				
AppleTalk Routing over ISL and IEEE 802.10 in Virtual LANs		No	Yes	Yes
CLNS and DECnet Fast Switching over PPP		No	Yes	Yes
DECnet/VINES/XNS over ISL: <ul style="list-style-type: none"> — Banyan VINES Routing over ISL Virtual LANs — DECnet Routing over ISL Virtual LANs — XNS Routing over ISL Virtual LANs 		No	Yes	No
Fast-Switched Policy Routing		Yes	Yes	Yes
IPX Routing over ISL Virtual LANs		No	Yes	Yes
VIP Distributed Switching Support for IP Encapsulated in ISL		No	No	No
Terminal Services				
Telnet Extensions for Dialout		Yes	Yes	Yes
Virtual Templates for Protocol Translation		No	Yes	Yes
SS7/CCS7 Dial Access Solution (DAS)	(3)	Yes	Yes	Yes
Large Scale Dialout	(3)	Yes	Yes	Yes
Voice Technologies				
Voice over IP	(3)	Yes	Yes	Yes
High-Density Voice over IP for Cisco AS5300/Voice Gateway	(5)	Yes	Yes	Yes
WAN Optimization				
ATM MIB Enhancements		No	No	No
PAD Enhancements		No	Yes	Yes
PAD Subaddressing		Yes	Yes	Yes

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
WAN Services				
Always On/Dynamic ISDN (AO/DI)		No	Yes	Yes
Async over UDP	(5)	Yes	Yes	Yes
Bandwidth Allocation Control Protocol		Yes	Yes	Yes
Dialer Watch		Yes	Yes	Yes
E1 R2 Country Support ¹		Yes	Yes	Yes
E1 R1 Support for only Taiwan ²		Yes	Yes	Yes
Enhanced Local Management Interface (ELMI)		Yes	Yes	Yes
Frame Relay Enhancements		Yes	Yes	Yes
Frame Relay MIB Extensions		Yes	Yes	Yes
Frame Relay Router ForeSight		Yes	Yes	Yes
ISDN Advice of Charge		Yes	Yes	Yes
ISDN Caller ID Callback		Yes	Yes	Yes
ISDN NFAS		Yes	Yes	Yes
Layer 2 Forwarding—Fast Switching		Yes	Yes	Yes
L2TP Dial-Out	(5)	Yes	Yes	Yes
Leased-Line ISDN at 128 kbps		No	No	No
ISDN LAPB-TA	(4)	Yes	Yes	Yes
Microsoft Point-to-Point Compression (MPPC)		Yes	Yes	Yes
MS Callback		Yes	Yes	Yes
Modem Management Enhancements		Yes	Yes	Yes
Multiple ISDN Switch Types		Yes	Yes	Yes
National ISDN Switch Types for BRI and PRI Interfaces (NI2)		Yes	Yes	Yes
PPP over ATM		No	No	No
SS7	(4)	Yes	Yes	Yes
Stackable Home Gateway		Yes	Yes	Yes
Switched 56K Digital Connections		Yes	Yes	Yes

Table 5 Selected Features Supported by the Cisco AS5300 Feature Sets (continued)

