CISCO SYSTEMS

Release Notes for Cisco IOS Release 11.3(5)T Feature Packs for Cisco 4500 and Cisco 4700 Routers

October 19, 1998

These release notes describe the Cisco IOS Release 11.3(5)T feature packs for Cisco 4500 and Cisco 4700 routers.

Contents

These release notes discuss the following topics:

Introduction

This section explains how to use this document, describes feature pack components, and has tables that define the aspects of a feature pack.

How to Use These Release Notes

The tables in these release notes contain details about the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1   Use Table 1, "Feature Pack Product Numbers Quick-Reference List," to identify the software image you want to load.

2   Use Table 2, "Cisco 4500/4700 Series Feature Packs," to identify your feature pack and the memory required for your feature set, based on the image you load.

3   Use Table 3, "Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers," to identify which features are supported in a feature set image.

4   Use Table 4, "Cisco 4500 and Cisco 4700 Default Memory and Upgrade Options," to check the memory required for your feature set, and determine the factory-default memory on the router and the available memory upgrades.

What Is a Feature Pack?

This section describes:

- Feature Pack Components
- Product Numbers Quick-Reference List
- Feature Pack Overview Table
- Feature Set Table

Feature Pack Components

A feature pack is a small box that contains the following items:

- CD-ROM with the following software:
    — Cisco IOS feature set software images that can include bundled modem firmware
    — Router Software Loader (RSL) program (a Windows 95 application)
    — Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only)
- *Getting Started with the Router Software Loader* CD booklet.
- Release notes that include 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 that contains all Cisco documentation

The heart of a feature pack is the CD-ROM that contains software images and the Router Software Loader (RSL), which is a Windows 95 application that loads an image onto an access server or router. Each feature pack CD-ROM contains at least one Cisco IOS feature set. The CD booklet, *Getting Started with the Router Software Loader*, explains how to use the RSL to install the router image. If you cannot use the RSL to load images, you can follow the instructions in the "Alternatives to the RSL" section on page 14.

Before running the RSL, read the "Installing Software Images Using the RSL" section on page 12. If you are loading software on a preconfigured router, you should save the router configuration file on your PC before beginning the image download process, as described in *Getting Started with the Router Software Loader*.

Product Numbers Quick-Reference List

Table 1 lists the Cisco product numbers of the feature packs supported in this release

Table 1   Feature Pack Product Numbers Quick-Reference List

Product Number	Feature Pack Description
CD45-C-11.3=	Cisco 4500/4700 IP Feature Pack
CD45-CL-11.3=	Cisco 4500/4700 IP Plus IPSEC 56 Feature Pack
CD45-CP-11.3=	Cisco 4500/4700 IP Plus Feature Pack
CD45-CW-11.3=	Cisco 4500/4700 IP Plus 40 Feature Pack
CD45-CY-11.3=	Cisco 4500/4700 IP Plus 56 Feature Pack
CD45-B-11.3=	Cisco 4500/4700 IP/IPX/AT/DEC Feature Pack
CD45-BP-11.3=	Cisco 4500/4700 IP/IPX/AT/DEC Plus Feature Pack
CD45-AL-11.3=	Cisco 4500/4700 Enterprise Plus IPSEC 56 Feature Pack
CD45-AP-11.3=	Cisco 4500/4700 Enterprise Plus Feature Pack
CD45-AW-11.3=	Cisco 4500/4700 Enterprise Plus 40 Feature Pack
CD45-AY-11.3=	Cisco 4500/4700 Enterprise Plus 56 Feature Pack

Feature Pack Overview Table

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, memory requirements, and the RSL installer description.

