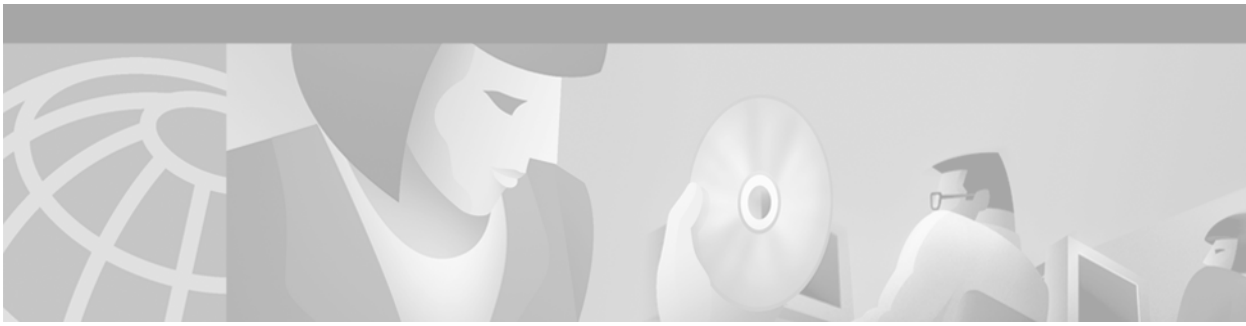

Release Notes for the SOHO 77 Routers and the Cisco 800 Series Routers for Cisco IOS Release 12.2(2)XI

March 25, 2002

These release notes for the SOHO 77 Routers and the Cisco 800 Series Routers describe the enhancements provided in Cisco IOS Release 12.2(2)XI2. These release notes are updated as needed. Use these release notes with *Cross-Platform Release Notes for Cisco IOS Release 12.2 T* located on Cisco.com and the Documentation CD.

For a list of the software caveats that apply to Cisco IOS Release 12.2(2)XI2, see the "Caveats" section on page 20 and *Caveats for Cisco IOS Release 12.2 T*. The caveats document is updated for every maintenance release and is located on Cisco.com and the Documentation CD.

Contents

These release notes discuss the following topics:

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System Requirements

This section describes the system requirements for Release 12.2(2)XI2 and includes the following sections:

Memory Requirements

Table 1 and Table 2 provide the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Release 12.2(2)XI2 on the SOHO 77 Routers and the Cisco 800 Series Routers.

Table 1 Memory Requirements for the SOHO 77 Routers

Platforms	Image Name	Feature Set	Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Cisco SOHO 77 Routers	Cisco SOHO 70 Series IOS IP	IP	soho70-y1-mz	8 MB	16 MB	RAM

Table 2 Memory Requirements for the Cisco 800 Series Routers

Platform	Image Name	Feature Set	Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Cisco 801-805 Routers	Cisco 800 Series IOS IP	IP	c800-y6-mw	8 MB	4 MB	RAM
	Cisco 800 Series IOS IP Plus	IP Plus	c800-sy6-mw	8 MB	8 MB	RAM
	Cisco 800 Series IOS IP/FW	IP/FW	c800-oy6-mw	8 MB	4 MB	RAM
	Cisco 800 Series IOS IP/FW Plus IPSec 3DES	IP/FW Plus IPSec 3DES	c800-k9osy6-mw	8 MB	12 MB	RAM
	Cisco 800 Series IOS IP/IPX/ FW Plus IPSec 3DES	IP/IPX/FW Plus IPSec 3DES	c800-k9nosy6-mw	8 MB	12 MB	RAM
Cisco 806 Routers	Cisco 806 Series IOS IP	IP	c806-y6-mz	8 MB	16 MB	RAM
	Cisco 806 Series IOS IP Plus	IP Plus	c806-sy6-mz	8 MB	16 MB	RAM
	Cisco 806 Series IOS IP/FW	IP/FW	c806-oy6-mz	8 MB	16 MB	RAM
	Cisco 806 Series IOS IP/FW Plus IPSec 3DES	IP/FW Plus IPSec 3DES	c806-k9osy6-mz	8 MB	20 MB	RAM

Table 2 Memory Requirements for the Cisco 800 Series Routers (continued)

Platform	Image Name	Feature Set	Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Cisco 820 Routers	Cisco 820 Series IOS IP	IP	c820-y6-mz	8 MB	16 MB	RAM
	Cisco 820 Series IOS IP/Voice	IP/Voice	c820-v6y6-mz	8 MB	24 MB	RAM
	Cisco 820 Series IOS IP Plus	IP Plus	c820-sy6-mz	8 MB	20 MB	RAM
	Cisco 820 Series IOS IP/Voice Plus	IP/Voice Plus	c820-sv6y6-mz	8 MB	24 MB	RAM
	Cisco 820 Series IOS IP/FW	IP/FW	c820-oy6-mz	8 MB	20 MB	RAM
	Cisco 820 Series IOS IP/FW/Voice	IP/FW/Voice	c820-ov6y6-mz	8 MB	24 MB	RAM
	Cisco 820 Series IOS IP/FW Plus IPSec 3DES	IP/FW Plus IPSec 3DES	c820-k9osy6-mz	8 MB	24 MB	RAM
	Cisco 820 Series IOS IP/FW/Voice Plus IPSec 3DES	IP/FW/Voice Plus IPSec 3DES	c820-k9osv6y6-mz	8 MB	32 MB	RAM

Hardware Supported

Cisco IOS Release 12.2(2)XI2 supports the following Cisco routers:

- SOHO 77 Routers
- Cisco 800 series routers:
  - Cisco 801–804 Routers
  - Cisco 805 Router
  - Cisco 806 Router
- Cisco 820 series routers:
  - Cisco 827 and Cisco 827-4V Routers
  - Cisco 828 Routers

For detailed descriptions of which features are supported on each router and new hardware features, see the "New and Changed Information" section on page 10.

SOHO 77 Routers

The SOHO 77 router provides the following key hardware features:

- Connection to an ADSL network through an asymmetric digital subscriber line (ADSL) port.
- A central processing unit: 50 MHz MPC 855T RISC processor.
- Ability to be stacked or mounted on a wall.
- Locking power connectors and a Kensington-compatible locking slot.

