



# Release Notes for Cisco IOS Release 11.3(3)T Software Feature Packs for Cisco 2500 Series Routers

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**June 8, 1998**

These release notes describe the Cisco IOS Release 11.3(3)T feature packs for Cisco 2500 series routers. Table 1 lists the Cisco product numbers for the supported feature packs.

**Table 1 Feature Pack Product Numbers**

CD25-C-11.3=	Cisco 2500 IP Feature Pack Release 11.3(3)T
CD25-CH-11.3=	Cisco 2500 IP/Firewall Feature Pack Release 11.3(3)T
CD25-CP-11.3=	Cisco 2500 IP Plus Feature Pack Release 11.3(3)T
CD25-CW-11.3=	Cisco 2500 IP Plus 40 Feature Pack Release 11.3(3)T
CD25-CY-11.3=	Cisco 200 IP Plus 56 Feature Pack Release 11.3(3)T
CD25-CL-11.3=	Cisco 2500 IP Plus IPSEC 56 Feature Pack Release 11.3(3)T
CD25-B-11.3=	Cisco 2500 IP/IPX/AT/DEC Feature Pack release 11.3(3)T
CD25-BP-11.3=	Cisco 2500 IP/IPX/AT/DEC Plus Feature Pack Release 11.3(3)T
CD25-BHP-11.3	Cisco 2500 IP/IPX/AT/DEC/Firewall Plus Feature Pack Release 11.3(3)T
CD25-AP-11.3=	Cisco 2500 Enterprise Plus Feature Pack Release 11.3(3)T
CD25-AW-11.3=	Cisco 2500 Enterprise Plus 40 Feature Pack Release 11.3(3)T
CD25-AY-11.3=	Cisco 2500 Enterprise Plus 56 Feature Pack Release 11.3(3)T
CD25-AL-11.3=	Cisco 2500 Enterprise Plus IPSEC 56 Feature Pack Release 11.3(3)T
CD25-AHY-11.3=	Cisco 2500 Enterprise/ Firewall Plus 56 Feature Pack Release 11.3(3)T
CD25-AHL-11.3=	Cisco 2500 Enterprise/ Firewall Plus IPSEC 56 Feature Pack Release 11.3(3)T
CD25-E-11.3=	Cisco 2500 Remote Access Server Feature Pack Release 11.3(3)T

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**Note** The feature packs listed here contain Cisco IOS Release 11.3(3)T software images, a selection of earlier images, and Router Software Loader (RSL) Version 7.0.

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**Note** Before running RSL, read the “Installing Software Images Using RSL” section on page 19.

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## Platforms Supported

The RSL supports the following Cisco 2500 series routers:

- CiscoPro CPA2501, CPA2502, CPA2503, CPA2504, CPA2505, CPA2507, CPA2509, CPA2511, CPA2513, CPA2514, CPA2516, CPA2520, CPA2521, CPA2522, CPA2523, and CPA2524
- Cisco 2501, 2502, 2503, 2504, 2505, 2507, 2509, AS2509-RJ, 2510, 2511, AS2511-RJ, 2512, 2513, 2514, 2515, 2516, 2520, 2521, 2522, 2523, 2524, and 2525

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**Note** The Cisco AS2509-RJ and AS2511-RJ only support software images for Cisco IOS Release 11.2(5)P or later.

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## What Is a Feature Pack?

The heart of a Cisco IOS software feature pack is a CD-ROM that contains a software image and the Router Software Loader (RSL), a Windows 95 application that loads the image onto the access router or server. Each Cisco IOS Release 11.2 feature pack CD contains one feature set. The CD booklet, *Getting Started with the Router Software Loader*, explains how to use the RSL to install the router software. Users who cannot use the RSL can load images by following the instructions in the “Installing the Router Software Using a TFTP Server Application” section of this document.

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**Note** The RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software from the CD-ROM to the router.

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Each Cisco IOS Release 11.2 software feature pack box contains the following:

- CD-ROM with the following software:
  - Feature set software image that includes bundled modem firmware
  - The RSL program (a Windows 95 application)
  - A Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only)
- Instruction booklet for using the RSL
- Release notes (this document), which includes alternatives to using the RSL for loading software images onto a router
- Software license for using Cisco software in-object code form on a single access server or router
- Cisco Documentation CD-ROM, which contains all Cisco IOS software documentation

Before running the RSL, read the section, “Installing Software Images Using RSL” on page 19 . If you are loading software on a preconfigured router, you should save the router configuration file on your PC before beginning the download process, as described in the CD booklet *Getting Started with the Router Software Loader*.

## Using Cisco Feature Packs

The tables in this release note describe the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

- 1 Use Table 1 on page 1 to identify your software image.
- 2 Use Table 2 in the section “Cisco Feature Pack and Memory Descriptions” to identify your feature pack and the memory required for your feature set, based on the image you run.
- 3 Check the memory required for your feature set against Table 3 in the section “Upgrading Cisco 2500 Memory” to determine the factory-default memory on the router and the available memory upgrades.
- 4 Use Table 4 and Table 5 in the section “Cisco IOS Release 11.3(3)T Feature Sets” to identify which features are supported in a feature set image on a specific platform.

## Cisco Feature Pack and Memory Descriptions

Table 2 identifies each feature pack as specified on the router software CD-ROM label, describes the feature sets in each feature pack, and lists the following: UNIX and DOS filenames of the images, router platform on which each feature set runs, and memory requirements for each feature set.

**Table 2 Cisco 2500 Series Feature Pack Image Filenames and Memory Requirements**

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD25-C-11.3=	Cisco 2500 IP Feature Pack Release 11.3(3)T	igs-i-l.110-18	80031618	8 MB	4 MB	Cisco 2500 IOS IP Feature Set 11.0(18)
		c2500-i-l.112-9	80135409	8 MB	4 MB	Cisco 2500 IOS IP Feature Set 11.2(9)
		c2500-i-l.112-11.P	80135411	8 MB	4 MB	Cisco 2500 IOS IP Feature Set 11.2(11)P