Table 2   Cisco 4500/4700 Series Feature Packs

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD45-C-11.3=	Cisco 4500/4700 IP Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-i-mz.113-5.T	80281005	4 MB	16 MB	Cisco 4500/4700 IP Feature Set Release 11.3(5)T
CD45-CL-11.3=	Cisco 4500/4700 IP Plus IPSEC 56 Release 11.3(5)T RSL Version 7.1	c4500-is56i-mz.113-5.T	80280405	8 MB	16 MB	Cisco 4500/4700 IP Plus IPSEC 56 Feature Set Release 11.3(5)T
CD45-CP-11.3=	Cisco 4500/4700 IP Plus Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-is-mz.113-5.T	80280805	8 MB	16 MB	Cisco 4500/4700 IP Plus Feature Set Release 11.3(5)T
CD45-CW-11.3=	Cisco 4500/4700 IP Plus 40 Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-is40-mz.113-5.T	80280605	8 MB	16 MB	Cisco 4500/4700 IP Plus 40 Feature Set Release 11.3(5)T

Table 2   Cisco 4500/4700 Series Feature Packs (continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD45-CY-11.3=	Cisco 4500/4700 IP Plus 56 Feature Pack Release 11.3(5) RSL Version 7.1	c4500-is56-mz.113-5	80233605	8 MB	16 MB	Cisco 4500/4700 IP Plus 56 Feature Set Release 11.3(5)
CD45-B-11.3=	Cisco 4500/4700 IP/IPX/AT/DEC Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-d-mz.113-5.T	80281505	4 MB	16 MB	Cisco 4500/4700 IP/IPX/AppleTalk/ DECnet Feature Set Release 11.3(5)T
CD45-BP-11.3=	Cisco 4500/4700 IP/IPX/AT/DEC Plus Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-ds-mz.113-5.T	80281305	8 MB	16 MB	Cisco 4500/4700 IP/IPX/AppleTalk/ DECnet Plus Feature Set, Release 11.3(5)T
CD45-AL-11.3=	Cisco 4500/4700 Enterprise Plus IPSEC 56 Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-js56i-mz.113-5.T	80279705	8 MB	16 MB	Cisco 4500/4700 Enterprise Plus IPSEC 56 Feature Set, Release 11.3(5)T
CD45-AP-11.3=	Cisco 4500/4700 Enterprise Plus Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-js-mz.113-5.T	80280205	8 MB	16 MB	Cisco 4500/4700 Enterprise Plus Feature Set, Release 11.3(5)T
CD45-AW-11.3=	Cisco 4500/4700 Enterprise Plus 40 Feature Pack Release 11.3(5)T RSL Version 7.1	c4500-js40-mz.113-5.T	80279905	8 MB	16 MB	Cisco 4500/4700 Enterprise Plus 40 Feature Set, Release 11.3(5)T
CD45-AY-11.3=	Cisco 4500/4700 Enterprise Plus 56 Feature Pack Release 11.3(5) RSL Version 7.1	c4500-js56-mz.113-5	80233105	8 MB	16 MB	Cisco 4500/4700 Enterprise Plus 56 Feature Set, Release 11.3(5)

Feature Set Table

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

- Plus—Value-added feature set with additional features.

- Plus 40—Value-added feature set with additional features, including 40-bit data encryption.

- Plus 56—Value-added feature set with additional features, 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.

The following list shows which feature sets are supported on the Cisco 4500 and Cisco 4700 series routers. These feature sets only apply to Cisco IOS Release 11.3 T:

- IP
- IP Plus IPSEC 56
- IP Plus
- IP Plus 40
- IP Plus 56
- IP/IPX/AT/DEC
- IP/IPX/AT/DEC Plus
- Enterprise Plus IPSEC 56
- Enterprise Plus
- Enterprise Plus 40
- Enterprise Plus 56

To determine what features are available with each feature set (software image), see Table 3. The table summarizes the features you can use when running a specific feature set on the Cisco 4500 and Cisco 4700 routers for Cisco IOS Release 11.3 T. Table 3 uses these terms:

Feature Set Matrix Term	Description
Basic	This feature is offered in the basic feature set.
Plus	This feature is offered in the Plus feature set.
Encrypt	This feature is offered in the encryption feature sets, which consist of 40-bit (Plus 40) or 56-bit (Plus 56) data encryption feature sets.