Table 3 summarizes Cisco SOHO 77 router ports.

Table 3 Supported Interfaces for the Cisco SOHO Series Routers

Router	Ethernet Ports	ADSL Ports	Console Ports
SOHO 77	One 10BaseT (RJ-45)	RJ-11	RJ-45

Cisco 801–804 Routers

The Cisco 801–804 routers provide the following key hardware features:

- Cisco 802 and Cisco 804 routers have an integrated NT-1, which eliminates the need for an external NT-1 in North America.
- Cisco 803 and Cisco 804 routers provide connection to analog telephones or fax machines, which are connected to telephone services through an ISDN line.
- Flash memory: Default is 8 MB, expandable to 12 MB. (4MB Flash soldered to the motherboard.)

Note To add additional Flash memory to the Cisco 801-804, remove the existing Flash card and install a new one.

- Dynamic RAM: Default is 4 MB, expandable to 12 MB. (4MB Dynamic RAM soldered to the motherboard.)
- ISDN B-channel LEDs are a different color from the other LEDs, which make them easy to distinguish.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.

Table 4 summarizes Cisco 801-804 router ports.

Table 4 Supported Interfaces for the Cisco 801-804 Series Routers

Router	Ethernet Ports	ISDN Ports	Telephone Ports	Console Ports
Cisco 801	One 10BASE-T (RJ-45)	ISDN BRI S/T (RJ-45)	—	RJ-45
Cisco 802	One 10BASE-T (RJ-45)	ISDN BRI U, integrated Network Termination 1 (NT-1) (RJ-45)	—	RJ-45
Cisco 803	Four-port 10BASE-T (RJ-45) hub	ISDN BRI S/T (RJ-45)	Two (RJ-11)	RJ-45
Cisco 804	Four-port 10BASE-T (RJ-45) hub	ISDN BRI U, integrated NT-1 (RJ-45)	Two (RJ-11)	RJ-45

Cisco 805 Router

The Cisco 805 router connects small professional offices over serial lines to corporate networks and to the Internet. The Cisco 805 router provides the following key features:

- One serial WAN interface that delivers up to 512 kbps for synchronous serial connections (Frame Relay, leased lines, and X.25) or up to 115 kbps for asynchronous dial-up.
- One Ethernet LAN interface.

- Flash memory: 4 MB default, expandable to 12 MB.
- Dynamic RAM: 8 MB, expandable to 16 MB.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.

Table 5 summarizes Cisco 805 router ports.

Table 5 Cisco 805 Router Ports

Port Type	Description
Ethernet Port	One 10BaseT (RJ-45)
Serial Port	One WAN interface (RS-232, RS-449, RS-530 and RS-530A, V.35, and X.21)
Console Port	RJ-45

Cisco 806 Router

The Cisco 806 router provides the following key hardware features:

- Provides connection to 10BaseT (10-Mbps) Ethernet networks and is compatible with 10/100-Mbps devices.
- Flash memory: The Cisco IOS uses the current default of 8 MB for loading Cisco IOS images.
- Webflash: 2 MB of Flash memory reserved for use by the Cisco Router Web Setup software.
- Cisco 806 Router Dynamic RAM: Default is 16 MB of DRAM and is expandable to 32 MB, using 4-MB, 8-MB, and 16-MB DIMM cards.
- The central processing unit is a 50 MHz MPC 855T RISC processor.
- Supports Cisco IOS software.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.
- Cable lock for physically securing the router.
- The routers provide locking power connectors and a Kensington-compatible locking slot.

Table 6 summarizes Cisco 806 router ports.

Table 6 Cisco 806 Router Ports

Port Type	Description
Ethernet Port	One 10BaseT (RJ-45). Connects to broadband modem or Ethernet switch.
Ethernet Hubbed Ports	Four 10BaseT (RJ-45). Connect to Ethernet network devices.
Console Port	One (RJ-45).

Cisco 827 and Cisco 827-4V Routers

The Cisco 827 and Cisco 827-4V Routers provide the following key hardware features:

- The routers provide connection to an ADSL network or telephones and fax machines through an ADSL port.
- Flash memory: Default is 12 MB and is expandable to 20 MB. If 12 MB of Flash is installed, 8 MB is used for the Cisco IOS images and 4 MB hosts the ROMMON and NVRAM. Additional memory can be added using Flash cards.
- Cisco 827 Router Dynamic RAM: Default is 16 MB of DRAM and is expandable to 32 MB.
- Cisco 827-4V Router Dynamic RAM: Default is 24 MB and is expandable to 32 MB. The Cisco 827-4V Router also contains an 8-MB DIMM card.
- The central processing unit is a 50 MHz MPC 855T RISC processor.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.
- The routers provide locking power connectors and a Kensington-compatible locking slot.

Table 7 lists the supported interfaces for the Cisco 827 and Cisco 827-4V routers.

Table 7 Supported Interfaces for the Cisco 827 and Cisco 827-4V Routers

Router	Ethernet Ports	ADSL Ports	Telephone Ports	Console Ports
Cisco 827	One 10BaseT (RJ-45)	RJ-11	–	RJ-45
Cisco 827-4V	One 10BaseT (RJ-45)	RJ-11	Four (RJ-11)	RJ-45

Cisco 828 Routers

Cisco 828 routers provide the following key hardware features:

- Provide connection to 10BaseT (10-Mbps) Ethernet networks and is compatible with 10/100-Mbps devices.
- Provide connection to G.991.2 (digital-encoding standard) symmetrical high-speed digital subscriber line (G.SHDSL) networks.
- Flash memory: The Cisco IOS uses the current default of 8 MB for loading Cisco IOS images, upgradable to 16 MB.
- Webflash: 2 MB of Flash memory reserved for use by the Cisco Router Web Setup software.
- Dynamic RAM: Default is 16 MB of DRAM and is expandable to 32 MB, using 4-MB, 8-MB, and 16-MB DIMM cards.
- The central processing unit is a 50 MHz MPC 855T RISC processor.
- Support Cisco IOS software.
- Color-coded ports and cables, which reduce the chance of cabling errors.
- Support router stacking or mounting on a wall.
- Accept a cable lock for physically securing the routers.
- Provide locking power connectors.