## Cisco Feature Pack and Memory Descriptions

**Table 2 Cisco 2500 Series Feature Pack Image Filenames and Memory Requirements (Continued)**

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c2500-i-1.113-3	80240503	8 MB	4 MB	Cisco 2500 IOS IP Feature Set 11.3(3)
		c2500-i-1.113-3.T	80271801	8 MB	4 MB	Cisco 2500 IOS IP Feature Set 11.3(3)T
CD25-CH-11.3=	Cisco 2500 IP/Firewall Feature Pack Release 11.3(3)T	c2500-io-1.112-11.P	80246301	8 MB	4 MB	Cisco 2500 IOS IP/Firewall Feature Set 11.2(11)P
		c2500-io-1.113-3.T	80271701	8 MB	6 MB	Cisco 2500 IOS IP/Firewall Feature Set 11.3(3)T
CD25-CP-11.3=	Cisco 2500 IP Plus Feature Pack Release 11.3(3)T	c2500-is-1.112-9	80135509	8 MB	4 MB	Cisco 2500 IOS IP Plus Feature Set 11.2(9)
		c2500-is-1.112-11.P	80135511	8 MB	4 MB	Cisco 2500 IOS IP Plus Feature Set 11.2(11)P
		c2500-is-1.113-3	80240403	8 MB	4 MB	Cisco 2500 IOS IP Plus Feature Set 11.3(3)
		c2500-is-1.113-3.T	80271601	8 MB	4 MB	Cisco 2500 IOS IP Plus Feature Set 11.3(3)T
		igs-ir-1.110-18	80031718	8 MB	4 MB	Cisco 2500 IOS IP/IBM Feature Set 11.0(18)
CD25-CW-11.3=	Cisco 2500 IP Plus 40 Feature Pack Release 11.3(3)T	c2500-is40-1.112-7a	80115007	8 MB	4 MB	Cisco 2500 IOS IP Plus 40 Feature Set 11.2(7a)
		c2500-is40-1.112-9	80115009	8 MB	4 MB	Cisco 2500 IOS IP Plus 40 Feature Set 11.2(9)
		c2500-is40-1.112-11.P	80135611	8 MB	4 MB	Cisco 2500 IOS IP Plus 40 Feature Set 11.2(11)P
		c2500-is40-1.113-3	80240303	8 MB	4 MB	Cisco 2500 IOS IP Plus 40 Feature Set 11.3(3)
		c2500-is40-1.113-3.T	80271501	8 MB	4 MB	Cisco 2500 IOS IP Plus 40 Feature Set 11.3(3)T
CD25-CY-11.3=	Cisco 2500 IP Plus 56 Feature Pack Release 11.3(3)T	c2500-is56-1.112-7a	80115107	8 MB	4 MB	Cisco 2500 IOS IP Plus 56 Feature Set 11.2(7a)
		c2500-is56-1.112-9	80115109	8 MB	4 MB	Cisco 2500 IOS IP Plus 56 Feature Set 11.2(9)
		c2500-is56-1.112-11.P	80135711	8 MB	4 MB	Cisco 2500 IOS IP Plus 56 Feature Set 11.2(11)P
		c2500-is56-1.113-3	80240203	8 MB	4 MB	Cisco 2500 IOS IP Plus 56 Feature Set 11.3(3)
		c2500-is56-1.113-3.T	80271401	8 MB	4 MB	Cisco 2500 IOS IP Plus 56 Feature Set 11.3(3)T
CD25-CL-11.3=	Cisco 2500 IP Plus IPSEC 56 Feature Pack Release 11.3(3)T	c2500-is56i-1.113-3.T	80272901	8 MB	4 MB	Cisco 2500 IOS IP Plus IPSEC 56 Feature Set 11.3(3)T

Table 2 Cisco 2500 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD25-B-11.3=	Cisco 2500 IP/IPX/AT/DEC Feature Pack Release 11.3(3)T	igs-d-l.110-18	80031118	8 MB	4 MB	Cisco 2500 IOS IP/IPX/AppleTalk Feature Set 11.0(18)
		c2500-d-l.112-9	80114109	8 MB	4 MB	Cisco 2500 IOS IP/IPX/AppleTalk/DEC Feature Set 11.2(9)
		c2500-d-l.112-11.P	80135011	8 MB	4 MB	Cisco 2500 IOS IP/IPX/AppleTalk/DEC Feature Set 11.2(11)P
		c2500-d-l.113-3	80241103	8 MB	4 MB	Cisco 2500 IOS IP/IPX/AppleTalk/DEC Feature Set 11.3(3)
		c2500-d-l.113-3.T	80272801	8 MB	4 MB	Cisco 2500 IOS IP/IPX/AppleTalk/DEC Feature Set 11.3(3)T
CD25-BP-11.3=	Cisco 2500 IP/IPX/AT/DEC Plus Feature Pack Release 11.3(3)T	igs-dr-l.110-18	80031218	8 MB	4 MB	Cisco 2500 IOS IP/IPX/Apple Talk/IBM Feature Set 11.0(18)
		c2500-ds-l.112-9	80114209	8 MB	4 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC Plus Feature Set 11.2(9)
		c2500-ds-l.112-11.P	80135111	8 MB	4 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC Plus Feature Set 11.2(11)P
		c2500-ds-l.113-3	80241003	8 MB	6 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC Plus Feature Set 11.3(3)
		c2500-ds-l.113-3.T	80272701	8 MB	6 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC Plus Feature Set 11.3(3)T
CD25-BHP-11.3=	Cisco 2500 IP/IPX/AT/DEC/Firewall Plus Feature Pack Release 11.3(3)T	c2500-dos-l. 112-11.P	80246201	16 MB	4 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC/Firewall Plus Feature Set 11.2(11)P
		c2500-dos-l. 113-3.T	80272601	16 MB	6 MB	Cisco 2500 IOS IP/IPX/Apple Talk/DEC/Firewall Plus Feature Set 11.3(3)T
CD25-AP-11.3=	Cisco 2500 Enterprise Plus Feature Pack Release 11.3(3)T	igs-j-l.110-18	80030918	8 MB	6 MB	Cisco 2500 IOS Enterprise Feature Set 11.0(18)
		c2500-js-l.112-9	80115209	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus Feature Set 11.2(9)
		c2500-js-l.112-11.P	80135911	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus Feature Set 11.2(11)P

## Cisco Feature Pack and Memory Descriptions

**Table 2 Cisco 2500 Series Feature Pack Image Filenames and Memory Requirements (Continued)**

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c2500-js-1.113-3	80240003	16 MB	6 MB	Cisco 2500 IOS Enterprise Plus Feature Set 11.3(3)
		c2500-js-1.113-3.T	80272501	16 MB	6 MB	Cisco 2500 IOS Enterprise Plus Feature Set 11.3(3)T
CD25-AW-11.3=	Cisco 2500 Enterprise Plus 40 Feature Pack Release 11.3(3)T	c2500-js40-1.112-7a	80115507	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 40 Feature Set 11.2(7a)
		c2500-js40-1.112-9	80115509	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 40 Feature Set 11.2(9)
		c2500-js40-1.112-11.P	80136011	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 40 Feature Set 11.2(11)P
		c2500-js40-1.113-3	80239903	16 MB	8 MB	Cisco 2500 IOS Enterprise Plus 40 Feature Set 11.3(3)
		c2500-js40-1.113-3.T	80272401	16 MB	8 MB	Cisco 2500 IOS Enterprise Plus 40 Feature Set 11.3(3)T
CD25-AY-11.3=	Cisco 2500 Enterprise Plus 56 Feature Pack Release 11.3(3)T	c2500-js56-1.112-7a	80115607	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 56 Feature Set 11.2(7a)
		c2500-js56-1.112-9	80115609	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 56 Feature Set 11.2(9)
		c2500-js56-1.112-11.P	80136111	8 MB	6 MB	Cisco 2500 IOS Enterprise Plus 56 Feature Set 11.2(11)P
		c2500-js56-1.113-3	80239803	16 MB	8 MB	Cisco 2500 IOS Enterprise Plus 56 Feature Set 11.3(3)
		c2500-js56-1.113-3.T	80272301	16 MB	8 MB	Cisco 2500 IOS Enterprise Plus 56 Feature Set 11.3(3)T
CD25-AL-11.3=	Cisco 2500 Enterprise Plus IPSEC 56 Feature Pack Release 11.3(3)T	c2500-js56i-1.113-3.T	80272201	16 MB	8 MB	Cisco 2500 IOS Enterprise Plus IPSEC 56 Feature Set 11.3(3)T
CD25-AHY-11.3=	Cisco 2500 Enterprise/Firewall Plus 56 Feature Pack Release 11.3(3)T	c2500-jos56-I. 112-11.P	80246101	16 MB	6 MB	Cisco 2500 IOS Enterprise/Firewall Plus 56 Feature Set 11.2(11)P
		c2500-jos56-I. 113-3.T	80272101	16 MB	8 MB	Cisco 2500 IOS Enterprise/Firewall Plus 56 Feature Set 11.3(3)T
CD25-AHL-11.3=	Cisco 2500 Enterprise/Firewall Plus IPSEC 56 Feature Pack Release 11.3(3)T	c2500-jos56i-I. 113-3.T	80272001	16 MB	8 MB	Cisco 2500 IOS Enterprise/Firewall Plus IPSEC 56 Feature Set 11.3(3)T