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

Feature	Feature Set												
	IP	IP Plus	IP Plus 40[1]	IP Plus IP-SEC 56[1]	IP/ IPX/ AT/ DEC	IP/ IPX/A T/ DEC Plus	Enter-prise Plus	Enter-prise Plus 40[1]	Enter-prise Plus IP-SEC 56[1]	Enter-prise/ APPN Plus	Enter-prise/ APPN Plus 40[1]	Enter-prise/ APPN Plus IP-SEC 56[1]	Enter-prise/ APPN/ DB Conn/ Plus
IBM Support													
APPN High Performance Routing	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
APPN MIB Enhancements	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
APPN over Ethernet LAN Emulation	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

Feature	Feature Set												
	IP	IP Plus	IP Plus 40[1]	IP Plus IP-SEC 56[1]	IP/ IPX/ AT/ DEC	IP/ IPX/A T/ DEC Plus	Enter-prise Plus	Enter-prise Plus 40[1]	Enter-prise Plus IP-SEC 56[1]	Enter-prise/ APPN Plus	Enter-prise/ APPN Plus 40[1]	Enter-prise/ APPN Plus IP-SEC 56[1]	Enter-prise/ APPN/ DB Conn/ Plus
APPN Scalability Enhancements	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Bisync Enhancements, includes: — Bisync 3780 Support — BSC Extended Addressing — Block Serial Tunneling (BSTUN) over Frame Relay	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cisco Database Connection[2]	No	No	No	No	No	No	No	No	No	No	No	No	No
Cisco MultiPath Channel (CMPC)	No	No	No	No	No	No	No	No	No	No	No	No	No
Database Connection Feature	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	No	Yes	Yes	Yes	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	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RIF Passthru in DLSw+[3]	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

Feature	IP	IP Plus	IP Plus 40[1]	IP Plus IP-SEC 56[1]	IP/ IPX/ AT/ DEC	IP/ IPX/AT/ DEC Plus	Enterprise Plus	Enterprise Plus 40[1]	Enterprise Plus IP-SEC 56[1]	Enterprise/ APPN Plus	Enterprise/ APPN Plus 40[1]	Enterprise/ APPN Plus IP-SEC 56[1]	Enterprise/ APPN/ DB Conn/ Plus
SRB over FDDI on Cisco 4000, 4500, and 4700 Series Routers	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TN3270 LU Nailing	No	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	No
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	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet													
DRP Server Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DRP Server Agent Enhancements[2]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Routing													
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
IP Type of Service and Precedence for GRE Tunnels (CSCdj88415)[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
TCP Enhancements, includes: — TCP Selective Acknowledgment — TCP Timestamp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAN Support													
AppleTalk Access List Enhancements	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DECnet Accounting	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPX Named Access Lists	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPX SAP-after-RIP	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NLSP Enhancements	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NLSP Multicast Support	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Management													
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

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

Feature	IP	IP Plus	IP Plus 40[1]	IP Plus IP-SEC 56[1]	IP/ IPX/ AT/ DEC	IP/ IPX/AT/ DEC Plus	Enter-prise Plus	Enter-prise Plus 40[1]	Enter-prise Plus IP-SEC 56[1]	Enter-prise/ APPN Plus	Enter-prise/ APPN Plus 40[1]	Enter-prise/ APPN Plus IP-SEC 56[1]	Enter-prise/ APPN/ DB Conn/ Plus
Entity MIB, Phase 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMPv2C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virtual Profiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB and Syslog Facility[3]	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Multimedia													
IP Multicast Load Splitting across Equal-Cost Paths	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP Multicast over ATM Point-to-Multipoint Virtual Circuits	No	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	Yes
PIM Version 2[2]	Yes	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	Yes
Quality of Service													
RTP Header Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security													
Named Method Lists for AAA Authorization & Accounting[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Additional Vendor-Proprietary RADIUS Attributes[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Automated Double Authentication[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Certificate Authority Interoperability[3]	No	No	No	Yes	No	No	No	No	Yes	No	No	Yes	No
Double Authentication	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encrypted Kerberized Telnet	No	No	No	No	No	No	No	No	Yes	No	No	Yes	No
HTTP Security	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet Key Exchange Security Protocol[3]	No	No	No	Yes	No	No	No	No	Yes	No	No	Yes	No
IPSec Network Security	No	No	No	Yes	No	No	No	No	Yes	No	No	Yes	No
MS-CHAP Support[3]	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Per-User Configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reflexive Access Lists	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TCP Intercept	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vendor-Proprietary RADIUS Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