Feature	Feature Set			
	In	IP Plus	Enterprise Plus	Enterprise Plus IPsec 56
Telnet Extensions for Dialout		Yes	Yes	Yes
X.25 Enhancements		Yes	Yes	Yes
X.25 on ISDN		Yes	Yes	Yes
X.25 Switching between PVCs and SVCs		Yes	Yes	Yes
X.28 Emulation		Yes	Yes	Yes
Miscellaneous				
H.323 Version 2 Support	(5)	Yes	Yes	Yes
Resource Pool Manager	(5)	Yes	Yes	Yes
Service Provider 1.0 Features	(3)	Yes	Yes	Yes
New 12.0(7)T Features				
Cisco H.323 Multizone Enhancements	(7)	Yes	Yes	Yes
Configuring RADIUS for Multiple User Datagram Protocol Ports	(7)	Yes	Yes	Yes
Debit Card Accounting and New RADIUS Attributes for IP Telephony	(7)	Yes	Yes	Yes
Dynamic Multiple Encaps for Dial-in over ISDN	(7)	Yes	Yes	Yes
Interactive Voice Response for Cisco Access	(7)	Yes	Yes	Yes
Open Settlements Protocol (OSP) for IP Telephony	(7)	No	No	Yes
Resource Pool Management Server	(7)	Yes	Yes	Yes
Resource Pool Management with Direct Remote Services	(7)	Yes	Yes	Yes
Selecting AAA Server Groups Based on DNIS	(7)	Yes	Yes	Yes
Voice over IP Q.SIG Network Transparency for Cisco AS5300	(7)	Yes	Yes	Yes
New 12.0(7)XR1 Features				
Cisco H.323 VoIP with SS7	(7)XR1	Yes	Yes	Yes
MGCP	(7)XR1	Yes	Yes	No

- 1 E1 R2 country support requires specific versions of Mica portware. For details, see the Mica portware release notes, which are available on CCO in the Software Center. Note that country support varies with the portware release level, and the release notes provide a list of countries.
- 2 E1 R1 signaling support for Taiwan requires MICA portware version 2.3.1.0.

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco AS5300 universal access servers for Release 12.0(7)XR4.

No New Hardware and Software Features in Release 12.0(7)XR4

There are no new hardware and software features supported by the Cisco AS5300 for Release 12.0(7)XR4.

No New Hardware and Software Features in Release 12.0(7)XR3

There are no new hardware and software features supported by the Cisco AS5300 for Release 12.0(7)XR3.

No New Hardware and Software Features in Release 12.0(7)XR2

There are no new hardware and software features supported by the Cisco AS5300 for Release 12.0(7)XR2.

No New Hardware Features in Release 12.0(7)XR1

There are no new hardware features supported by the Cisco AS5300 for Release 12.0(7)XR1.

New Software Features in Release 12.0(7)XR1

The following new software features are supported by the Cisco AS5300 for Release 12.0(7)XR1:

Cisco H.323 Voice over IP (VoIP) with SS7 for the Cisco AS5300 Access Gateway

The Cisco H.323 VoIP with SS7 feature provides SS7 connectivity for voice gateways by using the signaling controller as a protocol translator to control the gateway using the ISDN Q.931 protocol. This feature interacts over the IP network with other Cisco H.323 VoIP with SS7 solutions functioning as an end-to-end SS7 voice network. In addition, it can communicate with other H.323 endpoints, including gateways using non-SS7 signaling such as ISDN PRI and channelized T1.

The access gateway terminates the PSTN trunks, also referred to as bearer channels, that carry the call traffic. The PSTN trunks are T1 or E1 PRI interfaces. In addition, the access gateway performs call control (including originating and terminating call processing/signaling). The gateway referred to is the Cisco AS5300.

The following enhancements to dial peer configuration limit complexity of dial planning and reduces the amount of effort in creating dial peer entries:

- Additional Dial String Symbols

These new dial string symbols are added: period, brackets, percent, parenthesis, plus, and question mark.

Add table of dial string symbols

- Translation Rule Implementation

When configuring your dial peers, you are provided with an option called the translation rule. This rule applies a translation rule to a calling party number [Automatic Number Identification (ANI)] or a called party number [Dial Number Information Service (DNIS)] for both incoming and outgoing calls within Cisco H.323 voice-enabled gateways. Also, the rule allows translation of the *type of number*. Refer to the Q.931 ITU specification for details.

- Number Translation Command

To match on a number type for a dial peer call leg, the **numbering-type** command is used in **dial-peer** configuration mode.

- Number-Type Matching

Number-type matching is used in dial-peer configuration mode to match on a number type for a dial peer call leg.

