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Release Notes for Cisco 3600 Series for Cisco IOS Release 12.0(7)XK3

February 12, 2002

These release notes for Cisco 3600 series routers describe the enhancements provided in Cisco IOS Release 12.0(7)XK3, which is an early deployment release based on the Cisco IOS Release 12.0T. These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, microcode or modem code changes, and related documents.

For a list of the software caveats that apply to Cisco IOS Release 12.0(7)XK3, see the “Caveats” section on page 19.

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

Note Features in Cisco IOS Release 12.0(7)XK3 will not be available in Cisco IOS Release 12.1(1)T. Cisco IOS Release 12.0(7)XK3 features will be available in Cisco IOS Release 12.1(2)T.

Note Beginning with Cisco IOS Release 12.0(7)XK, Cisco changed the product numbers you use to order a specific Cisco IOS software image. In short, Cisco will remove the periods separating the release train, maintenance release, and build number. The following table provides some examples.

Old Product Number	New Product Number	Release	Image Description
S364AR1K2-12.0.7XK=	S364AR1K2-12007XK=	Cisco IOS Release 12.0(7)XK	Cisco 3640 Series IOS Enterprise/SNA SW PLUS IPSEC 3DES
S26CP-12.0.7XK=	S26CP-12007XK=	Cisco IOS Release 12.0(7)XK	Cisco 2600 Series IOS IP Plus

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Introduction

Cisco IOS Release 12.0(7)XK3 extends and updates voice capabilities on the Cisco 3600 platform. Features that have been added or updated are:

- The QSIG protocol provides signaling for Private Integrated services Network Exchange (PINX) devices and is based on the Q.931 standard.
- Voice over Frame Relay functionality has been updated in this release so that configuration on all supported platforms is nearly identical.
- New voice-port testing commands force voice ports into specific states for testing.
- The Cisco 2600, 3600, and MC3810 series routers and concentrators all support data, voice, and video transport to varying degrees. Numerous voice port commands and features that were previously limited to one or two of these platforms have been extended to additional platforms, and differences in configuration commands have been reduced or eliminated.

Cisco IOS Release 12.0(7)XK3 extends hardware support to include:

- All existing network modules on the Cisco 3660 including analog and digital modem, Channelized T1/E1/PRI, VIC-2BRI, and ATM-25 modules.
- Fast ethernet mixed-media network modules for the Cisco 2600 and 3600 series.
- WIC-2T and WIC2-A/S interface cards for the Cisco 3600 series.

System Requirements

This section describes the system requirements for Cisco IOS Release 12.0(7)XK3:

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Memory Recommendations

Table 1 Memory Recommendations for the Cisco 3600 Series

Feature Set by Platform	Image Name	Required Flash Memory	Required DRAM Memory	Runs From
IP	c3620-i-mz	8 MB	32 MB	RAM
IP/FW/IDS Plus IPSec 3DES	c3620-ik2o3s-mz	16 MB	64 MB	RAM
IP Plus IPSec 3DES	c3620-ik2s-mz	16 MB	48 MB	RAM
IP/FW/IDS	c3620-io3-mz	8 MB	32 MB	RAM
IP/FW/IDS Plus IPSec 56	c3620-io3s56i-mz	16 MB	64 MB	RAM
IP Plus	c3620-is-mz	16 MB	48 MB	RAM
IP Plus IPsec 56	c3620-is56i-mz	16 MB	48 MB	RAM
IP/H323	c3620-ix-mz	8 MB	48 MB	RAM
IP/IPX/AT/DEC	c3620-d-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC Plus	c3620-ds-mz	16 MB	48 MB	RAM
IP/IPX/AT/DEC/FW/IDS Plus	c3620-do3s-mz	16 MB	64 MB	RAM
Enterprise Plus	c3620-js-mz	16 MB	64 MB	RAM
Enterprise Plus IPSec 3DES	c3620-jk2s-mz	16 MB	64 MB	RAM
Enterprise/FW/IDS Plus IPSec 3DES	c3620-jk2o3s-mz	16 MB	64 MB	RAM
Enterprise/FW/IDS Plus IPSec 56	c3620-jo3s56i-mz	16 MB	64 MB	RAM
Enterprise Plus IPSec 56	c3620-js56i-mz	16 MB	64 MB	RAM
Enterprise/SNASW Plus IPSec 3DES	c3620-a3jk2s-mz	16 MB	64 MB	RAM
Enterprise/SNASW Plus	c3620-a3js-mz	16 Mb	64 Mb	RAM
Enterprise/SNASW Plus IPSec 56	c3620-a3js56i-mz	16 MB	64 MB	RAM
IP	c3640-i-mz	8 MB	32 MB	RAM
IP/FW/IDS Plus IPSec 3DES	c3640-ik2o3s-mz	16 MB	64 MB	RAM
IP Plus IPSec 3DES	c3640-ik2s-mz	16 MB	48 MB	RAM
IP/FW/IDS	c3640-io3-mz	8 MB	32 MB	RAM
IP/FW/IDS Plus IPSec 56	c3640-io3s56i-mz	16 MB	64 MB	RAM
IP Plus	c3640-is-mz	16 MB	48 MB	RAM
IP Plus IPSec 56	c3640-is56i-mz	16 MB	48 MB	RAM
IP/H323	c3640-ix-mz	8 MB	48 MB	RAM
IP/IPX/AT/DEC	c3640-d-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC Plus	c3640-ds-mz	16 MB	48 MB	RAM
IP/IPX/AT/DEC/FW/IDS Plus	c3640-do3s-mz	16 MB	64 MB	RAM
Enterprise Plus	c3640-js-mz	16 MB	64 MB	RAM
Enterprise Plus IPSec 3DES	c3640-jk2s-mz	16 MB	64 MB	RAM
Enterprise/FW/IDS Plus IPSec 3DES	c3640-jk2o3s-mz	16 MB	64 MB	RAM
Enterprise/FW/IDS Plus IPSec 56	c3640-jo3s56i-mz	16 MB	64 MB	RAM
Enterprise Plus IPSec 56	c3640-js56i-mz	16 MB	64 MB	RAM