**Table 2 Cisco 2500 Series Feature Pack Image Filenames and Memory Requirements (Continued)**

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD25-E-11.3=	Cisco 2500 Remote Access Server Feature Pack Release 11.3(3)T	igs-c-l.110-18	80032018	8 MB	4 MB	Cisco 2500 Remote Access Server Feature Set 11.0(18)
		c2500-c-l.112-9	80146009	8 MB	4 MB	Cisco 2500 Remote Access Server Feature Set 11.2(9)
		c2500-c-l.112-11.P	80146011	8 MB	4 MB	Cisco 2500 Remote Access Server Feature Set 11.2(11)P
		c2500-c-l.113-3.T	80271901	8 MB	6 MB	Cisco 2500 Remote Access Server Feature Set 11.3(3)T

## Upgrading Cisco 2500 Memory

Table 3 describes the memory delivered by default and the available memory upgrades.

**Table 3 Cisco 2500 Series Default Memory and Upgrade Options**

Memory Type	Default	Upgrade Options
Flash	8 MB	4-MB upgrade: MEM4F= 8-MB upgrade: MEM8F=
Main	4 MB	8-MB upgrade: MEM8D= 16-MB upgrade: MEM16D=

**Note** The actual default memory configuration on your particular router might vary depending on when the router was purchased.

## Cisco IOS Release 11.3(3)T Feature Sets

The Cisco IOS software is packaged into “feature sets” (also called “software images”). There are many different feature sets available, and each feature set contains a specific subset of Cisco IOS features. The following conventions are used to identify feature sets:

- Plus: a value-added option that contains a variable set of additional features depending on the hardware platform selected.
- Plus 40: a value-added option that contains a variable set of additional features depending on the hardware platform selected, including 40-bit data encryption.
- Plus 56: a value-added option that contains a variable set of additional features depending on the hardware platform selected, including 56-bit data encryption.

Cisco IOS images with strong encryption (including, but not limited to, 56-bit DES) are subject to U.S. government export controls and have a limited distribution. Images to be installed outside the U.S. require an export license. Customer orders might be denied or subject to delay due to U.S. government regulations. Contact your sales representative or distributor for more information, or send e-mail to [export@cisco.com](mailto:export@cisco.com).

The following list shows which feature sets are supported on the Cisco 2500 series routers and access servers. These feature sets only apply to Cisco IOS Release 11.3 T:

- IP
- IP Plus
- IP Plus 40
- IP Plus 56
- IP Plus IPSEC 56
- ISDN
- IP/IPX/ AT/ DEC
- IP/IPX/ AT/ DEC Plus
- IP/ IBM/APPN
- Enterprise Plus
- Enterprise Plus 40
- Enterprise Plus 56
- Enterprise Plus IPSEC56
- Enterprise/ APPN Plus
- Enterprise/ APPN Plus 40
- Enterprise/ APPN Plus 56
- Enterprise/ APPN Plus IPSEC 56
- Remote Access Server
- IP Firewall
- IP/IPX/ AT/DEC Firewall Plus
- Enterprise/ Firewall Plus 56
- Enterprise/ Firewall Plus IPSEC 56

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**Note** The Plus 40 and Plus 50 encryption images listed above are not available in Releases 11.3(1)T and 11.3(2)T. If you need encryption images, refer to the major release, Cisco IOS Release 11.3.

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To determine what features are available with each feature set (software image), see Table 4 and Table 5. The tables summarize the features you can use when running a specific feature set on the Cisco 2500 series routers for Cisco IOS Release 11.3T. The feature set tables use the following symbol conventions to identify features:

- Yes: the feature is offered in the feature set.
- No: the feature is not offered in the feature set.



Table 4 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 1

Feature	Feature Set											
	IP	IP Plus	IP Plus 40 <sup>1</sup>	IP Plus 56 <sup>1</sup>	IP Plus IPSEC 56 <sup>2</sup>	ISDN	IP/IPX/ AT/ DEC	IP/IPX/ AT/ DEC Plus	IP/ IBM/ APPN	Enterprise Plus	Enterprise Plus 40 <sup>1</sup>	Enterprise Plus 56 <sup>1</sup>
<b>IBM Support</b>												
APPN High Performance Routing	No	No	No	No	No	No	No	No	Yes	No	No	No
APPN MIB Enhancements	No	No	No	No	No	No	No	No	Yes	No	No	No
APPN over Ethernet LAN Emulation	No	No	No	No	No	No	No	No	Yes	No	No	No
APPN Scalability Enhancements	No	No	No	No	No	No	No	No	Yes	No	No	No
Bisync Enhancements, includes: — Bisync 3780 Support — BSC Extended Addressing — Block Serial Tunneling (BSTUN) over Frame Relay	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
Cisco MultiPath Channel (CMPC)	No	No	No	No	No	No	No	No	No	No	No	No
DLSw+ Enhancements, includes: — 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	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
FRAS Enhancements, includes: — FRAS Boundary Network Node Enhancement — FRAS Dial Backup over DLSw+ — FRAS DLCI Backup — FRAS Host — FRAS MIB — SRB over Frame Relay	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
RIF Passthru in DLSw+	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
SRB over FDDI on Cisco 4000, 450, and 4700 Series Routers	No	No	No	No	No	No	No	No	No	No	No	No
TN3270 LU Nailing	No	No	No	No	No	No	No	No	No	No	No	No
TN3270 Server Enhancements	No	No	No	No	No	No	No	No	No	No	No	No

Table 4 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 1 (Continued)