- Digit Strip Option

When a called number is received and matched to a POTS dial peer, the matched digits are stripped and the remaining digits are forwarded to the voice interface. A new command called **digit strip** makes this default behavior an option.

Media Gateway Control Protocol for the Cisco AS5300 Voice/Gateway

The Media Gateway Control Protocol (MGCP) provides simple call control functionality in a Voice over IP (VoIP) environment. In this VoIP environment, distributed call agent applications manage calls on trunking gateways.

This feature enables inter-exchange carriers (IXCs) that do not have time division multiplexing (TDM) equipment to provide both long distance services to corporate customers and provide connectivity to local exchange carriers (LECs) and other IXCs that use TDM equipment. This feature also offers IXCs IP networks as an alternative to congested TDM networks.

This feature provides standard MGCP implementing. MGCP will support SNMP through the XGCP-MIB which provides network management for external media gateway control protocols.

This feature also supports TDM hairpinning. Hairpinning allows trunking gateways to route a call back to the public switched telephone network or private or PBX if the IP network is too busy to handle the call. Hairpinning also can be used to connect the public switched telephone network (PSTN) to the network access server (NAS).

Note MGCP supports PBXs using CCS but not channel associated signaling (CAS).

MIBs

Current MIBs

If you have an account with CCO, you can find the current list of MIBs supported by Cisco. To reach the Cisco Network Management Toolkit, **Login** to CCO and click **Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

Deprecated and Replacement MIBs

Old Cisco Management Information Bases (MIBs) will be replaced in a future release. Currently, OLD-CISCO-* MIBs are being converted into more scalable MIBs—without affecting existing Cisco IOS products or NMS applications. You can update from deprecated MIBs to the replacement MIBs as shown in Table 6:

Table 6 **Deprecated and Replacement MIBs**

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	In development
OLD-CISCO-DECNET-MIB	
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB CISCO-QUEUE-MIB
OLD-CISCO-IP-MIB	
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBs)
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB
OLD-CISCO-TS-MIB	
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	

Important Information

The following section contains important notes about Cisco IOS Release 12.0(7)XR4 that can apply to the Cisco AS5300.

Caveat CSCdr91706 and IOS HTTP Vulnerability

A defect in multiple releases of Cisco IOS software will cause a Cisco router or switch to halt and reload if the IOS HTTP service is enabled, browsing to `http://router-ip/anytext?/` is attempted, and the enable password is supplied when requested. This defect can be exploited to produce a denial of service (DoS) attack.

The vulnerability, identified as Cisco bug ID CSCdr91706, affects virtually all mainstream Cisco routers and switches running Cisco IOS software releases 12.0 through 12.1, inclusive. This is not the same defect as CSCdr36952.

The vulnerability has been corrected and Cisco is making fixed releases available for free to replace all affected IOS releases. Customers are urged to upgrade to releases that are not vulnerable to this defect as shown in detail below.

This vulnerability can only be exploited if the enable password is known or not set.

You are strongly encouraged to read the complete advisory, which is available at <http://www.cisco.com/warp/public/707/ioshttpserverquery-pub.shtml>.

Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious.

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

All caveats in Release 12.0 and Release 12.0 T are also in Release 12.0(7)XR4.

For information on caveats in Cisco IOS Release 12.0, see *Caveats for Cisco IOS Release 12.0*.

For information on caveats in Cisco IOS Release 12.0 T, see *Caveats for Cisco IOS Release 12.0 T*, which lists severity 1 and 2 caveats and is located on CCO and the Documentation CD-ROM.

Note If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: Cisco Bug Toolkit: Cisco Bugtool Navigator II**, or at <http://www.cisco.com/support/bugtools>.

Open Caveats—Cisco IOS Release 12.0(7) XR4

There are no open caveats specific to Cisco IOS Release 12.0(7) XR4 that require documentation in the release notes.