Table 1 Memory Recommendations for the Cisco 3600 Series (continued)

Feature Set by Platform	Image Name	Required Flash Memory	Required DRAM Memory	Runs From
Enterprise/SNASW Plus IPSec 3DES	c3640-a3jk2s-mz	16 MB	64 MB	RAM
Enterprise/SNASW Plus	c3640-a3js-mz	16 Mb	64 Mb	RAM
Enterprise/SNASW Plus IPSec 56	c3640-a3js56i-mz	16 MB	64 MB	RAM
IP	c3660-i-mz	8 MB	32 MB ¹	RAM
IP/FW/IDS Plus IPSec 3DES	c3660-ik2o3s-mz	16 MB	64 MB ¹	RAM
IP Plus IPSec 3DES	c3660-ik2s-mz	16 MB	64 MB ¹	RAM
IP/FW/IDS	c3660-io3-mz	8 MB	64 MB ¹	RAM
IP/FW/IDS IPSec 56	c3660-io3s56i-mz	16 MB	64 MB ¹	RAM
IP Plus	c3660-is-mz	16 MB	64 MB ¹	RAM
IP Plus IPSec 56	c3660-is56i-mz	16 MB	64 MB ¹	RAM
IP/H323	c3660-ix-mz	8 MB	64 MB ¹	RAM
IP/IPX/AT/DEC	c3660-d-mz	8 MB	64 MB ¹	RAM
IP/IPX/AT/DEC Plus	c3660-ds-mz	16 MB	64 MB ¹	RAM
IP/IPX/AT/DEC/FW/IDS Plus	c3660-do3s-mz	16 MB	64 MB ¹	RAM
Enterprise Plus	c3660-js-mz	16 MB	64 MB ¹	RAM
Enterprise Plus IPSec 3DES	c3660-jk2s-mz	16 MB	64 MB ¹	RAM
Enterprise/FW/IDS Plus IPSec 3DES	c3660-jk2o3s-mz	16 MB	64 MB ¹	RAM
Enterprise/FW/IDS Plus IPSec 56	c3660-jo3s56i-mz	16 MB	64 MB ¹	RAM
Enterprise Telco ²	c3660-telco-mz	16 MB	64 MB ¹	RAM
Enterprise Telco Plus ²	c3660-telcoent-mz	16 MB	64 MB ¹	RAM
Enterprise Plus IPSec 56	c3660-js56i-mz	16 MB	64 MB ¹	RAM
Enterprise/SNASW Plus IPSec 3DES	c3660-a3jk2s-mz	16 MB	64 MB ¹	RAM
Enterprise/SNASW Plus	c3660-a3js-mz	16 Mb	64 Mb ¹	RAM
Enterprise/SNASW Plus IPSec 56	c3660-a3js56i-mz	16 MB	64 MB ¹	RAM

¹ The 3660 uses SDRAM.

² The Telco images only run on the 3662-AC-CO and 3662-DC-CO.

Hardware Supported

Cisco IOS Release 12.0(7)XK3 supports the Cisco 3600 series routers:

- Cisco 3620
- Cisco 3640
- Cisco 3660

Table 2 Supported Interfaces on the Cisco 3600 Series

Interface, Network Module, or Data Rate	Platforms Supported	
Dial Access Network Modules	16- and 32-port asynchronous network module	All Cisco 3600 series platforms
	6- to 30-port integrated digital modem network module	All Cisco 3600 series platforms
	8- or 16-port integrated analog network module	All Cisco 3600 series platforms
LAN Interfaces	1- and 4-port Ethernet (AUI and 10BaseT)	All Cisco 3600 series platforms
	1-port Fast Ethernet (100BaseTX and 100BaseFX)	All Cisco 3600 series platforms
Mixed Media Network Modules	1-port 10/100BaseTX with 1-port channelized/PRI E1 balanced mode	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 1-port channelized/PRI E1 unbalanced mode	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 1-port channelized/PRI T1	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 1-port channelized/PRI T1 with CSU	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 2-port channelized/PRI E1 balanced mode	All Cisco 3600 series platforms
Mixed Media Network Modules (continued)	1-port 10/100BaseTX with 2-port channelized/PRI E1 unbalanced mode	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 2-port channelized/PRI T1	All Cisco 3600 series platforms
	1-port 10/100BaseTX with 2-port channelized/PRI T1 with CSU	All Cisco 3600 series platforms
	1 Ethernet and 2 WAN card slots	All Cisco 3600 series platforms
	1 Ethernet, 1 Token Ring, and 2 WAN card slots	All Cisco 3600 series platforms
	2 Ethernet and 2 WAN card slots	All Cisco 3600 series platforms
	1-port fast Ethernet, 1-port Token Ring with 2 WAN card slots (NM-1FE1R2W[=])	All Cisco 3600 series platforms
	1-port fast Ethernet with 2 WAN card slots (NM-1FE2W[=])	All Cisco 3600 series platforms
	2-port fast Ethernet with 2 WAN card slots (NM-2FE2W[=])	All Cisco 3600 series platforms
	2 WAN card slots (NM-2W[=])	All Cisco 3600 series platforms
Multipoint T1/E1 ATM Network Modules with Inverse Multiplexing over ATM (IMA)¹	4-port T1 ATM network module with IMA (NM-4T1-IMA [=])	All Cisco 3600 series platforms
	4-port E1 ATM network module with IMA (NM-4E1-IMA [=])	All Cisco 3600 series platforms
	8-port T1 ATM network module with IMA (NM-8T1-IMA [=])	All Cisco 3600 series platforms
	8-port E1 ATM network module with IMA (NM-8E1-IMA [=])	All Cisco 3600 series platforms

Table 2 Supported Interfaces on the Cisco 3600 Series (continued)