Feature	Feature Set												
	IP	IP Plus	IP Plus 40 <sup>1</sup>	IP Plus 56 <sup>1</sup>	IP Plus IPSEC 56 <sup>2</sup>	ISDN	IP/IPX/ AT/ DEC	IP/IPX/ AT/ DEC Plus	IP/ IBM/ APPN	Enterprise Plus	Enterprise Plus 40 <sup>1</sup>	Enterprise Plus 56 <sup>1</sup>	
Token Ring LANE	No	No	No	No	No	No	No	No	No	No	No	No	No
Tunneling of Asynchronous Security Protocols	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes
<b>Internet</b>													
DRP Server Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
DRP Server Agent Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
<b>IP Routing</b>													
Easy IP (Phase 1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hot Standby Router Protocol (HSRP) over ISL in Virtual LAN Configurations	No	No	No	No	No	No	No	No	No	No	No	No	No
IP Enhanced IGRP Route Authentication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TCP Enhancements, includes: — TCP Selective Acknowledgment — TCP Timestamp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>LAN Support</b>													
AppleTalk Access List Enhancements	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
DECnet Accounting	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
IPX Named Access Lists	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
IPX SAP-after-RIP	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
NLSP Enhancements	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
NLSP Multicast Support	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
<b>Management</b>													
Cisco Call History MIB Command Line Interface	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cisco IOS Internationalization	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB, Phase 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMP Inform Requests	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
SNMPv2C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Virtual Profiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB and Syslog Facility	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes

**Table 4 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 1 (Continued)**

Feature	Feature Set											
	IP	IP Plus	IP Plus 40 <sup>1</sup>	IP Plus 56 <sup>1</sup>	IP Plus IPSEC 56 <sup>2</sup>	ISDN	IP/IPX/ AT/ DEC	IP/IPX/ AT/ DEC Plus	IP/ IBM/ APPN	Enterprise Plus	Enterprise Plus 40 <sup>1</sup>	Enterprise Plus 56 <sup>1</sup>
<b>Multimedia</b>												
IP Multicast Load Splitting across Equal-Cost Paths	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Multicast over ATM Point-to-Multipoint Virtual Connections	No	No	No	No	No	No	No	No	No	No	No	No
IP Multicast over Token Ring LANs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PIM Version 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stub IP Multicast Routing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Quality of Service</b>												
RTP Header Compression	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Security</b>												
Additional Vendor-Proprietary RADIUS Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Automated Double Authentication	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Certificate Authority Interoperability	No	No	No	No	Yes	No	No	No	No	No	No	No
Cisco IOS Firewall: Context-Based Access Control	No	No	No	No	No	No	No	No	No	No	No	No
Double Authentication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encrypted Kerberized Telnet	No	No	No	No	No	No	No	No	No	No	No	Yes
HTTP Security	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet Key Exchange Security Protocol	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes
IPSec Network Security	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes
MS-CHAP Support	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Named Method Lists for AAA Authentication & Accounting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Per-User Configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reflexive Access Lists	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
TCP Intercept	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Vendor-Proprietary RADIUS Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 4 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 1 (Continued)

Feature	Feature Set												
	IP	IP Plus	IP Plus 40 <sup>1</sup>	IP Plus 56 <sup>1</sup>	IP Plus IPSEC 56 <sup>2</sup>	ISDN	IP/IPX/ AT/ DEC	IP/IPX/ AT/ DEC Plus	IP/ IBM/ APPN	Enterprise Plus	Enterprise Plus 40 <sup>1</sup>	Enterprise Plus 56 <sup>1</sup>	
<b>Switching</b>													
AppleTalk Routing over ISL and IEEE 802.10 in Virtual LANs	No	No	No	No	No	No	No	No	No	No	No	No	No
CLNS and DECnet Fast Switching over PPP	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
DECnet/VINES/XNS over ISL, includes: — Banyan VINES Routing over ISL Virtual LANs — DECnet Routing over ISL Virtual LANs — XNS Routing over ISL Virtual LANs	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Fast-Switched Policy Routing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPX Routing over ISL Virtual LANs	No	No	No	No	No	No	No	No	No	No	No	No	No
VIP Distributed Switching Support for IP Encapsulated in ISL	No	No	No	No	No	No	No	No	No	No	No	No	No
<b>Terminal Services</b>													
Virtual Templates for Protocol Translation	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
<b>WAN Optimization</b>													
ATM MIB Enhancements	No	No	No	No	No	No	No	No	No	No	No	No	No
PAD Enhancements	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
PAD Subaddressing	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>WAN Services</b>													
Always On/Dynamic ISDN (AO/DI)	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Bandwidth Allocation Control Protocol	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced Local Management Interface (ELMI)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Enhancements	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay MIB Extensions	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Router ForeSight	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Advice of Charge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Caller ID Callback	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN NFAS	No	No	No	No	No	No	No	No	No	No	No	No	No

**Table 4 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 1 (Continued)**

Feature	Feature Set											
	IP	IP Plus	IP Plus 40 <sup>1</sup>	IP Plus 56 <sup>1</sup>	IP Plus IPSEC 56 <sup>2</sup>	ISDN	IP/IPX/ AT/ DEC	IP/IPX/ AT/ DEC Plus	IP/ IBM/ APPN	Enter-prise Plus	Enter-prise Plus 40 <sup>1</sup>	Enter-prise Plus 56 <sup>1</sup>
Layer 2 Forwarding—Fast Switching	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
Leased Line ISDN at 128 kbps	No	No	No	No	No	No	No	No	No	No	No	No
Microsoft Point-to-Point Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multiple ISDN Switch Types	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
National ISDN Switch Types for BRI and PRI Interfaces	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PPP over ATM	No	No	No	No	No	No	No	No	No	No	No	No
Telnet Extensions for Dialout	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
X.25 Enhancements	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
X.25 on ISDN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Switching between PVCs and SVCs	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
X.28 Emulation	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes

1. This image is not available in Releases 11.3(1)T and 11.3(2)T. It is available in Release 11.3(3)T and later 11.3 T releases.

2. This image is available in Release 11.3(3)T and later releases.

**Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2**

Feature	Feature Set										
	Enter-prise Plus IPSEC 56 <sup>2</sup>	Enter-prise/ APPN Plus	Enter-prise/ APPN Plus 40 <sup>1</sup>	Enter-prise/ APPN Plus 56 <sup>1</sup>	Enter-prise/ APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/ AT/DEC FIRE-WALL Plus <sup>2</sup>	Enter-prise/ FIRE-WALL Plus 56 <sup>2</sup>	Enter-prise/ FIRE-WALL Plus IPSEC 56 <sup>2</sup>	
<b>IBM Support</b>											
APPN High Performance Routing	No	Yes	Yes	Yes	Yes	No	No	No	No	No	
APPN MIB Enhancements	No	Yes	Yes	Yes	Yes	No	No	No	No	No	
APPN over Ethernet LAN Emulation	No	Yes	Yes	Yes	Yes	No	No	No	No	No	
APPN Scalability Enhancements	No	Yes	Yes	Yes	Yes	No	No	No	No	No	
Bisync Enhancements, includes: — Bisync 3780 Support — BSC Extended Addressing — Block Serial Tunneling (BSTUN) over Frame Relay	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	

Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2 (Continued)

Feature	Feature Set									
	Enterprise Plus IPSEC 56 <sup>2</sup>	Enterprise/APPN Plus	Enterprise/APPN Plus 40 <sup>1</sup>	Enterprise/APPN Plus 56 <sup>1</sup>	Enterprise/APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/AT/DEC FIRE-WALL Plus <sup>2</sup>	Enterprise/FIRE-WALL Plus 56 <sup>2</sup>	Enterprise/FIRE-WALL Plus IPSEC 56 <sup>2</sup>
Cisco MultiPath Channel (CMPC)	No	No	No	No	No	No	No	No	No	No
DLSw+ Enhancements, includes: — 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	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
FRAS Enhancements, includes: — FRAS Boundary Network Node Enhancement — FRAS Dial Backup over DLSw+ — FRAS DLCI Backup — FRAS Host — FRAS MIB — SRB over Frame Relay	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
RIF Passthru in DLSw+	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
SRB over FDDI on Cisco 4000, 4500, and 4700 Series Routers	No	No	No	No	No	No	No	No	No	No
TN3270 LU Nailing	No	No	No	No	No	No	No	No	No	No
TN3270 Server Enhancements	No	No	No	No	No	No	No	No	No	No
Token Ring LANE	No	No	No	No	No	No	No	No	No	No
Tunneling of Asynchronous Security Protocols	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
<b>Internet</b>										
DRP Server Agent	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
DRP Server Agent Enhancements	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2 (Continued)

Feature	Feature Set									
	Enterprise Plus IPSEC 56 <sup>2</sup>	Enterprise/APPN Plus	Enterprise/APPN Plus 40 <sup>1</sup>	Enterprise/APPN Plus 56 <sup>1</sup>	Enterprise/APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/AT/DEC FIRE-WALL Plus <sup>2</sup>	Enterprise/FIRE-WALL Plus 56 <sup>2</sup>	Enterprise/FIRE-WALL Plus IPSEC 56 <sup>2</sup>
<b>IP Routing</b>										
Easy IP (Phase 1)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Hot Standby Router Protocol (HSRP) over ISL in Virtual LAN Configurations	No	No	No	No	No	No	No	No	No	No
IP Enhanced IGRP Route Authentication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TCP Enhancements, includes: — TCP Selective Acknowledgment — TCP Timestamp	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
<b>LAN Support</b>										
AppleTalk Access List Enhancements	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
DECnet Accounting	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
IPX Named Access Lists	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
IPX SAP-after-RIP	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
NLSP Enhancements	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
NLSP Multicast Support	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
<b>Management</b>										
Cisco Call History MIB Command Line Interface	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Cisco IOS Internationalization	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB, Phase 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMPv2C	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
SNMP Inform Requests	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Virtual Profiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB and Syslog Facility	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
<b>Multimedia</b>										
IP Multicast Load Splitting across Equal-Cost Paths	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Multicast over ATM Point-to-Multipoint Virtual Connections	No	No	No	No	No	No	No	No	No	No
IP Multicast over Token Ring LANs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2 (Continued)

Feature	Feature Set									
	Enterprise Plus IPSEC 56 <sup>2</sup>	Enterprise/APPN Plus	Enterprise/APPN Plus 40 <sup>1</sup>	Enterprise/APPN Plus 56 <sup>1</sup>	Enterprise/APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/AT/DEC FIRE-WALL Plus <sup>2</sup>	Enterprise/FIRE-WALL Plus 56 <sup>2</sup>	Enterprise/FIRE-WALL Plus IPSEC 56 <sup>2</sup>
PIM Version 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stub IP Multicast Routing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Quality of Service</b>										
RTP Header Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Security</b>										
Additional Vendor-Proprietary RADIUS Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Automated Double Authentication	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Certificate Authority Interoperability	Yes	No	No	No	Yes	No	No	No	No	Yes
Cisco IOS Firewall: Context-Based Access Control	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Double Authentication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encrypted Kerberized Telnet	Yes	No	No	Yes	No	No	No	No	Yes	Yes
HTTP Security	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet Key Exchange Security Protocol	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes
IPSec Network Security	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes
MS-CHAP Support	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Named Method Lists for AAA Authentication & Accounting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Per-User Configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reflexive Access Lists	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TCP Intercept	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Vendor-Proprietary RADIUS Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Switching</b>										
AppleTalk Routing over ISL and IEEE 802.10 in Virtual LANs	No	No	No	No	No	No	No	No	No	No
CLNS and DECnet Fast Switching over PPP	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes



**Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2 (Continued)**

Feature	Feature Set									
	Enterprise Plus IPSEC 56 <sup>2</sup>	Enterprise/ APPN Plus	Enterprise/ APPN Plus 40 <sup>1</sup>	Enterprise/ APPN Plus 56 <sup>1</sup>	Enterprise/ APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/ AT/DEC FIRE-WALL Plus <sup>2</sup>	Enterprise/ FIRE-WALL Plus 56 <sup>2</sup>	Enterprise/ FIRE-WALL Plus IPSEC 56 <sup>2</sup>
DECnet/Vines/XNS over ISL, includes: — Banyan VINES Routing over ISL Virtual LANs — DECnet Routing over ISL Virtual LANs — XNS Routing over ISL Virtual LANs	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
Fast-Switched Policy Routing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPX Routing over ISL Virtual LANs	No	No	No	No	No	No	No	No	No	No
VIP Distributed Switching Support for IP Encapsulated in ISL	No	No	No	No	No	No	No	No	No	No
<b>Terminal Services</b>										
Virtual Templates for Protocol Translation	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
<b>WAN Optimization</b>										
ATM MIB Enhancements	No	No	No	No	No	No	No	No	No	No
PAD Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
PAD Subaddressing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>WAN Services</b>										
Always On/Dynamic ISDN (AO/DI)	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Bandwidth Allocation Control Protocol	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced Local Management Interface (ELMI)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay MIB Extensions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Router ForeSight	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISDN Advice of Charge	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
ISDN Caller ID Callback	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
ISDN NFAS	No	Yes	Yes	Yes	Yes	No	No	No	No	No
Layer 2 Forwarding—Fast Switching	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

**Table 5 Cisco IOS Software Feature Sets for the Cisco 2500 Series Routers, Part 2 (Continued)**

Feature	Feature Set									
	Enterprise Plus IPSEC 56 <sup>2</sup>	Enterprise/APPN Plus	Enterprise/APPN Plus 40 <sup>1</sup>	Enterprise/APPN Plus 56 <sup>1</sup>	Enterprise/APPN Plus IPSEC 56 <sup>2</sup>	Remote Access Server	IP FIRE-WALL <sup>2</sup>	IP/IPX/AT/DEC FIRE-WALL Plus <sup>2</sup>	Enterprise/FIRE-WALL Plus 56 <sup>2</sup>	Enterprise/FIRE-WALL Plus IPSEC 56 <sup>2</sup>
Leased Line ISDN at 128 kbps	No	No	No	No	No	No	No	No	No	No
Microsoft Point-to-Point Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multiple ISDN Switch Types	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
National ISDN Switch Types for Basic Rate and Primary Rate Interfaces	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
PPP over ATM	No	No	No	No	No	No	No	No	No	No
Telnet Extensions for Dialout	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 on ISDN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
X.25 Switching between PVCs and SVCs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.28 Emulation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. This image is not available in Releases 11.3(1)T and 11.3(2)T. It is available in Release 11.3(3)T and later 11.3 T releases.  
 2. This image is available in Release 11.3(3)T and later releases.