Resolved Caveats—Cisco IOS Release 12.0(7) XR4

All the caveats listed in this section are resolved in Cisco IOS Release 12.0(7) XR4. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdw65903

An error can occur with management protocol processing. Please use the following URL for further information:

<http://www.cisco.com/cgi-bin/bugtool/onebug.pl?bugid=CSCdw65903>

Resolved Caveats for Release 12.0(7) XR3

All the caveats listed in this section are resolved in Cisco IOS Release 12.0(7) XR3.

Basic System Services

- CSCdm11467

When utilizing Network Time Protocol (NTP) private mode and control type messages for remote query, a router might reload or you might see traceback messages. There is no workaround.

When utilizing NTP private mode and control type messages for remote query it is possible to see a router crash or traceback messages.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdm20829

If you enter the **show interface accounting** command on a Cisco router that is running Cisco IOS Release 12.0(3)T, the accounting records are updated only when the first system interface is sampled, and all interfaces share the accounting record of the first interface.

This is resolved in Cisco IOS Release 12.0(7) XR3.

Interfaces and Bridging

- CSCdm61866

A Cisco router that is running Cisco IOS Release 12.0(04a) might receive the following alignment error messages on dot1q over Internetwork Packet Exchange service access point (IPX SAP):

```
%ALIGN-3-CORRECT: Alignment correction made at 0x605B8E70 reading 0x63E5A6F1
%ALIGN-3-TRACE: -Traceback= 605B8E70 60095714 60095700 00000000 00000000
00000000 00000000 00000000
```

IPX SAP is affected only when dot1q encapsulation is involved (such as when IPX SAP is configured on a dot1q interface).

These alignment error messages do not affect connectivity or cause packet loss. There is no workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

IP Routing Protocols

- CSCdk37681

Same global inside address used for three different inside hosts - using dynamic address translation / 11.2.9 IOS.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdp05327

The following entries might be added to the running configuration of a Cisco router even though Network Address Translation (NAT) is not configured:

- **ip nat translation timeout never**
- **ip nat translation tcp-timeout never**

- **ip nat translation udp-timeout never**
- **ip nat translation finrst-timeout never**
- **ip nat translation syn-timeout never**
- **ip nat translation dns-timeout never**
- **ip nat translation icmp-timeout never**

There is no workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

Miscellaneous

- CSCdk41197

A Multiport Basic Rate Interface (MBRI) might pause indefinitely in "awaiting establishment" and "tei assigned" modes. Entering the **clear interface bri** *<interface number>* command establishes multiple frames on the port and allows another ISDN call to be made. There is no workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdk46853

For Cisco IOS Release 11.2 P or Cisco IOS Release 11.3, packets could be switched in the clear if Fast Ethernet subinterfaces are configured for encryption over encapsulation Inter-Switch Link (ISL), the crypto map is only applied to the main interface, and the IP address is configured in the subinterface. The packets might be dropped when using a Cisco IOS Release 12.0 image while enabling Cisco Express Forwarding (CEF). There is no workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdk55110

When tunneling IPX over an IP tunnel, and when using an extended inbound access list for IP on the tunnel interface, the IPX traffic gets blocked by the access list. As a workaround a **permit gre** statement could be added in the extended access-list.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdk66567

If Token Ring is the endpoint of an encrypted tunnel, extra packets are generated.

Symptoms are a high CPU load (mainly taken by the Crypto Engine) and bogus addresses when enabling the **debug tunnel** command.