Interface, Network Module, or Data Rate	Platforms Supported
Digital T1/E1 Packet Voice Trunk Network Modules and Spare Components 1-port, 30-channel E1 voice/fax module, supports 30 channels of G.729a/b, G.726, G.711 and fax or 18 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, three PVDM-12s, and one VWIC-1MFT-E1 ² . Part number: NM-HDV-1E1-30(=)	All Cisco 3600 series platforms
1-port, enhanced 30-channel E1 voice/fax module, supports 30 channels of G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of one NM-HDV, five PVDM-12s, and one VWIC-1MFT-E1 ² . Part number: NM-HDV-1E1-30E(=)	All Cisco 3600 series platforms
2-port, 60-channel E1 voice/fax module, supports add/drop multiplexing (drop and insert); 60 channels of G.729a/b, G.726, G.711, and fax; or 30 channels of G726, G729, G723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, five PVDM-12, and one VWIC-2MFT-E1-DI ² . Part number: NM-HDV-2E1-60(=)	All Cisco 3600 series platforms
1-port, 24-channel T1 voice/fax module, supports 24 channels of medium-complexity codecs: G.729a/b, G.726, G.711 and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, two PVDM-12s, and one VWIC-1MFT-T1 ² . Part number: NM-HDV-1T1-24(=)	All Cisco 3600 series platforms
1-port, enhanced 24-channel T1 voice/fax module, supports 24 channels of high- and medium-complexity codecs: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-1MFT-T1 ² . Part number: NM-HDV-1T1-24E(=)	All Cisco 3600 series platforms
2-port, 48-channel T1 voice/fax module, supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs: G.729a/b, G.726, G.711, and fax; or 24 channels of G726, G729, G723.1, G.728, G729a/b, G711, and fax. Consists of one NM-HDV, four PVDM-12, and one VWIC-2MFT-T1-DI ² . Part number: NM-HDV-2T1-48(=)	All Cisco 3600 series platforms
High-density voice/fax network module spare (NM-HDV=)	Digital T1/E1 packet voice trunk network modules spare component
12-channel packet voice DSP module upgrade spare (PVDM-12=)	Digital T1/E1 packet voice trunk network modules spare component
1-port RJ-48 multiFlex trunk - T1 (VWIC-1MFT-T1=) ²	Digital T1/E1 packet voice trunk network modules spare component
2-port RJ-48 multiFlex trunk - T1 (VWIC-2MFT-T1=) ²	Digital T1/E1 packet voice trunk network modules spare component
2-port RJ-48 multiFlex trunk with drop and insert - T1 (VWIC-2MFT-T1-DI=) ²	Digital T1/E1 packet voice trunk network modules spare component
1-port RJ-48 multiFlex trunk - E1 (VWIC-1MFT-E1=) ²	Digital T1/E1 packet voice trunk network modules spare component
2-port RJ-48 multiFlex trunk - E1 (VWIC-2MFT-E1=) ²	Digital T1/E1 packet voice trunk network modules spare component
2-port RJ-48 multiFlex trunk with drop and insert - E1 (VWIC-2MFT-E1-DI=) ²	Digital T1/E1 packet voice trunk network modules spare component

Table 2 Supported Interfaces on the Cisco 3600 Series (continued)

Interface, Network Module, or Data Rate	Platforms Supported	
T1/E1 Multiflex Voice/WAN Interface Cards¹	1-Port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 3600 series platforms
	1-Port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 3600 series platforms
	2-Port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 3600 series platforms
	2-Port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI) ³	All Cisco 3600 series platforms
	2-Port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	All Cisco 3600 series platforms
Voice/Fax Interfaces and Network Modules¹	1- and 2-port voice/fax network module	All Cisco 3600 series platforms with voice/fax network module
	2-port E&M voice interface card	All Cisco 3600 series platforms
	2-port FXO voice interface card	All Cisco 3600 series platforms with voice/fax network module
	2-port FXS voice interface card	All Cisco 3600 series platforms with voice/fax network module
	2-port BRI voice interface card	All Cisco 3600 series platforms with voice/fax network module
WAN Data Rates	48/56/64 kbps	All Cisco 3600 series platforms
	1.544/2.048 Mbps	All Cisco 3600 series platforms
	Up to 8 Mbps on 4-port serial network module	All Cisco 3600 series platforms
	52 Mbps max using High-Speed serial Interface (HSSI) network module	All Cisco 3600 series platforms
	Up to 100 Mbps on ATM OC-3 network modules	All Cisco 3600 series platforms
WAN Interfaces and Network Modules	1- and 2-port channelized T1 and E1 network module	All Cisco 3600 series platforms
	1-port ATM-25 network modules	All Cisco 3600 series platforms
	1-port BRI with NT or S/T WAN interface card	All Cisco 3600 series platforms
	1-port high speed serial interface (HSSI) network module	All Cisco 3600 series platforms
	4- and 8-port BRI network module with NT1	All Cisco 3600 series platforms
	4- and 8-port BRI network module with S/T interface	All Cisco 3600 series platforms
	4- and 8-port synchronous/asynchronous	All Cisco 3600 series platforms
	4-port serial	All Cisco 3600 series platforms
	2-port serial (WIC-2T[=]) ⁴	All Cisco 3600 series platforms
	2-port asynchronous/synchronous (WIC-2A/S[=]) ⁴	All Cisco 3600 series platforms
	56/64 kbps DSU/CSU	All Cisco 3600 series platforms
	T1 WAN interface card	All Cisco 3600 series platforms
	T1 with integrated DSU/CSU	All Cisco 3600 series platforms
	ATM OC-3 network module with multimode fiber and OC-3 uplink port	All Cisco 3600 series platforms
	ATM OC-3 network module with single-mode intermediate reach fiber and OC-3 uplink port (VPD)	All Cisco 3600 series platforms
ATM OC-3 network module with single-mode long reach fiber and OC-3 uplink port	All Cisco 3600 series platforms	

Table 2 Supported Interfaces on the Cisco 3600 Series (continued)

Interface, Network Module, or Data Rate		Platforms Supported
Other Network Modules	Compression network module	Cisco 3620 and 3640 platforms
	4 E1 data compression AIM	Cisco 3660 series platforms

- 1 Requires the Cisco IOS Plus feature sets.
- 2 See T1/E1 multiflex voice/WAN interface cards in this table.
- 3 For Cisco 3660 series, only supported in T1/E1 digital packet voice trunk network modules and new fast Ethernet mixed media network modules: NM-1FE2W, NM-2FE2W, NM-1FE1R2W and NM-2W. For Cisco 3620 and 3640 series, supported in T1 digital packet voice trunk network modules or in 1- or 2-port Ethernet and fast Ethernet network module: NM-1E2W, NM-2E2W, NM-1E1R2W, NM-1FE2W, NM-2FE2W, NM-1FE1R2W and NM-2W.
- 4 Supported in fast Ethernet mixed media network modules: NM-1FE2W, NM-2FE2W, NM-1FE1R2W, NM-2W.