Table 8 summarizes Cisco 828 router ports.

Table 8 Cisco 828 Router Ports

Port Type	Description
Ethernet Hubbed Ports	Four 10BaseT (RJ-45). Connect to Ethernet network devices.
G. SHDSL Port	One (RJ-11). Provides connection to G. SHDSL networks.
Console Port	One (RJ-45).

Determining the Software Version

To determine the version of Cisco IOS software running on your Cisco router, log in to the router and enter the **show version** EXEC command. The following sample displays command output from a Cisco 806 router running Release 12.2(2)XI2:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.2 Software (c806-y6-mz), Version 12.2(2)XI1, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, see Software Installation and Upgrade Procedures located at: http://www.cisco.com/warp/public/130/upgrade_index.shtml

Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features. Release 12.2(2)XI2 supports the same feature sets as Releases 12.2 T, but Release 12.2(2)XI2 can include new features supported by the SOHO 77 Routers and the Cisco 800 Series Routers.

Table 9 through Table 13 list the features and feature sets supported in Cisco IOS Release 12.2(2)XI2:

- Table 9—SOHO 77 routers
- Table 10—Cisco 801-804 routers
- Table 11—Cisco 805 routers
- Table 12—Cisco 806 routers
- Table 13—Cisco 828 routers

The tables use the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In—The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, “12.2(2)XI” means the feature was introduced in 12.2(2)XI. If a cell in this column is empty, the feature was included in the initial base release.

Note These feature set tables only contain a selected list of features. These tables are not cumulative—nor do they list all the features in each image.

Table 9 Feature List by Feature Set for the SOHO 77 Routers

		Feature Set
Features	**In**	**IP**
Address Conservation		
Dynamic Host Configuration Protocol (DHCP) Option 12/ DHCP "Client ID" Passthrough		No
Enhanced Security		
IP Security Through Network Address Translation	12.2(2)XI	Yes
Voice Services		
International Phone Support		No
WAN Services		
X.25 over TCP (XOT)		No

Table 10 Feature List by Feature Set for the Cisco 801-804 Routers

		Feature Sets				
Features	**In**	**IP**	**IP Plus**	**IP/FW**	**IP/FW Plus IPSec 3DES**	**IP/IPX/FW Plus IPSec 3DES**
Address Conservation						
Dynamic Host Configuration Protocol (DHCP) Option 12/ DHCP "Client ID" Passthrough		No	No	No	No	No
Enhanced Security						
IP Security Through Network Address Translation	12.2(2)XI	Yes	Yes	Yes	Yes	Yes
Voice Services						
International Phone Support		No	No	No	No	No
WAN Services						
X.25 over TCP (XOT)	12.2(2)XI	No	Yes	No	Yes	Yes

Table 11 Feature List by Feature Set for the Cisco 805 Routers

Features	In	Feature Sets				
		IP	IP Plus	IP/FW	IP/FW Plus IPSec 3DES	IP/IPX/FW Plus IPSec 3DES
Address Conservation						
Dynamic Host Configuration Protocol (DHCP) Option 12/ DHCP "Client ID" Passthrough		No	No	No	No	No
Enhanced Security						
IP Security Through Network Address Translation	12.2(2)XI	Yes	Yes	Yes	Yes	Yes
Voice Services						
International Phone Support		No	No	No	No	No
WAN Services						
X.25 over TCP (XOT)		No	No	No	No	No

Table 12 Feature List by Feature Set for the Cisco 806 Routers

Features	In	Feature Sets			
		IP	IP Plus	IP/FW	IP/FW Plus IPSec 3DES
Address Conservation					
Dynamic Host Configuration Protocol (DHCP) Option 12/ DHCP "Client ID" Passthrough	12.2(2)XI	Yes	Yes	Yes	Yes
Enhanced Security					
IP Security Through Network Address Translation	12.2(2)XI	Yes	Yes	Yes	Yes
Voice Services					
International Phone Support		No	No	No	No
WAN Services					
X.25 over TCP (XOT)		No	No	No	No

Table 13 Feature List by Feature Set for the Cisco 820 Series Routers

Features	In	Feature Sets							
		IP	IP Plus	IP/ Voice	IP/ Voice Plus	IP/FW	IP/FW/ Voice	IP/FW Plus IPSec 3DES	IP/FW/ Voice Plus IPSec 3DES
Address Conservation									
Dynamic Host Configuration Protocol (DHCP) Option 12/ DHCP "Client ID" Passthrough		No	No	No	No	No	No	No	No
Enhanced Security									
IP Security Through Network Address Translation	12.2(2)XI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voice Services									
International Phone Support[1]	12.2(2)XI	No	No	Yes	Yes	No	Yes	No	Yes
WAN Services									
X.25 over TCP (XOT)		No	No	No	No	No	No	No	No

1. Supported on Cisco 827-4V routers only.

New and Changed Information

The following sections list the new software features supported by routers for Release 12.2(2)XI2 and above:

New Features in Release 12.2(2)XI

The following sections list the new software features supported by Cisco IOS Release 12.2(2)XI2 on the SOHO 77 Routers and the Cisco 800 Series Routers.

Dynamic Host Configuration Protocol (DHCP) Option 12 / DHCP "Client ID"

Cisco IOS Release 12.2(2)XI2 supports Dynamic Host Configuration Protocol (DHCP). This feature provides a way to allocate IP addresses dynamically so that the addresses can be reused when hosts no longer need them.

Configuration information for the command **ip address dhcp** is provided in this section. See the Cisco IOS software documentation set for all other commands used with the DHCP feature.

ip address dhcp hostname Command

To specify a value for the DHCP option 12 field in the DISCOVER packet, use the Ethernet interface **ip address dhcp hostname** command.

ip address dhcp hostname *hostname*
no ip address dhcp hostname *hostname*

Syntax Description

hostname	Specify the host name to be placed in the DHCP option 12 field. This name need not be the same as the hostname entered in global configuration mode.

Default

None.

Command Mode

Ethernet interface configuration.