## Loading Cisco IOS Release 11.2 Software on CiscoPro Routers

The RSL has an upgrade utility to permanently modify a CiscoPro router so that it accepts Cisco IOS Release 11.2 software images. The utility changes the router SysObjectID Simple Network Management Protocol (SNMP) MIB value (used for network management) to that of a Cisco router. The software banner also changes and no longer identifies the router as a CiscoPro product.

**Note** After this upgrade, CiscoVision cannot recognize your router. If you choose the permanent upgrade, CiscoWorks for Windows is a recommended replacement for network management purposes. To upgrade your CiscoVision software to CiscoWorks Windows 2.1, order one of the following: CPW-CVCW-U to Upgrade CiscoVision to CiscoWorks Windows (managing up to 50 nodes) or CPW-CVCW-ENT-U to Upgrade CiscoVision to CiscoWorks Windows (managing up to 500 nodes). For general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

The upgrade utility must be located in the Images directory. If it is not, the upgrade utility informs you that the image is not present. The Cisco 2500 series upgrade utility filename is cpa25-upgrade-1.112-3.P.

## Installing Software Images Using RSL

This section describes some solutions to problems you might encounter when using the RSL. These solutions are additions to RSL online help.

### Recovering From a Connection Error

Try increasing the Short Timeout value in the Options dialog box if you receive the following message when trying to connect to the router:

```
"Failed to configure the router to enable the Cisco IOS software image and configuration file upload and download operations. You may want to check the router to make sure that the selected interface exists."
```

This connection recovery method is particularly applicable when you are connecting to one of the following devices:

- A router that has a large configuration file.
- A Cisco AS5200. Note that a Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM) due to the number of interfaces that must be checked during this process. Increase the Short Timeout value to 60 seconds.

---

**Note** Increasing the Short Timeout value might increase the time it takes for the RSL to connect to the target router.

---

### Restoring the Startup Configuration

In some cases, the RSL is unable to restore the startup configuration. If this happens, take the following steps:

- Step 1** Ensure that all cables are properly attached to both the router and the PC.
- Step 2** Restart the RSL, and connect by using the **Preconfigured router** option.
- Step 3** When asked if you want to overwrite the existing startup configuration file, choose **no**.
- Step 4** When asked if you want to continue, choose **yes**.
- Step 5** When the router is connected, select **Download Router Configuration** in the Router Software Loader dialog box.
- Step 6** Select the appropriate file, and click the radio button beside **Copy configuration to the router nonvolatile memory**.

The router should now contain the startup configuration it had before the initial RSL connection. You can now exit the RSL.

---

**Note** In the previous situation, the router configuration register is not restored.

---

---

**Note** If you enter **Ctrl-Alt-Delete** to terminate the RSL, the router configuration and configuration register are not restored. However, in this case the configuration file is not deleted from the PC, so you can restore it using the previous steps, beginning with Step 2.

---

### Helpful Hints

The following information about RSL operations can help you with the installation process:

- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one or more of them might be deleted by the RSL. You need to manually re-enter any deleted entries in the PC ARP table.
- If the router running configuration at connection time is not the same as its startup configuration, the exact configuration is not restored. Any changes that you have made since the last time a **copy running-config startup-config** or **write memory** command was entered are lost.
- The RSL restores the router startup configuration, but some running configuration commands are not restored. To restore the exact running configuration, reboot the router. The following interface configuration commands are not restored to the running configuration: **no shutdown**, **no ringspeed**, and **media-type aui**.

## Installing the Router Software Using a TFTP Server Application

Use this TFTP server application method as an alternative to using the RSL to install the router software from the CD-ROM. You can perform this procedure using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the router software to the router.

First obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. Use the RSL or the TFTP server included on the feature pack CD-ROM to install the router software only if you are using a PC running Windows 95. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or available as shareware from public sources on the World Wide Web.

---

**Note** To use an rcp application, follow the same procedure, and substitute rcp for TFTP in the instructions. Use the **copy rcp flash** command instead of the **copy tftp flash** command.

---

- Step 1** Install any TFTP server application on the PC. (A PC application is included on the feature pack CD-ROM for Microsoft Windows 95 only.)
- Step 2** Launch the TFTP server application on the PC, usually by double-clicking the application icon or its .exe filename.
- Step 3** Set up the PC as a TFTP server by using the TFTP server application setup or configuration facility.

Most TFTP server applications include a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, you can select **Settings** to display a panel that includes a checkbox beside the word Server. To configure the local PC as a server, select this check box.

The TFTP server also allows the selection of a “root” directory. You must select the directory in which the Cisco IOS files reside, for example, d:\cpwinst\images.



**Caution** Make sure you set up your local PC as a TFTP server. If you overlook this step, you cannot perform the copy procedure. This reminder also applies if you are using rcp instead of TFTP.

**Step 4** Establish a console session from your local PC (which is now configured as a TFTP server) to the Cisco router by using one of these methods:

- Connect the PC com port to the router console port.

This is the recommended method. When you reload the router with the new image in Step 25, you remain connected to the router. (If you use Telnet, you lose connection to the router.)

- Establish a Telnet session from the PC to the router.



**Caution** Make sure your PC is set up to communicate with the 10BaseT Ethernet port on the router.

**Step 5** Connect your PC Ethernet port to the corresponding router LAN port. Use the 10BaseT crossover cable to connect to an Ethernet port. Use straight-through cables if you are connecting via a 10BaseT hub or a 100BaseT hub.

---

**Note** We recommend that you back up the router configuration before upgrading the router software.

---

**Step 6** Enter the following commands to set the configuration register to 0x2101 and reload to the bootstrap image:

```
Router# config terminal
Router(config)# config-reg 0x2101
Router(config)# end
Router# reload
```

---

**Note** If you are upgrading a CiscoPro CPA2500 series router running from an image in Flash memory, the router reloads to ROM monitor mode because of an interaction between the Flash Load Helper and the cpa2500-upgrade-l.112-3.P image.

---

**Step 7** Enter **yes** in response to the prompt asking if the system configuration has been modified:

```
# System configuration has been modified. Save? yes
```

**Step 8** If the password prompt appears, enter the password.

```
Password: <password>
```

**Step 9** At the router prompt, enter **enable** and then the password:

```
Router(boot)> enable
Password: <password>
```

**Step 10** If you are *not* upgrading a CiscoPro CPA2500 router, go to Step 19.

**Step 11** At the router prompt, enter the following command to copy the router upgrade utility from the PC CD-ROM drive to the router:

```
Router(boot)# copy tftp flash
```

---

**Note** If you are using rcp, enter **copy rcp flash** instead.

---

**Step 12** When prompted, enter the IP address of your PC, as in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not the router. (Note that you can obtain your PC IP address from the DOS prompt in the windows directory by entering **wini**pcfg, as follows: C:\WINDOWS> **wini**pcfg.)