Determining the Software Version

To determine the version of Cisco IOS software running on a Cisco 3600 series router, log in to the router and enter the **show version EXEC** command:

```
router>show version
Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (c3600-i-mz), Version 12.0(7)XK3, RELEASE SOFTWARE
```

Feature Set Tables

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.



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, the purchaser or user must obtain local import and use authorizations for all encryption strengths. Contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Table 3 and Table 4 list the features and feature sets supported by the Cisco IOS Release 12.0(7)XK3 for the Cisco 3600 series.

- Table 3—IP and IP/IPX/AppleTalk/DEC feature sets and Features for the Cisco 3600 Series
- Table 4—Enterprise and Enterprise Plus feature sets and features for the Cisco 3600 Series
- Table 5—Telco and Telco Plus feature sets and features for the Cisco 3600 Series

The following tables use the following conventions to identify features:

- Yes—The feature is supported in the feature set.
- No—The feature is not supported in the feature set.
- In—The Cisco IOS release that first introduces a feature. For example, (1) means a feature is introduced in 12.0(1)T. If a cell is empty in this column, the feature was included in the initial base release.

Note These feature set tables contain only selected lists of features. These tables are not cumulative or complete lists of all the features in each image.

Table 3 Feature Lists by Feature Sets for the Cisco 3600 Series, Part 1 of 3

Features	In	Feature Sets									
		IP	IP Plus	IP Plus IPsec 3DES	IP Plus IPsec 56	IP FW IDS	IP FW IDS Plus IPsec 3DES	IP FW IDS Plus IPsec 56	IP IPX AT DEC	IP IPX AT DEC Plus	IP IPX AT DEC FW Plus
New Features in 12.0(7)XK											
Voice over ATM	(7)XK	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Voice over Frame Relay Enhancements	(7)XK	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Voice Port Testing	(7)XK	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Q.SIG	(7)XK	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Connectivity											
Layer 2 Tunnel Protocol (L2TP)	(1)	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
RIP Enhancements	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMP version 3	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IBM Support											
DLSw+ RSVP	(3)	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
DLSw+ Enhanced Load Balancing	(3)	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
DLSw+ Peer Clusters	(3)	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Token Ring Interswitch Link	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Routing											
Easy IP Phase 2- DHCP Server	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flow Random Early Detection	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSPF Packet Pacing	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS_IFSS	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Response Time Reporter Enhancements	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Service Provider 1	(3)	No	No	No	No	No	No	No	No	No	No
NetFlow Policy Infrastructure	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Web Cache Communications Protocol V2 (WCCPv2)	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Management											
IFE2P Network Module	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN MIB RFC 2127	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quality of Service											
CLI String Search	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

System Requirements

Table 3 Feature Lists by Feature Sets for the Cisco 3600 Series, Part 1 of 3 (continued)

Features	In	Feature Sets									
		IP	IP Plus	IP Plus IPsec 3DES	IP Plus IPsec 56	IP FW IDS	IP FW IDS Plus IPsec 3DES	IP FW IDS Plus IPsec 56	IP IPX AT DEC	IP IPX AT DEC Plus	IP IPX AT DEC FW Plus
Security											
Cisco IOS Firewall Feature Set	(1)	No	No	No	No	Yes	Yes	Yes	No	No	Yes
IPsec Triple DES	(2)	No	No	Yes	No	No	Yes	No	No	No	No
Switching											
Cisco IOS STP Enhancements	(1)	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Voice											
BRI Voice over IP: VIC-2BRI-S/T-TE ¹	(3)	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Voice over Frame Relay, FRF.11 and FRF.12	(4)	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
WAN Services											
Digital T1/E1 Packet Voice Trunk network Modules	(5)XK	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Multipoint T1/E1 ATM Network Modules with Inverse Multiplexing over ATM	(5)XK	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex-G (X.25 over Frame Relay)	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ATM OC-3 NM	(3)	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
IOS IEEE 802.1Q Support	(1)	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
ISDN Dynamic Multiple Encaps for Dial-in	(4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN LAPB-TA	(4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile IP	(1)	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Modem over ISDN BRI ¹	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PPP over Frame Relay	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2 Signaling	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-Based Access Lists	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 over ISDN D Channel	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Load Balancing	(3)	No	No	No	No	No	No	No	No	No	No

¹ Cisco 3640 and 3660 routers only

Table 4 Feature Lists by Feature Sets for the Cisco 3600 Series, Part 2 of 3

Features	In	Software Images by Feature Sets							
		Enter- prise Plus	Enter- prise Plus IPSec 56	Enter- prise FW IDS Plus IPSec 56	Enter- prise Plus IPSec 3DES ¹	Enter- prise FW IDS Plus IPSec 3DES ²	Enter- prise SNASW Plus	Enter- prise SNASW Plus IPSec 56	Enter- prise SNASW Plus IPSec 3DES ²
New Features in 12.0(7)XK									
Voice over ATM	(7)XK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice over Frame Relay Enhancements	(7)XK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice Port Testing	(7)XK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q.SIG	(7)XK	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
IBM Support									
DLSw+ RSVP	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DLSw+ Enhanced Load Balancing	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DLSw+ Peer Clusters	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Token Ring Interswitch Link	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Routing									
Easy IP Phase 2-DHCP Server	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flow Random Early Detection	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NetFlow Policy Infrastructure	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSPF Packet Pacing	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS_IFSS	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Response Time Reporter Enhancements	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Service Provider 1	(3)	No	No	No	No	No	No	No	No
Web Cache Communications Protocol V2 (WCCPv2)	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Management									
ISDN MIB RFC 2127	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IFE2P Network Module	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quality of Service									
CLI String Search	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security									
Cisco IOS Firewall Feature Set Platform Support	(1)	No	No	Yes	No	Yes	No	No	No
IPSec Triple DES	(2)	No	No	No	Yes	Yes	No	No	Yes