The workaround is to use the interface command **tunnel sequence-datagrams** on both endpoints of the tunnel.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdm39077

When changing traffic shaping parameters in presence of traffic going through, NRP may have a software crash. There is already a fix, but not in 11.3(9)DB2. One may choose to shutdown the interface during configuration update as a workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdp19753

In Cisco IOS Release 12.0 T, Cisco Express Forwarding (CEF) will not work with bundle virtual circuits (VCs) if you use subinterfaces that are part of the same physical interface.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCdp58675

Received packets which had been padded by the previous hop so as to not be Ethernet runs are corrupted by the MPLS DCEF label imposition code and will result in IP checksum errors at their final destination, or at an intermediate hop, depending on the network configuration. A workaround is to disable DCEF globally or on a per-vip-interface basis.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCdp64926

A Cisco AS5300 was idle because the VSC was in a hung state and RLM along with NFAS was down on the gateway. The gateway flushed on bad ISDN frames and restarted.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCDp66855

When using RLM to connect a Cisco AS5300 access server to a SC2200 running Elan 7, you must configure NFAS on T1 controllers consecutively starting at T1 controller 0. If NFAS is configured on any other combination of T1 controllers, the SS7 CICs on the SC2200 may be blocked upon the restart of TransPath. This can be verified by issuing a **rtrv-tc:all** command at the mml prompt on the SC2200. All blocked CICs will be identified as BLK=LOCMAN. If you do not use the workaround described above, you must issue a **reset-cic** command from the mml prompt on the SC2200 for all blocked CICs.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCdm93488

An MGCP call agent can request the Cisco AS5300 to detect the new milli-watt (1004Hz) tone. This is done via the MGCP RQNT command with the requested event being "nm". The problem is that the detection of this milli-watt tone works most of the time, but not 100%.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCdp60087

The disconnect or release message cause value should pass end to end across different networks. If the cause value is equal to UUNSPECIFIED_CAUSE (0x1F), the value will be change to NORMAL_CLEARING (0x10) in the CSM module. To fix this bug, the disconnect cause value will pass end to end instead of change to a different value.

This is resolved in Cisco IOS Release 12.0(7) XR3.
- CSCdp24644

If devices that can share the same IP address at different times are connected behind an MPC, some Multiprotocol over ATM (MPOA) shortcuts might not be valid after they switch over the IP address. There is no workaround.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdp58566

When the destination pattern explicitly has N number of ".", we expect a match up to the last "." and only forward N digits. Currently, if the called number is longer than the destination pattern, then the whole number is sent. For example:

```
dial-peer voice 100 pots
destination-pattern 408.....
port 0:D
```

If a call comes in via an IP-call leg and the called number is "4085277878", it would match the above dial-peer. However, instead of forwarding 52778, which is what is configured, the entire called number sent is 527878.

Previous to the addition of the new wildcards (%,+,\$), this is the behavior and was accepted. However, with the new wildcards, we now have a way to configure for variable length numbers so the explicit matching should now be enforced.

Note Before this is implemented, customers who have the previous functionality must be made aware of this change or modified behavior. Also, the CLI interpreter may need to be modified so that it will recognize that the CLI is of a previous version and insert an "%".

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdp60101

The Kerberos Client functionality on Cisco products, when configured to provide access control, will fail in a "deny" state when the expiration of the credentials is in January or February of leap years, thus denying any Kerberos-authenticated access. A workaround for the problem is to choose an alternate form of authentication such as TACACS+ or RADIUS.

This is resolved in Cisco IOS Release 12.0(7) XR3.

Wide-Area Networking

- CSCdp18409

The problem seems to happen only when transferring large amounts of information (i.e., ftp).

During that time we see Badsync or Badversion.

This is resolved in Cisco IOS Release 12.0(7) XR3.

- CSCdp29684

If there are calls that are up, and the signalling controller (SC) does a switchover, some existing active calls are dropped on the network access server.

Workaround: Upgrade to Cisco IOS Release 12.0(6.5)T7 or higher.

This is resolved in Cisco IOS Release 12.0(7) XR3.

Related Documentation

The following sections describe the documentation available for the Cisco AS5300 universal access servers. 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 CCO and the Documentation CD-ROM.