Platforms

Cisco 806 router.

Command History

Release	Modification
Cisco IOS Release 12.2(2)XI	The keyword **hostname** for the command **ip address dhcp hostname** was introduced on Cisco 806 routers.

Usage Guidelines

In some installations, a Cisco router must be configured to obtain its IP address from a DHCP server. When a router is configured in this way, it sends a DHCP DISCOVER packet to provide information about itself to the DHCP server on the network.

Some DHCP servers require a value for option 12, the host name. If a host name value is required, use the *hostname* keyword of the command **ip address dhcp** to specify a value for option 12 to place in the DISCOVER packet.

Some DHCP servers require a value in the DISCOVER packet client-ID field instead of—or in addition to—a value in the option 12 field. The value for the client-ID field is specified using the **client-id** keyword for the **ip address dhcp** command.

You might need to experiment with different configurations to determine the one required by your DHCP server. Table 14 shows the possible configuration methods and the information placed in the DISCOVER packet for each method.

Table 14 Configuration Method and Resulting Contents of the DISCOVER Packet

Configuration Method	Contents of Discover Packet
ip address dhcp	The DISCOVER packet contains "cisco-*mac-address* -Eth1" in the client ID field. The *mac-address* is the media access control (MAC) address of the Ethernet 1 interface and contains the default host name of the router in the option 12 field.
ip address dhcp hostname *name*	The DISCOVER packet contains "cisco-*mac-address* -Eth1" in the client ID field. The *mac-address* is the MAC address of the Ethernet 1 interface, and contains *name* in the option 12 field.
ip address dhcp client-id ethernet 1	The DISCOVER packet contains the MAC address of the Ethernet 1 interface in the client ID field and contains the default host name of the router in the option 12 field.
ip address dhcp client-id ethernet 1 hostname *name*	The DISCOVER packet contains the MAC address of the Ethernet 1 interface in the client ID field and contains *name* in the option 12 field.

Configuration Examples

In the examples that follow, the command **ip address dhcp** is entered for the Ethernet 1 interface. The DISCOVER packet sent by a router configured as shown in the following example would contain "cisco-*mac-address* -Eth1" in the client-ID field, and the value 806fresno in the option 12 field.

```
hostname 806fresno
!
interface Ethernet 1
 ip address dhcp
```

The DISCOVER packet sent by a router configured as shown in the following example would contain "cisco- *mac-address* -Eth1" in the client-ID field, and the value 806test in the option 12 field.

```
hostname 806fresno
!
interface Ethernet 1
 ip address dhcp hostname 806test
```

The DISCOVER packet sent by a router configured as shown in the following example would contain the MAC address of the Ethernet 1 interface in the client-id field, and the value 806fresno in the option 12 field.

```
hostname 806fresno
!
interface Ethernet 1
 ip address dhcp client-id Ethernet 1
```

The DISCOVER packet sent by a router configured as shown in the following example would contain the MAC address of the Ethernet 1 interface in the client-id field, and the value 806test in the option 12 field.

```
hostname 806fresno
!
interface Ethernet 1
 ip address dhcp client-id Ethernet 1 hostname 806test
```

IP Security Through Network Address Translation Support

Cisco IOS Release 12.2(2)XI IP Security (IPSec) supports clients that do not use TCP wrapping or UDP wrapping. On Cisco 80-804 routers and Cisco 806 routers, this feature allows clients that have wrapping disabled, or clients that do not support wrapping, to use IPSec. Each client creates an IPSec tunnel, and NAT translates the private IP addresses of these packets to public IP addresses.

On the Cisco 801, 802, 803 or 804 routers, you must enter the following global configuration mode command for this feature to work:

ip nat inside source list *number* **interface bri** *number* **overload**

In this command, *number* refers to the source list number, and the basic rate interface number, respectively. The document at the following URL contains an example configuration:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_fix/800/800swcfg/advscen.htm

If the Cisco 801, 802, 803, or 804 router is appropriately configured, you can enter this command for the Dialer interface instead of the Basic Rate interface as shown in the previous command.

On the Cisco 806 router, you must enter the following global configuration mode command for this feature to work:

ip nat inside source list *number* **interface Ethernet 1 overload**

In this command, *number* refers to the source list number. The document at the following URL contains an example configuration:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_fix/806/806swcg/routconf.htm

International Phone Support

The international phone support feature (H.323 only) is provided for the Cisco 827-4V router for the following countries:

- Italy
- Denmark

International phone support commands configure Caller ID settings and voice port settings. Feature support is documented in *Software Enhancements for the Cisco 820 Series and SOHO 77 Routers*.

Caller ID

Caller ID (CLID)—which is called Calling Line Identity Presentation (CLIP) in some countries—is an analog service that displays the number of the calling line to the receiving line terminal device when it receives a call. The Cisco 827-4V router receives CLID data through its ADSL port and transmits it to the terminal device, which can either be a CLID device or a telephone capable of showing CLID messages.

There are two types of CLID, type I and type II. Type I CLID transmits the signal when the receiving phone is on hook. Type II transmits the signal when the receiving phone is off hook. Only type I CLID is supported in this release.

Voice Port Settings

The default voice-port configuration specifies the United States country code, a 600-ohm impedance, and a 25-Hz ring frequency. Commands for setting ring tone, cadence, frequency, and line impedance are supported in Release 12.2(2)XI for the Cisco 827-4V router.

X.25 over TCP

The Cisco 801, 802, 803, and 804 routers support X.25 over TCP (XOT) routing. The XOT feature allows X.25 packets to be sent over a TCP/IP network instead of a Link Access Procedure, Balanced (LAPB) link. The X.25 protocol standard is an International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) for WAN communications that defines how connections between user devices and network devices are established and maintained.

For more information about XOT, refer to the following URL:

http://www.cisco.com/warp/public/133/x25_over_tcpip.html

For background information about X.25, refer to the following URL:

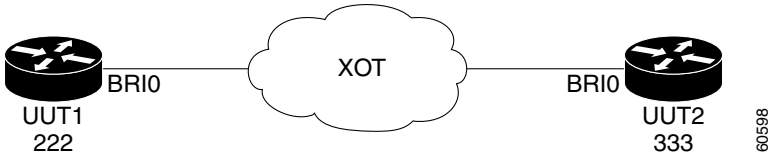
http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/x25.htm

Below are two scenarios with accompanying configuration steps and examples.