Table 4 Feature Lists by Feature Sets for the Cisco 3600 Series, Part 2 of 3 (continued)

Features	In	Software Images by Feature Sets							
		Enterprise Plus	Enterprise Plus IPsec 56	Enterprise Plus FW IDS Plus IPsec 56	Enterprise Plus IPsec 3DES ¹	Enterprise Plus FW IDS Plus IPsec 3DES ²	Enterprise Plus SNASW Plus	Enterprise Plus SNASW Plus IPsec 56	Enterprise Plus SNASW Plus IPsec 3DES ²
Switching									
Cisco IOS STP Enhancements	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice									
BRI Voice over IP: VIC-2BRI-S/T-TE ²	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice over Frame Relay, FRF.11 and FRF.12	(4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WAN Services									
Multipoint T1/E1 ATM Network Modules with Inverse Multiplexing over ATM	(5)XK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital T1 Packet Voice Trunk network modules	(5)XK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annex-G (X.25 over Frame Relay)	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ATM OC-3 NM	(3)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Cisco IOS IEEE 802.1Q Support	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Dynamic Multiple Encaps for Dial-in	(4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN LAPB-TA	(4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile IP	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Modem over ISDN BRI ²	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PPP over Frame Relay	(1)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
R2 Signaling	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-Based Access Lists	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Load Balancing	(3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 over ISDN D Channel	(1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1 This image was introduced in Cisco IOS Release 12.0(2)T.

2 Cisco 3640 and 3660 routers only.

Table 5 Feature Lists by Feature Sets for the Cisco 3600 Series, Part 3 of 3

Features	In	Software Images by Feature Sets	
		Telco	Telcoent
New Features in 12.0(7)XK			
Voice over ATM	(7)XK	Yes	Yes
Voice over Frame Relay Enhancements	(7)XK	Yes	Yes
Voice Port Testing	(7)XK	Yes	Yes
Q.SIG	(7)XK	Yes	Yes

New and Changed Information

The following sections list the new features supported by the Cisco 3600 series for Cisco IOS Release 12.0(7)XK3.

New Features in Cisco IOS Release 12.0(7)XK3

No new features are supported for the Cisco 3600 series in Cisco IOS Release 12.0(7)XK3.

New Features in Cisco IOS Release 12.0(7)XK2

No new features are supported for the Cisco 3600 series in Cisco IOS Release 12.0(7)XK2.

New Features in Cisco IOS Release 12.0(7)XK1

No new features are supported for the Cisco 3600 series in Cisco IOS Release 12.0(7)XK1.

New Hardware Features in Release 12.0(7)XK

Note Added support for all existing 2600/3600 series network modules on the 3660 with the exception of the NM-COMPR. (Use AIM-COMPR4 instead)

High-Density Voice Network Module

- Supports one or two T1 or E1 interfaces
- Uses VWICs to supply physical interface:
 - VWIC-1MFT-E1
 - VWIC-2MFT-E1-D1
- T1 CAS signaling only
- E1 ISDN PRI Q.SIG signaling only (requires Cisco IOS Release 12.0(7)XK)

- Each PVDM-12 contains three TI 549 DSPs
 - Runs up to 12 voice calls using a low complexity codec (G.711, G.729a/b, G.726, fax)
 - Runs up to 6 voice calls using a high complexity codec (G.729, G.728, G.723.1)
 - PVDM-12 fits into SIMM sockets on the NM-1HDV network module
 - Five PVDM SIMM sockets on the NM-1HDV network module
- New product numbers:
 - NM-HDV-1E1-30
 - NM-HDV-1E1-30E
 - NM-HDV-1E1-60

Cisco 2600 and 3600 Series 10/100 Ethernet/Token Ring Mixed Media Network Modules

- High-performance WIC slots (up to 8 Mbps throughput)
- 10 Mbps or 100 Mbps (autosensing) Ethernet connections at full/half duplex
- Full support for the WIC-2T, WIC-2A/S, and VWIC (single and dual port) Wan Interface Cards in all Cisco 2600 and 3600 platforms
- Support for up to four WICs on a Cisco 2600 using the 2W NM
- Full or half duplex, 4/16 Mbps Token Ring
- New Product Numbers:
 - NM-2W (Cisco 2600 and 3600 series)
 - NM-1FE2W (Cisco 3600 series only; not supported on the Cisco 2600 series)
 - NM-2FE2W (Cisco 3600 series only; not supported on the Cisco 2600 series)
 - NM-1FE1R2W (Cisco 3600 series only; not supported on the Cisco 2600 series)

New Software Features in Release 12.0(7)XK

The following software features are available for the Cisco 3600 series in Cisco IOS Release 12.0(7)XK.

Voice over ATM on Cisco 3600 Routers

Voice over ATM on Cisco 3600 Series routers extends support for Voice over ATM, previously available only on the Cisco MC3810, to the Cisco 3600 Series routers. Voice over ATM enables a Cisco 3600 Series router to carry voice traffic (for example, telephone calls and faxes) over an ATM network.

Voice over Frame Relay Using FRF.11 and FRF.12

Voice over Frame Relay functionality has been updated in this release so that configuration on all supported platforms is nearly identical. In Cisco IOS Release 12.0(4)T, when support for Voice over Frame Relay using FRF.11 and FRF.12 was introduced, configuration procedures differed depending on the router platform used.