Use these release notes with these documents:

- Release-Specific Documents, page 21
- Platform-Specific Documents, page 22
- Feature Modules, page 22
- Cisco IOS Software Documentation Set, page 22

Release-Specific Documents

The following documents are specific to Release 12.0 and are located on CCO and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.0*

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

- Product bulletins, field notices, and other release-specific documents on CCO at:

Technical Documents: Product Bulletins

- *Caveats for Cisco IOS Release 12.0(7)T*

As a supplement to the caveats listed in “Caveats” in these release notes, see *Caveats for Cisco IOS Release 12.0* and *Caveats for Cisco IOS Release 12.0 T*, which contains caveats applicable to all platforms for all maintenance releases of Release 12.0 XR4.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats

Note If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: Cisco Bug Toolkit: Cisco Bugtool Navigator II**, or at <http://www.cisco.com/support/bugtools>.

Platform-Specific Documents

These documents are available for the Cisco AS5300 universal access servers on CCO and the Documentation CD-ROM:

- *Cisco AS5300 Chassis Installation Guide*
- *Cisco AS5300 Module Installation Guide*
- *Cisco AS5300 Software Configuration Guide*
- *Cisco AS5300 Quick Start Guide (with Fast Step)*
Cisco AS5300 Universal Access Server Install and Configure
- *Configuring Cisco IOS Software Features*
- *Dial Case Study*
- Modem Information—Firmware/portware release notes, configuration notes, command references, FAQs (frequently asked questions)
- *Regulatory Compliance and Safety Information*
- Documentation for Spare Parts—Removal and replacement procedures for modem modules, feature cards, power supply

On CCO at:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Access Servers: Cisco AS5300

On the Documentation CD-ROM at:

Cisco Product Documentation: Access Servers and Access Routers: Access Servers: Cisco AS5300

Feature Modules

Feature modules describe new features supported by Release 12.0(7)XR4 and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation

Cisco IOS Software Documentation Set

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

Documentation Modules

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

On CCO and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Configuration Guides and Command References

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Configuration Guides and Command References

Release 12.0 Documentation Set

Table 7 describes the contents of the Cisco IOS Release 12.0 software documentation set, which is available in electronic form and in printed form upon request.

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

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0

Table 7 Cisco IOS Software Release 12.0 Documentation Set

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Configuration Fundamentals Configuration Guide</i> • <i>Configuration Fundamentals Command Reference</i> 	Configuration Fundamentals Overview Cisco IOS User Interfaces File Management System Management

Table 7 Cisco IOS Software Release 12.0 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Bridging and IBM Networking Configuration Guide</i> • <i>Bridging and IBM Networking Command Reference</i> 	Transparent Bridging Source-Route Bridging Token Ring Inter-Switch Link Remote Source-Route Bridging DLSw+ STUN and BSTUN LLC2 and SDLC IBM Network Media Translation DSPU and SNA Service Point SNA Frame Relay Access Support APPN Cisco Database Connection NCIA Client/Server Topologies Cisco Mainframe Channel Connection Airline Product Set
<ul style="list-style-type: none"> • <i>Dial Solutions Configuration Guide</i> • <i>Dial Solutions Command Reference</i> 	X.25 over ISDN Appletalk Remote Access Asynchronous Callback, DDR, PPP, SLIP Bandwidth Allocation Control Protocol ISDN Basic Rate Service ISDN Caller ID Callback PPP Callback for DDR Channelized E1 & T1 Dial Backup for Dialer Profiles Dial Backup Using Dialer Watch Dial Backup for Serial Lines Peer-to-Peer DDR with Dialer Profiles DialOut Dial-In Terminal Services Dial-on-Demand Routing (DDR) Dial Backup Dial-Out Modem Pooling Large-Scale Dial Solutions Cost-Control Solutions Virtual Private Dialup Networks Dial Business Solutions and Examples
<ul style="list-style-type: none"> • <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Reference</i> 	Interface Configuration Overview LAN Interfaces Logical Interfaces Serial Interfaces
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 1</i> • <i>Network Protocols Command Reference, Part 1</i> 	IP Overview IP Addressing and Services IP Routing Protocols
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 2</i> • <i>Network Protocols Command Reference, Part 2</i> 	AppleTalk Novell IPX
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 3</i> • <i>Network Protocols Command Reference, Part 3</i> 	Network Protocols Overview Apollo Domain Banyan VINES DECnet ISO CLNS XNS