Simple XOT Link

Two routers can be configured to support a simple XOT link, as shown in Figure 1.

Figure 1 Cisco 800 Routers Supporting a Simple XOT Link



Both routers communicate using the BRI. The routers are identified to each other by their X.121 addresses.

Follow these steps to configure the router to support X.25 routing and the creation of an XOT link using the BRI, in global configuration mode.

Step 1 Enable the router to place packet assembler and disassembler (PAD) calls through XOT by entering the command **service pad to-xot**.

Step 2 Enable the router to receive PAD calls through XOT by entering the command **service pad from-xot**.

Step 3 Enable X.25 routing by entering the command **x25 routing**.

Step 4 Define an XOT route by entering the command **x25 route** *x121-address* **xot** *ip-address*.

The *x121-address* is the X.121 address of the router on the remote end of the link, and the **xot** *ip-address* is the IP address of the BRI interface for that router.

Note The IP addresses of the local and the remote BRI interfaces must be on the same network.

Step 5 Specify the X.25 host name and the X.121 address for the local router by entering the BRI interface command **x25 host** *hostname x121-address*.

For information on the format of X.121 addresses, refer to the following URL:

http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/x25.htm#xtocid1227311

Step 6 Configure the BRI 0 interface.

a. Enter the command **interface bri0**.

b. Configure an IP address and subnet mask for the BRI 0 interface by entering the command **ip address** *ip-address subnet-mask*.

c. Enter the command **end** to leave configuration mode.

Configuration Examples

The following examples show configurations for routers at both ends of an XOT link. The first configuration is for the router with the X.25 hostname Router1:

```
ip tcp synwait-time 5
service pad to-xot
service pad from-xot
!
x25 routing
!
interface bri0
 ip address  192.168.1.2 255.255.255.0
 dialer string 914085460166
 dialer-group 1
 isdn switch-type basic-5ess
 !
no ip http server
ip classless
!
dialer-list 1 protocol ip permit
!
x25 route 333 xot 192.168.1.3 <----| Routes the pad call to 333 via XOT.
x25 host Router1 222               <----| Sets the X.121 address to this host
```

The following example shows the configuration for the router at the other end of the XOT link, named Router2:

```
ip tcp synwait-time 5
service pad to-xot
service pad from-xot
!
x25 routing
!
interface bri0
 ip address 192.168.1.3 255.255.255.0
 dialer string 914085460165
 dialer-group 1
 isdn switch-type basic-5ess
!
x25 route 222 xot 192.168.1.2  <-| Allows any pad call from 222 to be routed back via XOT.
x25 host Router2 333 <----| Sets the X.121 address for this host
!
```

Verifying the Configuration

To verify X.25 connections, use the command **pad** to log on to remote routers and the command **show** to display X.25 virtual circuit activity. The following example displays a logon sequence conducted from Router2. The command **pad 222** to log on to Router1. When the password is verified, the Router1 prompt appears, which shows that the link works.

```
Router2#pad 222
Trying 222...Open


User Access Verification

Password:

Router1>
```

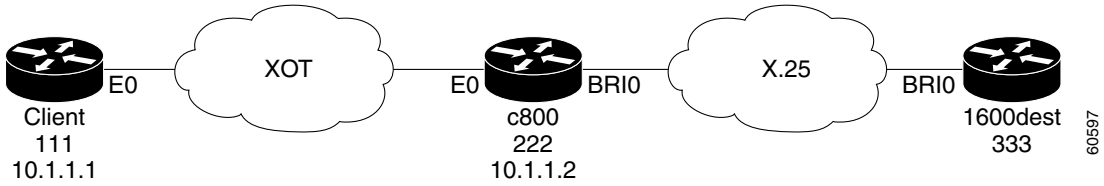
To verify that the PAD is connecting through XOT, use the command **show x25 vc** on Router1.

```
Router1#sh x25 vc
SVC 1,  State:D1,  Interface:[192.168.1.3,11005/192.168.1.2,1998]
  Started 00:00:18, last input 00:00:13, output 00:00:13

  Line:1   vty 0    Location: Host:333
  333 connected to 222 PAD <--> XOT 192.168.1.3,11005

  Window size input:2, output:2
  Packet size input:128, output:128
  PS:0  PR:0  ACK:0  Remote PR:0  RCNT:0  RNR:no
  P/D state timeouts:0  timer (secs):0
  data bytes 87/61 packets 8/8 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

XOT Network to X.25 Network

Figure 2 shows a scenario in which a client communicates with a Cisco 800 series router using an Ethernet link to an XOT network, and the router communicates with a Cisco 1600 series router over an X.25 network.

Figure 2 Cisco 800 Router Used in XOT and X.25 Networks



To configure a Cisco 801, 802, 803, or 804 for links to an XOT network and to an X.25 network, complete the following steps, beginning in global configuration mode:

Step 1 Enable the router to place PAD calls through XOT by entering the command **service pad to-xot**.

Step 2 Enable the router to receive PAD calls through XOT by entering the **service pad from-xot** command.

Step 3 Enable X.25 routing by entering the **x25 routing** command.

Step 4 Define an XOT route by entering the **x25 route** *x121-address* **xot** *ip-address* command.

In this command, *x121-address* is the X.121 address of the router on the remote end of the link, and **xot** *ip-address* is the IP address of that router's BRI interface.

Note The IP addresses of the local and the remote BRI interfaces must be on the same network.

Step 5 Define an X.25 route for the BRI 0 interface to use by entering the **x25 route** *x121-address* **interface bri0** command.

Step 6 Specify the X.25 host name and the X.121 address for the local router by entering the **x25 host** *hostname x121-address* command.

For information on the format of X.121 addresses, refer to the following URL:

http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/x25.htm#xtocid1227311

Step 7 Configure the BRI 0 interface.

a. Enter the **interface bri0** command.

b. Enter **no ip address** to disable IP addressing for this interface.

c. Enter the **encapsulation x25 dce** command to specify that the router will operate as a DCE.

d. Disable multicast routing caching by entering the **no ip mroute-cache**.

Step 8 Enter the **interface ethernet 0** command to configure the Ethernet 0 interface.

a. Enter the **ip address** *ip-address subnet-mask* command to specify the IP address for the interface.

b. Enter **no cdp enable** to disable Cisco Discovery Protocol.

c. Enter **end** to leave configuration mode.

Configuration Examples

Examples are given for:

- Client configuration
- Cisco 800 series configuration
- Cisco 1600 series configuration

This example shows the client configuration. Two **x25 route** commands are used to specify the routers in the route:

```
! Client Config
!Allows X25 pad calls to be placed to show XOT connection is possible
service pad to-xot
service pad from-xot
!
hostname client
!
x25 routing  <-----| Enable x25 routing
cns event-service server
!
interface Ethernet0
 ip address 10.1.1.1 255.255.255.0
 no ip directed-broadcast
!
! These x25 route commands will route an x25 call to the x121 address via XOT.
! XOT will only forward it to the router on the other side of the Ethernet link.
x25 route 333 xot 10.1.1.2
x25 route 222 xot 10.1.1.2
x25 host client 111 <----| Set the X121 address on this client
!
```

This example shows the configuration for the Cisco 800 series router:

```
! c800 Config
service pad to-xot
service pad from-xot
hostname c800
!
x25 routing
isdn switch-type basic-5ess
!
interface Ethernet0
 ip address 10.1.1.2 255.255.255.0
 no cdp enable
!
interface BRI0
 no ip address
 encapsulation x25 dce
 no ip mroute-cache
 dialer string 914085460166
 dialer-group 1
 isdn switch-type basic-5ess
 isdn twait-disable
 no cdp enable
!
ip http server
ip classless
!
dialer-list 1 protocol ip permit
no cdp run
!
x25 route 333 interface BRI0  <----| Forward any calls to 333 X.121 address through BRI0
x25 route 111 xot 10.1.1.1     <----| Any X25 calls to 111 X.121 address forward via XOT
x25 host c800 222
```

This example shows the configuration for the 1600 series router:

```
! 1600dest Config
service pad to-xot
service pad from-xot
!
hostname 1600dest
!
no ip subnet-zero
!
no ip domain-lookup
x25 routing
isdn switch-type basic-5ess
isdn voice-call-failure 0
!
!
interface BRI0
 no ip address
 encapsulation x25
 dialer string 914085460165
 dialer-group 1
 x25 address 333  <-----| Assigned 333 as the X121 address for BRI0
 isdn switch-type basic-5ess
!
no ip http server
ip classless
!
dialer-list 1 protocol ip permit
x25 route 111 interface BRI0 <------| This is return path for connection from client
!
```

Verifying the Configuration

Use the command **pad** at the client to log on to the 1600 series router, and use the command **show x25 vc** on each node to verify that X.25 and XOT are being used for communication. Examples of these commands are shown in the "Verifying the Configuration" section on page 15.

New Software Features in Release 12.2 T

For information regarding the features supported in Cisco IOS Release 12.2 T, refer to the Cross-Platform Release Notes and New Feature Documentation links at the following location on Cisco.com:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/index.htm

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click on the following path:

Service & Support: **Technical Documents**: **Release 12.2** (from the **Cisco IOS Software** drop-down list)

Limitations and Restrictions

This section describes limitations and restrictions that apply to this release.

International Phone Support

H.323 international phone support on the Cisco 827 router has been tested and verified to work with the equipment listed in this section.

The following devices are supported in Italy:

- Telephones:
  - Siemens Gigaset 3015 Class Model
  - Telecom Italia MASTER s.p. LUPO VIEW
  - Alcatel Dial Face Mod. SIRIO 2000 Basic A
- Caller-ID Devices:
  - BRONDI INDOVINO
- Fax equipment:
  - Canon FAX-B155

The following devices are supported in Denmark:

- Telephones:
  - Tele Danmark dana classic
  - Tele Danmark Danafon Topas
- Caller-ID Devices:
  - DORO Danmark DOROX5

Important Notes

Configuring PPPoE on a Cisco 806 Router

When specifying the method of authentication while configuring PPPoE and connecting to a Service Provider, the *optional* argument might be required to successfully authenticate the connection. For example:

```
interface Dialer0
 ppp authentication pap optional
```

or

```
interface Dialer0
 ppp authentication chap optional
```

Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats, severity 2 caveats are less serious, and severity 3 caveats are the least serious of these three severity levels.

Caveats in Cisco IOS Releases 12.2 and 12.2 T are also in Cisco IOS Release 12.2(2)XI2. For information on caveats in Cisco IOS Release 12.2, see *Caveats for Cisco IOS Release 12.2*. For information on caveats in Cisco IOS Release 12.2 T, see *Caveats for Cisco IOS Release 12.2 T*. These two documents list severity 1 and 2 caveats and are located on CCO and the Documentation CD-ROM.

Note If you have an account with Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in toCisco.com and click **Service & Support**: **Technical Assistance Center**: **Tool Index**: **Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Resolved Caveats - Releases 12.2(2)XI1 and 12.2(2)XI2

This section describes unexpected behavior that is fixed in Releases 12.2(2)XI1 and 12.2(2)XI2.

Management

CSCdw65903

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

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

Caveats for Release 12.2(2)XI

This section describes possibly unexpected behavior by software Release 12.2(2)XI and above.

Resolved Caveats for Release 12.2(2)XI

This section describes possibly unexpected behavior by software releases prior to Release 12.2(2)XI that have been resolved in Release 12.2(2)XI and above.

CSCdu46601

The IOS DHCP client code does not correctly parse option 150 if the length is greater than 4 (more than 1 IP address), and thus parsing of later options in the same DHCP response fails. This defect has been fixed in Release 12.2(2)XI. Support for more than one TFTP server IP address is available.

Unresolved Caveats for Release 12.2(2)XI

This section describes possibly unexpected behavior by software Release 12.2(2)XI.

Cisco 801-804 Routers

CSCdu52623

When directly configuring encapsulation of X.25 under D channel, the c800 will not bring up Layer 2 even with **isdn tei-negotiation powerup** set. A **no shutdown** or a **clear interface bri 0** is needed to bring up the interface.

A possible work around is to use X.25 encapsulation under a dialer interface.

CSCdu77946

Layer 2 timer trace back occurs intermittently during shut down of BRI interface when X.25 over D is configured. It does not affect functionality.

Cisco 827 Routers

CSCdu74749

The router does not generate a user-busy tone when the receiver is offhook. When the phone connected to one of the voice-ports is offhooked, and a call is made to that port from a remote phone, the remote phone does not get the correct user-busy tone. The caller instead of hearing a “User Busy Tone” hears a “No Circuit Available” tone. The difference in the “User Busy” tone and the “No Circuit Available” tone is generally not distinguishable to the human ear.

The problem has no workaround.

CSCdv02785

When calling-party name is not available, some caller-ID devices display the calling number and also the message “Number not available”. For example, some Italian caller-ID devices display “NON disponibile,” which means “Number Not Available” and at the same time display the calling number. The message that should appear is “No Name,” meaning the name of the calling side is not known.

In order to associate a name with a given voice-port on the calling-side, the caller must configure **station-id name** *station-name* on the voice-port from which call will be made.

CSCdv03686

The caller-id will sometimes not be displayed when calls are received in quick succession on a given voice-port if the cptone configured for that voice port is Denmark (**dk**). The workaround for this problem is to enter the voice-port configuration mode command **timing digit 70** on all voice ports for which the configured cptone is **dk**.

CSCdv03489

The 827-4V router supports dial-tone DTMF digit outgoing calls only. Pulse dialing mode currently isn't supported.

CSCdv12488

ATM cells sent from the 827-series routers have CRC errors at the rate of approximately 0.15%.

Related Documentation

The following sections describe the documentation available for the Cisco 800 Series Routers. Typically, these documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, feature modules, and other documents.

Documentation is available as printed manuals or electronic documents, except for feature modules and these release notes, which are available online on Cisco.com and the Documentation CD-ROM.

Use these release notes with the documents listed in the following sections:

- Release-Specific Documents
- Platform-Specific Documents
- Feature Modules
- Cisco IOS Software Documentation Set

Release-Specific Documents

The following documents are specific to Release 12.2 and apply to Release 12.2(2)XI2. They are located on Cisco.com and the Documentation CD-ROM:

- *Release Notes for Cisco IOS Release 12.2(2)XI2*
  - To reach the *Release Notes for the Cisco IOS Release 12.2(2)XI2* from Cisco.com, click this path (under the heading **Service & Support**):

    Technical Documents: **Cisco IOS Software**: **Release 12.2**: **Release Notes**: **<platform> Routers**: **<platform> Series - Release Notes for Release 12.2(2)XI**
  - To reach the *Release Notes for the Cisco 800 Series Routers for Cisco IOS Release 12.2(2)XI2* on the Documentation CD-ROM, click this path:

    Cisco Product Documentation: Cisco IOS Software Configuration: **Cisco IOS Release 12.2**: **Release Notes**: **Cisco 800 Series Routers**: **Cisco 800 Series - Release Notes for Release 12.2(2)XI**

- *Release Notes for Cisco IOS Release 12.2*
  - To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2* from Cisco.com, click this path (under the heading **Service & Support**):

    Technical Documents: **Cisco IOS Software**: **Release 12.2**: **Release Notes**: **Cross-Platform Release Notes** (Cisco IOS Release 12.2)
  - To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2* on the Documentation CD-ROM, click this path:

    Cisco Product Documentation: Cisco IOS Software Configuration: **Cisco IOS Release 12.2**: **Release Notes**: **Cross-Platform Release Notes**
- Product bulletins, field notices, and other release-specific documents

  To reach these documents from Cisco.com, click this path (under the heading **Service & Support**):

  Technical Documents: **Product Bulletins**
- *Caveats for Cisco IOS Release 12.2 and 12.2 T*

  The *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2 T* documents contain caveats applicable to all platforms for all maintenance releases of Release 12.2.
  - To reach the caveats document from Cisco.com, click this path (under the heading **Service & Support**):

    Technical Documents: **Cisco IOS Software**: **Release 12.2**: **Caveats**
  - To reach the caveats document on the Documentation CD-ROM, click this path:

    Cisco Product Documentation: **Cisco IOS Software Configuration**: **Cisco IOS Release 12.2**: **Caveats**

Note If you have an account with Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in toCisco.com and click **Service & Support**: **Technical Assistance Center**: **Tool Index**: **Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl.

Platform-Specific Documents

Hardware installation guides, configuration and command reference guides, and additional documents are available for the SOHO 77 Routers and Cisco 800 Series Routers on Cisco.com and the Documentation CD-ROM:

Cisco 800 Series and SOHO 77 Routers

Documents specific to the Cisco 800 series and SOHO 77 routers are on Cisco.com:

Technical Documents: **Documentation Home Page**: **Access Servers and Access Routers**: **Fixed Configuration Access Routers**: **<platform_name>**

On the Documentation CD-ROM:

Cisco Product Documentation: **Access Servers and Access Routers**: **Fixed Configuration Access Routers**: **<platform_name>**

Software Configuration

This document is available for the Cisco 800 Series and SOHO 77 routers on Cisco.com and the Documentation CD-ROM: *Cisco Router Web Setup User Guide*.