In addition, this release provides support for digital voice calls for Voice over Frame Relay on the Cisco 2600 and 3600 series routers. In previous releases, the Cisco 2600 and 3600 series only supported analog voice calls for Voice over Frame Relay.

Note In Cisco IOS releases prior to Release 12.0(5)XE, the Cisco 7200 series could only act as a tandem router in Voice over Frame Relay topologies, and could not terminate VoFR calls. Beginning in Cisco IOS Release 12.0(5)XE and 12.1(1)T, the Cisco 7200 series can terminate VoFR calls.

Voice-Port Testing Enhancements

New voice-port testing commands force voice ports into specific states for testing:

- Testing Detector-Related Functions
- Loopback Tests
- Tone Injection Tests
- Testing Relay-Related Functions
- Fax/Voice Mode Tests

Voice-Port Enhancements

The Cisco 2600, 3600, and MC3810 series routers and concentrators all support data, voice, and video transport to varying degrees. Numerous voice-port commands and features that were previously limited to one or two of these platforms have been extended to additional platforms, and differences in configuration commands have been reduced or eliminated.

- **Configuring Permanent Connection Options**—Configure a voice-port connection mode and destination telephone number for permanent connections. This feature was unified across the Cisco MC3810, 2600, and 3600 platforms in Cisco IOS Release 12.0(7)XK.
- **Configuring Ring Cadence**—Specify on and off times for ringing pulses on an FXS voice port. The ability to specify ring cadence is a new feature on the Cisco 2600 and 3600 platforms, and the syntax for configuring the ring cadence is new in Cisco IOS Release 12.0(7)XK.
- **Configuring Auto-Cut-Through Options**—Disable or enable the auto-cut-through feature on E&M voice ports. When enabled, this feature makes call completion possible when a PBX does not provide an M-lead response. This feature is enabled by default on E&M voice ports. This is a new feature on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.
- **Configuring E&M Signaling Bit Functioning**—Modify the functioning of transmit and receive signaling bits for E&M and E&M MELCAS voice signaling. These are new features on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.
- **Manipulating Signaling Bits**—Force individual transmit and receive signaling bit states on any voice port type. This is a new feature on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.
- **Configuring Disconnect Acknowledgement**—Configuring an FXS or FXS MELCAS voice port to return an acknowledgment upon receipt of a disconnect signal. This is a new feature on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.
- **Configuring Playout Delay**—Enables the tuning of the playout buffer to accommodate packet jitter caused by switches in the WAN. This is a new feature on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.

- **Configuring Voice-Port Timing Characteristics**—Change various timing characteristics on voice ports, including:
 - Configuring Guard-Out Time on FXO Voice Ports
 - Changing the Timing Percent Break of Dialing Pulses
 - Changing the Ringing Timeout on a Voice Port
 - Changing the Wait Release Delay on a Voice Port
 - Configuring the VAD Silence Detection Time

These are new features on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK.

- **Using Voice-Related Show Commands**—These commands have enhanced functionality on the Cisco 2600 and 3600 platforms in Cisco IOS Release 12.0(7)XK:
 - Displaying Voice Port Information
 - Displaying Voice Call Information
 - Displaying Voice Channel DSP Information
 - Displaying the Active Voice Call Table
 - Displaying the Voice Call History Table

QSIG Protocol Support on Cisco MC3810, 7200, 2600, and 3600 Series Routers

QSIG protocol support allows Cisco voice switching services to connect private branch exchanges (PBXs), key systems (KTs), and central office switches (COs) that communicate by using the QSIG protocol, which is becoming the standard for PBX interoperability in Europe and North America. QSIG is a variant of ISDN D-channel signaling. With QSIG, Cisco networks emulate the functionality of the public-switched telephone network (PSTN), and QSIG signaling messages allow the dynamic establishment of voice connections across a Cisco wide-area network (WAN) to a peer router, which can then transport the signaling and voice packets to a second private integrated services network exchange (PINX).

The Cisco voice packet network appears to the traditional QSIG PBXs as a distributed transit PBX that can establish calls to any PBX, non-QSIG PBX, or other telephony endpoint served by a Cisco gateway, including non-QSIG endpoints. When originating and terminating on QSIG endpoints, the QSIG messages are passed transparently across the network; the PBXs are responsible for processing and provisioning the supplementary services. When linking QSIG and non-QSIG endpoints served by a Cisco packet voice gateway, only basic calls are supported. In addition, all switched voice connections must be established and torn down in response to QSIG control messages.

QSIG support includes the following capabilities:

- Enables digit forwarding on POTS dial peers.
- On Cisco 3600 series routers, enables QSIG-switched calls over Voice over Frame Relay (VoFR), Voice over IP (VoIP), and Voice over ATM (VoATM) for T1/E1 and BRI voice interface cards.
- On Cisco 2600 series routers, enables QSIG-switched calls over Voice over Frame Relay (VoFR) and Voice over IP (VoIP) for T1/E1 and BRI voice interface cards.
- On Cisco 3600 series routers, enables T1 or E1 PRI and Basic Rate Interface (BRI) QSIG-switched calls over VoFR, VoATM, and VoIP for Cisco 2600 and 3600 digital packet voice trunk network modules.

- On Cisco 2600 series routers, enables T1 or E1 PRI and Basic Rate Interface (BRI) QSIG-switched calls over VoFR and VoIP for digital packet voice trunk network modules.
- On Cisco 7200 series routers, enables QSIG-switched calls over Voice over Frame Relay (VoFR) and Voice over IP (VoIP) on T1/E1 voice interface cards.
- On Cisco MC 3810, enables T1 or E1 PRI and Basic Rate Interface (BRI) QSIG-switched calls over VoFR, VoIP, and VoATM for Cisco MC3810 digital voice modules (DVMs) and BRI voice module (BVM). QSIG support on the Cisco MC3810 was introduced in Cisco IOS Release 12.0(2)T.