Feature	IP	IP Plus	IP Plus 40[1]	IP Plus IP-SEC 56[1]	IP/IPX/AT/DEC	IP/IPX/AT/DEC Plus	Enterprise Plus	Enterprise Plus 40[1]	Enterprise Plus IP-SEC 56[1]	Enterprise/APPN Plus	Enterprise/APPN Plus 40[1]	Enterprise/APPN Plus IP-SEC 56[1]	Enterprise/APPN/DB Conn/Plus
Switching													
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	Yes	Yes	Yes	Yes	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	Yes	Yes	Yes	Yes	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
Terminal Services													
Virtual Templates for Protocol Translation	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WAN Optimization													
ATM MIB Enhancements	No	No	No	No	No	No	No	No	No	No	No	No	No
Enhanced ATM VC Configuration and Management[2]	No	No	No	No	No	No	No	No	No	No	No	No	No
Frame-Per-Token Limit[2]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PAD Enhancements	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PAD Subaddressing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WAN Services													
Always On/Dynamic ISDN (AO/DI)[3]	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Bandwidth Allocation Control Protocol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dialer Watch[2]	Yes	Yes	Yes	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	Yes	Yes	Yes

Table 3   Cisco IOS Software Feature Sets for the Cisco 4500 and Cisco 4700 Routers

						Feature Set						
Feature	**IP**	**IP Plus**	**IP Plus 40[1]**	**IP Plus IP-SEC 56[1]**	**IP/ IPX/ AT/ DEC**	**IP/ IPX/AT/ DEC Plus**	**Enter-prise Plus**	**Enter-prise Plus 40[1]**	**Enter-prise Plus IP-SEC 56[1]**	**Enter-prise/ APPN Plus**	**Enter-prise/ APPN Plus 40[1]**	**Enter-prise/ APPN Plus IP-SEC 56[1]**	**Enter-prise/ APPN/ DB Conn/ Plus**
Frame Relay Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay MIB Extensions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame Relay Router ForeSight	Yes	Yes	Yes	Yes	Yes	Yes	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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Layer 2 Forwarding—Fast Switching	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leased Line ISDN at 128 kbps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Microsoft Point-to-Point Compression (MPPC)[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
MS Callback[2]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multiple ISDN Switch Types[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
National ISDN Switch Types for BRI/PRI Interfaces (NID)[3]	Yes	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	No
PPP over Frame Relay[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telnet Extensions for Dialout	No	No	No	No	No	No	No	No	No	No	No	No	No
X.25 Enhancements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 on ISDN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Switching between PVCs and SVCs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X.28 Emulation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1   This image is available in Cisco IOS Release 11.3(3)T and later releases. It is not available in Cisco IOS Release 11.3(1)T or 11.3(2)T.
2   This feature was introduced in Cisco IOS Release 11.3(2)T. It is not available in Release 11.3(1)T.
3   This feature was introduced in Cisco IOS Release 11.3(3)T. It is not available in Release 11.3(1)T or 11.3(2)T.

System Requirements

This section describes the following:

- Memory Requirements

- Hardware Supported

- Software Compatibility

- Determining Your Software Release

Memory Requirements

Table 4 lists the memory delivered by default and the available memory upgrades.

Table 4   Cisco 4500 and Cisco 4700 Default Memory and Upgrade Options

Memory Type	Default	Upgrade Options
Cisco 4500 Router		
Flash	4 MB	4-MB upgrade: MEM-4500-4F= 16-MB upgrade: MEM-4500-16F=
Main	16 MB	32-MB upgrade: MEM-4500-32D=
Shared	8 MB	16-MB upgrade: MEM-4500-16S=
Cisco 4700 Router		
Flash	4 MB	8-MB upgrade: MEM-4700-8F= 16-MB upgrade: MEM-4700-16F=
Main	16 MB	32-MB upgrade: MEM-4700-32D=
Shared	8 MB	8-MB upgrade: MEM-4700-8S= 16-MB upgrade: MEM-4700-16S=

Hardware Supported

The following Cisco routers are supported by Cisco IOS Release 11.3 T:

- Cisco 4000, Cisco 4000-M

- Cisco 4500, Cisco 4500-M

- Cisco 4700, Cisco 4700-M

The following LAN interfaces are supported on Cisco 4500 and Cisco 4700 routers:

- 16-Mbps Token Ring

- 4-Mbps Token Ring

- ATM OC3, DS3, E3

- Ethernet (10BaseT)

- Ethernet (AUI)

- Fast Ethernet (100BaseFX via MII)

- Fast Ethernet (100BaseTX)

- FDDI DAS

- FDDI multimode (DAS/SAS)

- FDDI SAS

- FDDI single-mode

The following WAN interfaces are supported on Cisco 4500 and Cisco 4700 routers:

- Channelized E1

- Channelized T1

- E1-G.703/G.704

- Synchronous and Asynchronous

- EIA/TIA-449

- EIA/TIA-613 (HSSI)

- EIA-530

- ISDN BRI

- ISDN PRI

- Serial

- V.35

- X.21

Software Compatibility

The feature packs described in these release notes contain Cisco IOS Release 11.3(5)T software images, some earlier images, and the Router Software Loader (RSL) Version 7.1. Before running the RSL, read the "Installing Software Images Using the RSL" section on page 12.

Determining Your Software Release

To view the version of Cisco IOS software that is running on your Cisco 4500 or Cisco 4700 router, log in to the router, and enter the **show version** user EXEC command:

```
router> show version
```

An output begins similar to the following. The Cisco IOS version appears in the second line.

```
Cisco Internetwork Operating System Software
IOS (tm) 4500 Software (C4500-JS-M), Version 11.3(5)T, RELEASE SOFTWARE
```

The output includes more information including processor revision numbers, memory amounts, hardware IDs, and partition information.

Installation

This section provides solutions to problems you might encounter when using the RSL to load Cisco IOS software on a router. It also describes special cases that might require you to load Cisco IOS software on a CiscoPro router or to use an alternative to the RSL.

Installing Software Images Using the RSL

Recovering from a Connection Error

This installation tip provides a possible recovery solution if you are unable to connect to your router. You can skip this section unless you are experiencing a connection error.

In some cases, you might receive the following error message while connecting to the target 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."
```

If you encounter this message, try increasing the Short Timeout value, which is set to 25 seconds, in the Options dialog box, especially if one of the following situations applies:

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

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

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 (**config-register 0x***nnnn*) is not restored.

Note If you press **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's 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's 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**.

Loading Cisco IOS Release 11.3 Software on CiscoPro Routers

The RSL has an upgrade utility to permanently modify a CiscoPro router so that it accepts Cisco IOS Release 11.3 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 will not be able to 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.

If you select a Cisco IOS Release 11.3 image from the image list and are connected to a CiscoPro CPA 4000 series router, a message box tells you that the router requires a permanent upgrade to load this image. You can either select **yes** to have the RSL upgrade the router and continue loading the selected image, or select **no** to cancel the load operation.

If you select **yes**, the RSL utility downloads, performs the upgrade, reboots the router, and issues a message to confirm the upgrade. Confirm this message. The RSL then downloads the selected image.

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.

Alternatives to the RSL

The RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software to the router. The booklet included with the CD-ROM explains how to perform this simple install process. However, an alternative is available for installing router software: using a TFTP server application.

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 checkbox.

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:\cpswinst\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# configure terminal
Router(config)# config-reg 0x2101
Router(config)# end
Router# reload
```

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 4000 series 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 **winipcfg**, as follows: C:\WINDOWS> **winipcfg**.)

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

```
Source file name? cpa4500-i-mz.113-5.T
```

Note The upgrade image file on the Feature Pack CD has a long filename (cpa4500-i-mz.113-5.T); note that DOS displays it in 8.3 format as cpa4500~1.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 [cpa4000-upgrade-1.113-5.T]?
cpa4500-i-mz.113-5.T
```

(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. An 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 11.3 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 11.3 image to be copied to the router, as in the following example:

```
Source file name? 80281005.bin
```

This example specifies the DOS image name of the IP feature set for Cisco 4000 or 4500 series routers. (See Table 2 in the "Feature Pack Overview Table" section on page 3).

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 "Feature Pack Overview Table" section on page 3 for the UNIX image filename.