On Cisco.com at:

Technical Documents: **Router Configuration Tools**: **Cisco Router Web Setup**

On the Documentation CD-ROM at:

Cisco Product Documentation: **Router Configuration Tools**: **Cisco Router Web Setup**

Feature Modules

Feature modules describe new features supported by Release 12.2 and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

To reach the Release 12.2 feature modules:

- From Cisco.com, click this path (under the heading **Service & Support**):

  Technical Documents: **Cisco IOS Software**: **Release 12.2**: **New Feature Documentation**: **New Features in 12.2-Based Limited Lifetime Releases**: **New Features in 12.2X Releases**

- From the Documentation CD-ROM, click this path:

  Cisco Product Documentation: **Cisco IOS Software Configuration**: **Cisco IOS Release 12.2**: **New Feature Documentation**: **New Features in 12.2-Based Limited Lifetime Releases**: **New Features in 12.2X Releases**

Feature Navigator

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a particular set of features and which features are supported in a particular Cisco IOS image. Feature Navigator is available 24 hours a day, 7 days a week.

To access Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, e-mail the Contact Database Administration group at cdbadmin@cisco.com. If you do not have an account on Cisco.com, go to http://www.cisco.com/register and follow the directions to set up an account.

To use Feature Navigator, you must have a JavaScript-enabled web browser such as Netscape 3.0 or later, or Internet Explorer 4.0 or later. Internet Explorer 4.0 always has JavaScript enabled. To enable JavaScript for Netscape 3.x or Netscape 4.x, follow the instructions provided with the web browser. For JavaScript support and enabling instructions for other browsers, check with the browser vendor.

Feature Navigator is updated when major Cisco IOS software releases and technology releases occur. You can access Feature Navigator at the following URL:

http://www.cisco.com/go/fn

Cisco IOS Software Documentation Set

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

Documentation Modules

Each module in the Cisco IOS documentation set consists of one or more configuration guides and one or more corresponding command references. Chapters in a configuration guide describe protocols, configuration tasks, and Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference. The Cisco IOS software documentation set is available on Cisco.com and on the Documentation CD-ROM.

On Cisco.com (under the heading **Service & Support**) at:

Technical Documents: **Cisco IOS Software**: **Release 12.2**: **Configuration Guides and Command References**

On the Documentation CD-ROM at:

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

Release 12.2 Documentation Set

Table 15 on page 26 lists the contents of the Cisco IOS Release 12.2 software documentation set, which is available in both electronic and printed form.

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

On Cisco.com (under the heading **Service & Support**) at:

Technical Documents: **Cisco IOS Software**: **Release 12.2**

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2

Table 15 Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
• *Cisco IOS Configuration Fundamentals Configuration Guide* • *Cisco IOS Configuration Fundamentals Command Reference*	Cisco IOS User Interfaces File Management System Management
• *Cisco IOS Bridging and IBM Networking Configuration Guide* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2*	Transparent Bridging SRB Token Ring Inter-Switch Link Token Ring Route Switch Module RSRB DLSw+ Serial Tunnel and Block Serial Tunnel LLC2 and SDLC IBM Network Media Translation SNA Frame Relay Access NCIA Client/Server Airline Product Set DSPU and SNA Service Point SNA Switching Services Cisco Transaction Connection Cisco Mainframe Channel Connection CLAW and TCP/IP Offload CSNA, CMPC, and CMPC+ TN3270 Server
• *Cisco IOS Dial Technologies Configuration Guide* • *Cisco IOS Dial Technologies Command Reference*	Preparing for Dial Access Modem and Dial Shelf Configuration and Management ISDN Configuration Signaling Configuration Dial-on-Demand Routing Configuration Dial Backup Configuration Dial Related Addressing Service Virtual Templates, Profiles, and Networks PPP Configuration Callback and Bandwidth Allocation Configuration Dial Access Specialized Features Dial Access Scenarios
• *Cisco IOS Interface Configuration Guide* • *Cisco IOS Interface Command Reference*	LAN Interfaces Serial Interfaces Logical Interfaces
• *Cisco IOS IP Configuration Guide* • *Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services* • *Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols* • *Cisco IOS IP Command Reference, Volume 3 of 3: Multicast*	IP Addressing and Services IP Routing Protocols IP Multicast
• *Cisco IOS AppleTalk and Novell IPX Configuration Guide* • *Cisco IOS AppleTalk and Novell IPX Command Reference*	AppleTalk Novell IPX

Table 15 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide* • *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference*	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
• *Cisco IOS Voice, Video, and Fax Configuration Guide* • *Cisco IOS Voice, Video, and Fax Command Reference*	Voice over IP Call Control Signaling Voice over Frame Relay Voice over ATM Telephony Applications Trunk Management Fax, Video, and Modem Support
• *Cisco IOS Quality of Service Solutions Configuration Guide* • *Cisco IOS Quality of Service Solutions Command Reference*	Packet Classification Congestion Management Congestion Avoidance Policing and Shaping Signaling Link Efficiency Mechanisms
• *Cisco IOS Security Configuration Guide* • *Cisco IOS Security Command Reference*	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options Supported AV Pairs
• *Cisco IOS Switching Services Configuration Guide* • *Cisco IOS Switching Services Command Reference*	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
• *Cisco IOS Wide-Area Networking Configuration Guide* • *Cisco IOS Wide-Area Networking Command Reference*	ATM Broadband Access Frame Relay SMDS X.25 and LAPB
• *Cisco IOS Mobile Wireless Configuration Guide* • *Cisco IOS Mobile Wireless Command Reference*	General Packet Radio Service

Table 15 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• *Cisco IOS Terminal Services Configuration Guide* • *Cisco IOS Terminal Services Command Reference*	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
• *Cisco IOS Configuration Guide Master Index* • *Cisco IOS Command Reference Master Index* • *Cisco IOS Debug Command Reference* • *Cisco IOS Software System Error Messages* • New Features in 12.2-Based Limited Lifetime Releases • New Features in Release 12.2 T • Release Notes (Release note and caveat documentation for 12.2-based releases and various platforms)	

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

The most current Cisco documentation is available on the World Wide Web at http://www.cisco.com. Translated documentation can be accessed at http://www.cisco.com/public/countries_languages.shtml.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

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

You can e-mail your comments to bug-doc@cisco.com.

For your convenience, many documents contain a response card behind the front cover for submitting your comments by mail. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

The following sections provide sources for obtaining technical assistance from Cisco Systems.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

http://www.cisco.com/register/

Cisco.com registered users who cannot resolve a technical issue by using the TAC online resource can open a case online by using the TAC Case Open tool at the following website:

http://www.cisco.com/tac/caseopen

Contacting TAC by Telephone

If you have a priority level 1(P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

This document is to be used in conjunction with the documents listed in the "Related Documentation" section on page 22.