Limitations and Restrictions

Cisco IOS Release 12.0(7)XK3 contains the following limitations and restrictions. Unless otherwise indicated, these limitations and restrictions apply to all previous software releases as well.

Voice over ATM on Cisco 3600 Routers

- Voice over ATM on the Cisco 3600 series requires one of the following modules to be installed:
 - Multiprot T1/E1 ATM network module with IMA
The Multiprot T1/E1 ATM network module with IMA supports up to 8 T1/E1 lines. For more information, see the Cisco IOS Release 12(05)T online document *Configuring Multiprot T1/E1 ATM Network Modules with Inverse Multiplexing over ATM on Cisco 2600 and 3600 series routers*.
 - OC-3 ATM Network Module:
The OC-3 ATM network module supports one OC-3 line. For more information about the digital T1/E1 packet voice trunk network modules, see the Cisco IOS Release 12.0(3)T online document *ATM OC-3 Network Module for the Cisco 3600 Series Routers*.
- Voice over ATM on the Cisco 3600 series supports ATM encapsulation AAL5 only. AAL2 is not supported.
- Voice over ATM Switched Virtual Circuits (SVCs) are not supported in this release.

Voice over Frame Relay

- The Cisco 2600 series and 3600 series routers cannot terminate calls initiated by a Cisco MC3810 using VoFR implementations prior to Cisco IOS Release 12.0(3)XG or 12.0(4)T.
- Cisco MC3810 concentrators running Cisco IOS releases prior to 12.0(3)XG or 12.0(4)T cannot tandem VoFR calls from Cisco 2600 series, 3600 series, and 7200 series routers.
- It is currently not possible to translate from the VoIP transport protocol to other protocols such as VoFR. As a result, a call coming in on a VoIP connection might not be (tandem) switched to a VoFR connection.
- Hookflash for dial tone recall from the router is not supported. However, the router can pass-through hookflash on FXO-FXS permanent connections using the connection trunk voice-port configuration command.



Caution Voice over ATM SVCs were first supported on the Cisco MC3810 in Cisco IOS Release 12.0(5)XK and 12.0(7)T. If upgrading a Cisco MC3810 from IOS release 12.0(5)XK or 12.0(7)T to this release to obtain Voice over Frame Relay improvements, you will lose support for your Voice over ATM SVCs.

Important Notes

Beginning with Cisco IOS Release 12.0(7)XK, Cisco changed the product numbers you use to order a specific Cisco IOS software image. In short, Cisco will remove the periods separating the release train, maintenance release, and build number. The following table provides some examples.

Old Product Number	New Product Number	Release	Image Description
S364AR1K2-12.0.7XK=	S364AR1K2-12007XK=	Cisco IOS Release 12.0(7)XK	Cisco 3640 Series IOS Enterprise/SNA SW PLUS IPSEC 3DES
S26CP-12.0.7XK=	S26CP-12007XK=	Cisco IOS Release 12.0(7)XK	Cisco 2600 Series IOS IP Plus

Caveat CSCdr91706 and Cisco 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 Cisco 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 Cisco 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>.

Deprecated MIBs

Older Cisco Management Information Bases (MIBs) will be replaced in a future release. OLD-CISCO-* MIBs are currently migrated into more scalable MIBs, without affecting existing Cisco IOS products or NMS applications. Application developers should update from deprecated MIBs to the replacement MIBs as shown in the following table.

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	In Development

Deprecated MIB	Replacement
OLD-CISCO-DECNET-MIB	In Development
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	In Development
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	In Development
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	In Development

Caveats

Caveats describe unexpected behavior or defects in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 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)XK3.

For information on caveats in Cisco IOS Release 12.0, see *Caveats for Cisco IOS Release 12.0* that describes caveats affecting all maintenance releases.

For information on other caveats that also apply to this release, 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 Bug Navigator II** or at <http://www.cisco.com/support/bugtools>.

Open for Caveats for Release 12.0(7)XK3

There are no open caveats specific to Cisco IOS Release 12.0(7) XK3 that require documentation in the release notes.

Resolved Caveats for Release 12.0(7)XK3

All the caveats listed in this section are resolved in Cisco IOS Release 12.0(7) XK3. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

SNMP

- CSCdw65903
An error can occur with management protocol processing. Please use the following URL for further information:
<http://www.cisco.com/cgi-bin/bugtool/onebug.pl?bugid=CSCdw65903>

Open Caveats for Release 12.0(7)XK2

This section describes possibly unexpected behavior by Release 12.0(7)XK2. Unless otherwise noted, these caveats apply to all 12.0 releases up to and including 12.0(7)XK2.

- 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.
- CSCdp18787
A Cisco router that has tag switching enabled and is running Cisco IOS Release 12.0(5)T might reload if a tag advertisement appears in a certain time window when a related routing update takes place. An ATM interface transition might cause this condition. There is no workaround.
- CSCdp34055
A router may crash after entering the clear ip bgp * command on a peer PE router when running 12.0(5)T onwards, 12.1 and 12.0ST. The crash occurs with the following stack trace:

```
bgp_fwdbentry_info bgp_v4class_update_fwdbtable_walker rn_walktree_version
bgp_update_fwdbtable bgp_router
```

The crash occurs on the local PE when a PE iBGP session is cleared on the remote box.

Resolved Caveats for Release 12.0(7)XK2

This section describes behavior that is now corrected in Cisco IOS Release 12.0(7)XK2.

- CSCdp77631
Voice call attempted to some voice ports fail due to DSP channel nailup problem. This problem is related to incomplete cleanup at the end of voice call. So the next call to the same port fails due to a hanging call.