Table 7 Cisco IOS Software Release 12.0 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Security Configuration Guide</i> • <i>Security Command Reference</i> 	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options
<ul style="list-style-type: none"> • <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i> 	Switching Services Switching Paths for IP Networks Virtual LAN (VLAN) Switching and Routing
<ul style="list-style-type: none"> • <i>Wide-Area Networking Configuration Guide</i> • <i>Wide-Area Networking Command Reference</i> 	Wide-Area Network Overview ATM Frame Relay SMDS X.25 and LAPB
<ul style="list-style-type: none"> • <i>Voice, Video, and Home Applications Configuration Guide</i> • <i>Voice, Video, and Home Applications Command Reference</i> 	Voice over IP Voice over Frame Relay Voice over ATM Voice over HDLC Frame Relay-ATM Internetworking Synchronized Clocks Video Support Universal Broadband Features
<ul style="list-style-type: none"> • <i>Quality of Service Solutions Configuration Guide</i> • <i>Quality of Service Solutions Command Reference</i> 	Policy-Based Routing QoS Policy Propagation via BGP Committed Access Rate Weighted Fair Queueing Custom Queueing Priority Queueing Weighted Random Early Detection Scheduling Signaling RSVP Packet Drop Frame Relay Traffic Shaping Link Fragmentation RTP Header Compression
<ul style="list-style-type: none"> • <i>Cisco IOS Software Command Summary</i> • <i>Dial Solutions Quick Configuration Guide</i> • <i>System Error Messages</i> • <i>Debug Command Reference</i> 	

Note *Cisco Management Information Base (MIB) User Quick Reference* is no longer published. For the latest list of MIBs supported by Cisco, see *Cisco Network Management Toolkit* on Cisco Connection Online. From CCO, click on the following path: **Service & Support: Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB.**

Service and Support

For service and support for a product purchased from a reseller, contact the reseller, who offers a wide variety of Cisco service and support programs described in “Service and Support” of *Cisco Information Packet* that shipped with your product.

Note If you purchased your product from a reseller, you can access CCO as a guest. CCO is Cisco Systems’ primary real-time support channel. Your reseller offers programs that include direct access to CCO services.

For service and support for a product purchased directly from Cisco, use CCO.

Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO login account, you can access the following URL, which contains links and tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/technotes/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO and click on this path: **Products & Technologies: Products: Technical Tips.**

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.
- Field Notices—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- Frequently Asked Questions—Describes the most frequently asked technical questions about Cisco hardware and software.
- Hardware—Provides technical tips related to specific hardware platforms.
- Hot Tips—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888-50-CISCO (888-502-4726). From other areas, call 650-596-4408.
- Internetworking Features—Lists tips on using Cisco IOS software features and services.
- Sample Configurations—Provides actual configuration examples that are complete with topology and annotations.
- Software Products—Contains Cisco IOS Software Bulletins, Cisco TCP/IP Suite 100, General Cisco IOS, Internet/Intranet Applications and Software, Network Management, Network Protection Software Tips, and WAN Switching Products and Software.
- Special Collections—Lists other helpful documents, including Case Studies, References & Request for Comments (RFCs), and Security Advisories.

Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can reach CCO in the following ways:

- WWW: <http://www.cisco.com>
- Telnet: [cco.cisco.com](telnet://cco.cisco.com)
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

Translated documentation can be accessed on the WWW at:

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

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which package that ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at <http://www.cisco.com>.

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

This document is to be used in conjunction with the documents listed in "Related Documentation" on page 21.

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