```
Destination file name [80281005.bin]? c4500-i-mz.113-5.P
```

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.

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

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

```
Router# reload
```

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

Documentation Updates

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-xx, DOC-CIOSCS11.2=). For complete documentation of all source-route bridging commands, refer to the *Bridging and IBM Networking Command Reference* (78-4743-xx). You can also obtain the most current documentation on the Documentation CD-ROM or Cisco Connection Online (CCO).

Related Documentation

This section describes the documentation related to the Cisco 4500 and Cisco 4700 routers, typically including hardware installation guides, software installation guides, Cisco IOS configuration and command references, system error messages, and feature modules that are updates to the Cisco IOS documentation set. Documentation is available as printed manuals or electronic documents, except for the feature modules that are available online only.

The most up-to-date documentation can be found on the Web via Cisco Connection Online (CCO) and on the latest Documentation CD-ROM. These electronic documents might contain updates and modifications made after the paper documents were printed. For information on CCO, refer to the "Cisco Connection Online" section later in this document. For more information on to the CD-ROM, refer to the "Documentation CD-ROM" section later in this document.

Release-Specific Documents

Use these release notes with the following documents:

- *Release Notes for Cisco IOS Release 11.3* that contains some feature and caveat information applicable to Cisco IOS Release 11.3(5)T.

- *Caveats for Cisco IOS Release 11.3 T* that accompanies these release notes.

- Product bulletins; the path is as follows from Cisco Connection Online:

    Products and Ordering: More Information: Product Bulletins. Scroll to **Software**. Under **Cisco IOS 11.3**, click the **Upgrade Paths** bulletin. The *Upgrade Paths and Packaging Simplification* bulletin appears.

Feature Modules

Feature modules describe new features introduced in 11.3 T releases and are updates to the Cisco IOS documentation set. As updates, the features modules are available online only. The feature module information will be added to the Cisco IOS documentation set before the next printing. Feature modules have a brief overview of the feature, benefits, configuration tasks, and a command reference.

To access all the 11.3 T feature modules on CCO, follow this path:

Products and Ordering: **Cisco Documentation**: **Cisco IOS Software Configuration**: **Cisco IOS Release 11.3**: **Cisco IOS 11.3T New Features**.

To access the feature modules on the documentation CD-ROM, follow this path:

Cisco Product Documentation: **Cisco IOS Software Configuration**: **Cisco IOS Release 11.3**: **Cisco IOS 11.3T New Features**.

Hardware-Specific Documentation

The following Cisco 4500 and Cisco 4700 documents are available:

- *Cisco 4000 Hardware Installation and Maintenance*

- *Cisco 4000 Series Hardware Installation and Maintenance*

- *Cisco 4000 Series Installation Guide*

- Cisco 4000 Series Configuration Notes

- Release Notes — Cisco 4000 Series Routers

- *Regulatory Compliance and Safety Information*

This documentation can be found on CCO and on the Documentation CD-ROM:

- On Cisco Connection Online (CCO), the path is **Software & Support**: **Cisco Documentation**: **Access Servers and Access Routers**: **Modular Access Routers**: **Cisco 4000 Series**. For more information, refer to "Cisco Connection Online," page 23.

- On the Documentation CD, the path is **Access Servers and Access Routers**: **Modular Access Routers**: **Cisco 4000 Series.** For more information, refer to "Documentation CD-ROM," page 24.

Cisco IOS Software Documents

The Cisco IOS software documentation is divided into nine modules and two master indexes. There are also four supporting documents.

Note The most current Cisco IOS documentation can be found on the latest Documentation CD-ROM and on the Web. These electronic documents contain updates and modifications made after the paper documents were printed.

You can access the Cisco IOS software electronic documents either on Cisco Connection Online (CCO) on the World Wide Web or on the Cisco Documentation CD-ROM:

- On CCO, click **Software & Support**: **Documentation**: **Cisco IOS Software Configuration**: **Cisco IOS Release 11.3**.

- On the Documentation CD-ROM, click **Cisco Product Documentation**: **Cisco IOS Software Configuration**: **Cisco IOS Release 11.3**.