- CSCdp77635
Busyout monitor may remain configured on a voice port after being de-configured through the CLI.
- CSCdp77616
During boot, when bulk voice calls are attempted some voice ports get stuck in S_WAIT_HOST_DISC state. Before a setup request is sent to session app, if a disconnect is requested, the voice port gets locked in this state.
- CSCdp76631
The router reports "VOICE ERROR 0x3A" when placing a outbound ISDN call. Incoming calls from the same router work fine.
- CSCdp93594
Outgoing BRI data calls fail because they are incorrectly tagged as voice calls.
- CSCdp33945
VOIP performance is seriously affected after changing codec complexity from high to medium unless the router is powered off and on.
- CSCdm78894
Online insertion or removal of a fast Ethernet , mixed-media network module in a 3660 may cause the router to crash.

Open Caveats for Release 12.0(7)XK1

This section describes possibly unexpected behavior by Release 12.0(7)XK1. Unless otherwise noted, these caveats apply to all 12.0 releases up to and including 12.0(7)XK1.

- 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.
- CSCdp18787
A Cisco router that has tag switching enabled and is running Cisco IOS Release 12.0(5)T might reload if a tag advertisement appears in a certain time window when a related routing update takes place. An ATM interface transition might cause this condition. There is no workaround.
- CSCdp34055

A router may crash after entering the `clear ip bgp *` command on a peer PE router when running 12.0(5)T onwards, 12.1 and 12.0ST. The crash occurs with the following stack trace:

```
bgp_fwdbentry_info bgp_v4class_update_fwdbtable_walker rn_walktree_version  
bgp_update_fwdbtable bgp_router
```

The crash occurs on the local PE when a PE iBGP session is cleared on the remote box.

Resolved Caveats for Release 12.0(7)XK1

This section describes behavior that is now corrected in Cisco IOS Release 12.0(7)XK1.

- **CSCdp77631**
Voice call attempted to some voice ports fail due to DSP channel nailup problem. This problem is related to incomplete cleanup at the end of voice call. So the next call to the same port fails due to a hanging call.
- **CSCdp77635**
Busyout monitor may remain configured on a voice port after being de-configured through the CLI.
- **CSCdp77616**
During boot, when bulk voice calls are attempted some voice ports get stuck in S_WAIT_HOST_DISC state. Before a setup request is sent to session app, if a disconnect is requested, the voice port gets locked in this state.
- **CSCdp76631**
The router reports "VOICE ERROR 0x3A" when placing a outbound ISDN call. Incoming calls from the same router work fine.
- **CSCdp93594**
Outgoing BRI data calls fail because they are incorrectly tagged as voice calls.
- **CSCdp33945**
VOIP performance is seriously affected after changing codec complexity from high to medium unless the router is powered off and on.
- **CSCdm78894**
Online insertion or removal of a fast Ethernet , mixed-media network module in a 3660 may cause the router to crash.

Caveats for Release 12.0(7)XK

This section describes possibly unexpected behavior by Release 12.0(7)XK. Unless otherwise noted, these caveats apply to all 12.0 releases up to and including 12.0(7)XK.

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.

IP Routing Protocols

- CSCdp18787

A Cisco router that has tag switching enabled and is running Cisco IOS Release 12.0(5)T might reload if a tag advertisement appears in a certain time window when a related routing update takes place. An ATM interface transition might cause this condition. There is no workaround.

Miscellaneous

- 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.

- CSCdm39077

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

- 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. There is no workaround.

Wide-Area Networking

- CSCdp29684

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

The workaround is to upgrade to Cisco IOS Release 12.0(6.5)T7 or higher.

Related Documentation

The following sections describe the documentation available for the Cisco 3600 series. 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 24
- Platform-Specific Documents, page 25
- Feature Modules, page 25
- Cisco IOS Software Documentation Set, page 26

Release-Specific Documents

The following documents are specific to Cisco IOS Releases 12.0 T and 12.0, on which Release 12.0(7)XK2 is based and 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:
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:
Technical Documents
- Caveat documents

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

 - On CCO:
Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats: Caveats for Cisco IOS Release 12.0 T
 - On the Documentation CD-ROM:
Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS 12.0: Caveats: Caveats for Cisco IOS Release 12.0 T

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 Bug Navigator II** or at <http://www.cisco.com/support/bugtools>.

Platform-Specific Documents

These documents are available for the Cisco 3600 series on CCO and on the Documentation CD-ROM:

- *Quick Start Guide Cisco 3600 Series Cabling and Setup*
- *Cisco 3600 Series Hardware Installation Guide*
- *Network Modules Hardware Installation Guide*
- *Update to Network Module Hardware and Software Guides*
- *Cisco WAN Interface Cards Hardware Installation Guide*
- *Update to WAN Interface Cards Hardware Installation Guide*
- *Software Configuration Guide For Cisco 3600 and Cisco 2600 Series Routers*
- New and Changed Show Commands for the Cisco 3600 Series Routers
- Cisco 3600 Series Configuration Notes
- Analog Modem Firmware
- Analog modem firmware release notes and AT command set
- Cisco 3600 Series Cabling Specifications
- Cisco Modular Access Router Cable Specifications

On CCO:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Modular Access Routers: Cisco 3600 Series Routers

On the Documentation CD-ROM:

Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 3600 Series Routers

Feature Modules

Feature modules describe new features supported by Cisco IOS Release 12.0 T and 12.0(7)XK2, and 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:

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

On the Documentation CD-ROM:

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 which 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 comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Each configuration guide can be used in conjunction with its corresponding command reference.

On CCO:

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

On the Documentation CD-ROM:

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

Cisco IOS Release 12.0 Documentation Set

Table 6 describes the contents of the Cisco IOS Release 12.0 software documentation set. The document set is available in electronic form and also 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 paper documents were printed.

On CCO:

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

On the Documentation CD-ROM:

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

Table 6 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 6 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 6 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> 	

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 TAC 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:

- Configuration Cookbooks—Cisco's Configuration Cookbooks contain common configuration examples that demonstrate how to configure various internetworking technologies on Cisco devices.
- 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 access CCO in the following ways:

- WWW: <http://www.cisco.com>
- WWW: <http://www-europe.cisco.com>
- WWW: <http://www-china.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.

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 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>, <http://www-china.cisco.com>, or <http://www-europe.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 the “Related Documentation” section on page 24.

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