**Step 13** When prompted, enter the filename of the image to be copied to the router as in the following example:

```
Source file name? cpa2500-upgrade-1.112-3.P
```

---

**Note** The upgrade image file on the Feature Pack CD has a long filename (cpa2500-upgrade-1.112-3.P); note that DOS displays it in 8.3 format as cpa2500~1.P. The upgrade utility is a special file, not a Cisco IOS run-time image.

---

**Step 14** In response to the following prompt, enter the destination filename, and press Enter.

```
Destination file name [cpa2500-upgrade-1.112-3.P]?  
cpa2500-upgrade-1.112-3.P
```

(This is the name of the image file on the router, not the full pathname of the image on the PC CD-ROM.)

During the transfer process, messages indicate that the software has accessed the file you have specified and is loading it.

If the file is not found, check the following:

- The filename is correct.
- The TFTP server is enabled.
- The correct root directory is selected.
- There is IP connectivity between the router and TFTP server.

If the file is still not found, create a temporary directory called C:\temp and copy the CiscoPro upgrade file into the directory. Select the C:\temp directory as the root directory.

**Step 15** Enter **yes** in response to the prompt asking if you want to erase the existing image in the router Flash memory before copying the new one:

```
Erase flash device before writing? [confirm] yes
```

The entire copying process takes several minutes and differs from network to network. The exclamation point (!) indicates that the copy process is taking place. Each exclamation point indicates that ten packets have been transferred successfully. If you see three or more periods (...), the transfer might fail. If the transfer fails, use the **ping** command to check IP connectivity between the router and TFTP server.

**Step 16** Enter the **reload** command to reload the router:

```
Router (boot) # reload
```

Do not save the configuration.

After reload is complete, your CiscoPro router has been upgraded to a Cisco Enterprise router. Because the original Cisco IOS image that resided in Flash memory was erased during the upgrade process, the router is now running in bootstrap mode.

- Step 17** If the password prompt appears, enter the password.

```
Password: <password>
```

- Step 18** At the router prompt, enter **enable** and then the password:

```
Router(boot)# enable
Password: <password>
```

- Step 19** At the router prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the router:

```
Router(boot)(config)# copy tftp flash
```

In the next series of steps, you download the Cisco IOS Release 11.2 images that you want installed on your router.

- Step 20** When prompted, enter the IP address of your PC, as in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not that of the router.

- Step 21** When prompted, enter the filename of the Cisco IOS Release 11.2 image to be copied to the router, as in the following example:

```
Source file name? 80031718.bin
```

This example specifies the DOS image name of the IP feature set for Cisco 2500 series routers (as shown in Table 2 in the section, “Cisco IOS Release 11.3(3)T Feature Sets”).

- Step 22** In response to the prompt, enter the destination UNIX image filename, and press Enter.

This is the name of the image file on the router, not the full pathname of the image on the CD-ROM attached to the PC. Refer to Table 2 in the section, “Cisco IOS Release 11.3(3)T Feature Sets” for the UNIX image filename.

```
Destination file name [80031718.bin]? c2500-i-1
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

- Step 23** Enter **yes** in response to the prompt asking if you want to erase the existing image copy resident in the router Flash memory before copying the new one.

```
Erase flash device before writing? [confirm] yes
```

The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory.

- Step 24** Enter the following commands to reset the configuration register to 0x2102.

```
Router(boot)(config)# config terminal
Router(boot)(config)# config-reg 0x2102
Router(boot)(config)# end
```

- Step 25** Enter the **reload** command to reload the router:

```
Router# reload
```



**Caution** If you upgraded a CiscoPro CPA2500 router, do not save the configuration when prompted.

After reload is complete, the router should be running the required Cisco IOS image. Use the **show version** command to verify.

## Related Documentation

All documents mentioned in this section are available in printed or electronic format. (See the section “Online Navigation” for more information on accessing electronic documentation.)

The following sections describe the documentation related to these release notes:

- Cisco 2500 Series-Specific Documentation
- Cisco IOS Documentation Set and Related Supporting Documents
- Software Configuration Tips on the Cisco TAC Home Page

## Cisco 2500 Series-Specific Documentation

The following documents are specific to the Cisco 2500 series routers:

- *Cisco 2524 and Cisco 2525 Public Network Certification*
- *Installing WAN Modules in the Cisco 2524 and Cisco 2525 Routers*
- *Cisco 2524 and Cisco 2525 Router User Guide*
- Product-specific installation, configuration, and maintenance guides
- Router and hub user guides
- *Supporting Documentation for the Cisco 2500 Series*
- *Regulatory and Safety Information for the Cisco 2500 Series*
- *Cisco 2509, 2510, 2511, and 2512 (user guide)*

## Cisco IOS Documentation Set and Related Supporting Documents

The following documents apply to the Cisco 2500 series routers:

- *Release Notes for Cisco IOS Release 11.3*
- Product-Specific Release Notes
- *Cisco IOS 11.3 Dial Solutions Quick Configuration Guide*
- Cisco IOS Release 11.3 Configuration Guides, Command References
- Cisco IOS 11.3T New Features
- *Cisco IOS 11.3 Command Summary*
- *Cisco IOS 11.3 System Error Messages*
- *Debug Command Reference*
- *Access Services Quick Configuration Guide*
- *Cisco IOS Software Release 11.3 and 11.3T Caveats*
- *CIP Microcode Release Note and Upgrade Instructions*
- *Cisco IOS 11.3 Debug Command Reference*



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**Note** Due to a production problem, many source-route bridging commands were omitted from the printed version of the *Cisco IOS Software Command Summary* (78-4746-01, DOC-CIOSCS11.3=). For complete documentation of all source-route bridging commands, refer to the *Bridging and IBM Networking Command Reference* (78-4743-01). You can also obtain the most current documentation on the Documentation CD-ROM or Cisco Connection Online (CCO).

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The Cisco IOS configuration guides, command references, and chapter topics are as follows:

<b>Books</b>	<b>Chapter Topics</b>
<ul style="list-style-type: none"> <li>• <i>Configuration Fundamentals Configuration Guide</i></li> <li>• <i>Configuration Fundamentals Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Configuration Fundamentals Overview</li> <li>Cisco IOS User Interfaces</li> <li>File Management</li> <li>Interface Configuration</li> <li>System Management</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Network Protocols Configuration Guide, Part 1</i></li> <li>• <i>Network Protocols Command Reference, Part 1</i></li> </ul>	<ul style="list-style-type: none"> <li>IP Addressing</li> <li>IP Services</li> <li>IP Routing Protocols</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Network Protocols Configuration Guide, Part 2</i></li> <li>• <i>Network Protocols Command Reference, Part 2</i></li> </ul>	<ul style="list-style-type: none"> <li>AppleTalk</li> <li>Novell IPX</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Network Protocols Configuration Guide, Part 3</i></li> <li>• <i>Network Protocols Command Reference, Part 3</i></li> </ul>	<ul style="list-style-type: none"> <li>Apollo Domain</li> <li>Banyan VINES</li> <li>DECnet</li> <li>ISO CLNS</li> <li>XNS</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Wide-Area Networking Configuration Guide</i></li> <li>• <i>Wide-Area Networking Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>ATM</li> <li>Frame Relay</li> <li>SMDS</li> <li>X.25 and LAPB</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Security Configuration Guide</i></li> <li>• <i>Security Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>AAA Security Services</li> <li>Security Server Protocols</li> <li>Traffic Filtering</li> <li>Network Data Encryption</li> <li>Passwords and Privileges</li> <li>Neighbor Router Authentication</li> <li>IP Security Options</li> </ul>

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<b>Books</b>	<b>Chapter Topics</b>
<ul style="list-style-type: none"> <li>• <i>Dial Solutions Configuration Guide</i></li> <li>• <i>Dial Solutions Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Dial Business Solutions and Examples</li> <li>Dial-In Port Setup</li> <li>DDR and Dial Backup</li> <li>Remote Node and Terminal Service</li> <li>Cost-Control and Large-Scale Dial Solutions</li> <li>VPDN</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Switching Services Configuration Guide</i></li> <li>• <i>Cisco IOS Switching Services Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Switching Paths for IP Networks                             <ul style="list-style-type: none"> <li>• Fast Switching</li> <li>• Autonomous Switching</li> <li>• NetFlow Switching</li> <li>• Optimum Switching</li> </ul> </li> <li>Virtual LAN (VLAN) Switching and Routing                             <ul style="list-style-type: none"> <li>• Inter-Switch Link Protocol Encapsulation</li> <li>• IEEE 802.10 Encapsulation</li> <li>• LAN Emulation</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <i>Bridging and IBM Networking Configuration Guide</i></li> <li>• <i>Bridging and IBM Networking Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Transparent Bridging</li> <li>Source-Route Bridging</li> <li>Remote Source-Route Bridging</li> <li>DLSw+</li> <li>STUN and BSTUN</li> <li>LLC2 and SDLC</li> <li>IBM Network Media Translation</li> <li>DSPU and SNA Service Point</li> <li>SNA Frame Relay Access Support</li> <li>APPN</li> <li>NCIA Client/Server Topologies</li> <li>IBM Channel Attach</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Software Command Summary</i></li> <li>• <i>Dial Solutions Quick Configuration Guide</i></li> <li>• <i>System Error Messages</i></li> <li>• <i>Debug Command Reference</i></li> </ul>	

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**Note** The *Cisco Management Information Base (MIB) User Quick Reference* publication is no longer being published. For the latest list of MIBs supported by Cisco, see the *Cisco Network Management Toolkit* on Cisco Connection Online. On CCO, go to *Software and Support*, select *Software Center*, and click *Network Management Products*. Next, select *Cisco Network Management Toolkit*, and click *Cisco MIBs*.

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## Software Configuration Tips on the Cisco TAC Home Page

The following URL contains links to access helpful tips on configuring your Cisco products:

[http://www.cisco.com/kobayashi/serv\\_tips.shtml](http://www.cisco.com/kobayashi/serv_tips.shtml)

This URL is subject to change without notice. If it changes, point your web browser to <http://www.cisco.com/>, and follow this path: *Software & Support*, *Technical Tips* (button on left margin).

“Hot Tips” are 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 access FAX-on-demand and receive documents at your FAX machine, from the USA, call 888-50-CISCO (888-502-4726). From other areas, call 415-596-4408.

The following sections are provided from the Technical Tips page:

- **Field Notices**—Designed to provide notification of any critical issues regarding Cisco products. These include problem descriptions, safety or security issues, and hardware defects.
- **Hardware**—Technical Tips related to specific hardware platforms.
- **Internetworking Features**—Tips on using and deploying Cisco IOS software features and services.
- **Sample Configurations**—Actual configuration examples complete with topology and annotations.
- **Software Products**—MultiNet & Cisco Suite 100, Network Management, Cisco IOS Software Bulletins, and CiscoPro Configurations.
- **Special Collections**—Other Helpful Documents, Frequently Asked Questions, Security Advisories, References & RFCs, Case Studies, and the CiscoPro Documentation CD-ROM.

## Online Navigation

The Cisco IOS software documentation set is available as printed manuals or electronic documents. You can access Cisco 2500 series-specific documentation and Cisco IOS software documentation at Cisco Connection Online (CCO) on the World Wide Web and on the Cisco Documentation CD-ROM:

- Cisco 2500 series manuals and configuration notes:
  - Using a web browser, go to *http://www.cisco.com/*, click *Products & Ordering*, select *Cisco Documentation*, and go to *Access Servers and Access Routers*. Use one of the following link paths to find additional documentation:  
  
Select *Modular Access Routers*, and click *Cisco 2500 Series Modular Routers*  
or  
Select *Fixed Configuration Access Routers*, and click *Cisco 2500*. Select your 2500 Series product to access its installation and configuration manual or click of the following links: *Supporting Documentation for the Cisco 2500 Series*, *Regulatory and Safety Information for the Cisco 2500 Series*, or *Cisco 2509, 2510, 2511, and 2512*.
  - On the Documentation CD-ROM, go to *Cisco Product Documentation*, select *Access Servers and Access Routers*, and go to *Access Servers and Access Routers*. Use one of the following link paths to find additional documentation:  
  
Select *Modular Access Routers* and click *Cisco 2500 Series Modular Routers*  
or  
Select *Fixed Configuration Access Routers*, and click *Cisco 2500*. Select your 2500 Series product to access its installation and configuration manual or click of the following links: *Supporting Documentation for the Cisco 2500 Series*, *Regulatory and Safety Information for the Cisco 2500 Series*, or *Cisco 2509, 2510, 2511, and 2512*.
- Cisco IOS documentation set and supporting documents:
  - On the Documentation CD-ROM, go to *Cisco Product Documentation*, select *Cisco IOS Software Configuration*, and then select *Cisco IOS Release 11.3*.
  - On CCO, go to *Software and Support*, and select *Documentation*. Next, select *Documentation*, click *Cisco IOS Software Configuration*, and then click *Cisco IOS Release 11.3*.

For additional information about the Documentation CD-ROM and CCO, refer to the sections “Cisco Connection Online” and “Documentation CD-ROM” at the end of these release notes.

## 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](http://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](mailto:cco-help@cisco.com). For additional information, contact [cco-team@cisco.com](mailto:cco-team@cisco.com).

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**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](mailto: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](mailto:cs-rep@cisco.com).

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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.

## 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 up to date 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>.

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This document is to be used in conjunction with the Cisco IOS configuration guide and command reference publications.

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