The following are some of the types of Cisco IOS Release 11.3 documents available:

- Configuration guides and command references

- Feature descriptions

- Product-specific release notes

- Cisco IOS software caveats

New online navigation enhancements for Release 11.3 include the following:

- Online hot-linked master indexes for configuration guide and command reference documentation sets.

  On CCO or on the Documentation CD-ROM, go to Cisco IOS Release 11.3 and click **Cisco IOS Release 11.3 Configuration Guides, Command References**. Then click **Configuration Guide Master Index** or **Command Reference Master Index**. To access documentation related to an index entry, click the page number following the entry.

- Online hot-linked list of features that are new since Release 11.2.

  On CCO or the Documentation CD-ROM, go to Cisco IOS Release 11.3 and click **Cisco IOS Release 11.3 Configuration Guides, Command References**. Next, click **Cisco IOS 11.3 New Features**.

  To access configuration documentation for a feature, do one of the following:

  — Click the page number following the feature name. This takes you to the location of the feature document.

  — Using your browser search function, search on one or more keywords from the feature name. This brings the feature document to your screen.

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

Cisco IOS Documentation Set

The Cisco IOS documentation set consists of the following books and chapter topics:

Books	Chapter Topics
• *Configuration Fundamentals Configuration Guide*	Configuration Fundamentals Overview
• *Configuration Fundamentals Command Reference*	Cisco IOS User Interfaces
	File Management
	Interface Configuration
	System Management
• *Network Protocols Configuration Guide, Part 1*	IP Addressing
• *Network Protocols Command Reference, Part 1*	IP Services
	IP Routing Protocols
• Network Protocols Configuration Guide, Part 2	AppleTalk
• Network Protocols Command Reference, Part 2	Novell IPX
• Network Protocols Configuration Guide, Part 3	Apollo Domain
• Network Protocols Command Reference, Part 3	Banyan VINES
	DECnet
	ISO CLNS
	XNS
• Wide-Area Networking Configuration Guide	ATM
• Wide-Area Networking Command Reference	Frame Relay
	SMDS
	X.25 and LAPB
• Security Configuration Guide	AAA Security Services
• Security Command Reference	Security Server Protocols
	Traffic Filtering
	Network Data Encryption
	Passwords and Privileges
	Neighbor Router Authentication
	IP Security Options
• Dial Solutions Configuration Guide	Dial Business Solutions and Examples
• Dial Solutions Command Reference	Dial-In Port Setup
	DDR and Dial Backup
	Remote Node and Terminal Service
	Cost-Control and Large-Scale Dial Solutions
	VPDN

Books	Chapter Topics
• Cisco IOS Switching Services Configuration Guide	Switching Paths for IP Networks
• Cisco IOS Switching Services Command Reference	Fast Switching
	Autonomous Switching
	NetFlow Switching
	Optimum Switching
	Virtual LAN (VLAN) Switching and Routing
	Inter-Switch Link Protocol Encapsulation
	IEEE 802.10 Encapsulation
	LAN Emulation
• Bridging and IBM Networking Configuration Guide	Transparent Bridging
• Bridging and IBM Networking Command Reference	Source-Route Bridging
	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
	NCIA Client/Server Topologies
	IBM Channel Attach
• Cisco IOS Software Command Summary	
• Dial Solutions Quick Configuration Guide	
• System Error Messages	
• Debug Command Reference	

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**: **Software Center**: **Network Management Products**: **Cisco Network Management Toolkit**: **Cisco MIBs**.

Service and Support

For service and support for a product purchased from a reseller, contact the reseller. Resellers offer a wide variety of Cisco service and support programs, which are described in the section "Service and Support" in the 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

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

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:

- Access Dial Cookbook—Offers easy-to-follow "recipes" for sample router configurations. The first cookbook contains network diagrams, sample configurations, and troubleshooting commands for helping you set up and use dial technologies on Cisco access routers.

- 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.

Upgrading to a New Release

For information on upgrading to a new software release, refer to the *Cisco IOS Software Release Upgrade Paths and Packaging Simplification product bulletin #703* located on CCO. On CCO, follow this path: **Products and Ordering: More Information: Product Bulletins.** Scroll to **Software**. Under **Cisco IOS 11.3**, click the **Upgrade Paths** bulletin.

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.