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Release Notes for Cisco 800 Series Routers for Cisco IOS Release 12.0(1)XB

March 2, 1999

These release notes describe the new features and significant software components for Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1 for Cisco 800 series routers.

Note The Cisco 800 series routers support a subset of the Cisco IOS features described in these release notes. The Cisco IOS features that are available for the Cisco 800 series routers are listed in the section “Cisco IOS Feature Sets for Cisco 800 Series Routers” on page 3.

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System Requirements

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Memory Requirements

This section describes the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1 on Cisco 800 series routers.

Table 1 Release 12.0 Memory Requirements for Cisco 800 Routers

Platform/Feature Set	Image Name	Minimum Required Code Memory	Required Main Memory	Release 12.0 Runs from
IP	c800-g3-mw	8 MB Flash	4 MB DRAM	RAM
IP Plus	c800-g3s-mw	8 MB Flash	4 MB DRAM	RAM
IP/IPX Plus	c800-g3n-mw	8 MB Flash	4 MB DRAM	RAM
IP/X.25	c800-g3x-mw	8 MB Flash	4 MB DRAM	RAM

Cisco 800 Series Routers

The Cisco 800 series routers connect small professional offices over Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) lines to corporate networks and to the Internet. Table 2 summarizes the Cisco 800 series routers and the ports that each model offers.

Table 2 Cisco 800 Series Router Ports

Router	Ethernet Ports	ISDN Ports	Telephone Ports	Console Ports
Cisco 801	One 10BaseT (RJ-45)	ISDN BRI S/T (RJ-45)	–	RJ-45
Cisco 802	One 10BaseT (RJ-45)	ISDN BRI U, integrated Network Termination 1 (NT1) (RJ-45)	–	RJ-45
Cisco 803	Four-port 10BaseT (RJ-45) hub	ISDN BRI S/T (RJ-45)	Two (RJ-11)	RJ-45
Cisco 804	Four-port 10BaseT (RJ-45) hub	ISDN BRI U, integrated NT1 (RJ-45)	Two (RJ-11)	RJ-45

The Cisco 800 series routers provide the following key features:

- Cisco 802 and Cisco 804 routers have an integrated NT1, which eliminates the need for an external NT1 in North America.
- Cisco 803 and Cisco 804 routers provide connection to analog telephones, fax machines, or modems, which are connected to telephone services through an ISDN line.
- Flash memory: 8 MB default, expandable to 16 MB.
- Dynamic RAM: 4 MB, expandable to 12 MB.
- 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.

Cisco IOS Feature Sets for Cisco 800 Series Routers

The following list shows which feature sets are supported on the Cisco 800 series routers. These feature sets only apply to Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1:

- IP
- IP Plus
- IP/IPX Plus
- IP/X.25

Feature Set Tables

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 800 series routers. The feature set table uses the following symbol conventions to identify features:

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

Note This feature set table contains only a selected list of features. This table is not a cumulative or complete list of all the features in each image.

Table 3 Cisco IOS Software Feature Sets for the Cisco 800 Routers

Features	Feature Set			
	IP	IP Plus	IP/IPX Plus	IP/X.25
IP Routing				
Easy IP Phase 1- NAT (including NAT overload, which is also known as PAT) and PPP/IPCP	Yes	Yes	Yes	Yes
Easy IP Phase 2-DHCP Server	Yes	Yes	Yes	Yes
Cisco IOS STP Enhancements	Yes	Yes	Yes	Yes
IP Type of Service and Precedence for GRE Tunnels	No	Yes	Yes	Yes
ISDN MIB RFC 2127	Yes	Yes	Yes	Yes
NAT (includes NAT overload)	Yes	Yes	Yes	Yes
OSPF Packet Pacing	No	No	No	No
OS IFSS Featurette	No	No	No	No
Protocol-Independent Multicast (PIM) Version 2	No	No	No	No
IBM Support				
Bridging Code Rework	No	No	No	No
RIF Passthru in DLSw+	No	No	No	No

System Requirements

Table 3 Cisco IOS Software Feature Sets for the Cisco 800 Routers

Features	Feature Set			
	IP	IP Plus	IP/IPX Plus	IP/X.25
Security				
AAA Support for MS-CHAP	Yes	Yes	Yes	Yes
Additional Vendor-Proprietary RADIUS Attributes	No	No	No	No
Authenticating ACL	No	No	No	No
Automated Double Authentication	Yes	Yes	Yes	Yes
Context-Based Access Control (CBAC)	No	No	No	No
Certificate Authority Interoperability	No	No	No	No
Internet Key Exchange Security Protocol	No	No	No	No
IPSec Network Security	No	No	No	No
Named Method Lists for AAA Authentication & Accounting	No	No	No	No
Management				
VPDN MIB Feature	No	No	No	No
WAN Services				
Always On/Dynamic ISDN	No	No	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes
Interface Name Modularity	No	No	No	No
MPPC- MS PPP Compression	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes
Mobile IP	No	No	No	No
Level 2 Tunnel Protocol (L2TP)	No	No	No	No
PPP Over Frame Relay	No	No	No	No
RIP Enhancements	Yes	Yes	Yes	Yes
Time-Based Access Lists	Yes	Yes	Yes	Yes
Switching				
Multiple ISDN Switch Types	Yes	Yes	Yes	Yes
National ISDN Switch Type	Yes	Yes	Yes	Yes
Scalability				
Airline Product Set (ALPS)	No	No	No	No
Cisco IOS File System	No	No	No	No
Conditionally Triggered Debugging	No	No	No	No
Entity MIB	No	No	No	No
Expression MIB	No	No	No	No
OSPF Point to Multipoint	No	No	No	No

The Cisco 800 series routers also support the features listed in Table 4.

Table 4 Additional Features supported by Cisco 800 Routers

Feature	IP	IP Plus	IP/IPX Plus	IP/X.25
Routed Protocol	IP	IP	IP/IPX	IP
Routing Protocol	RIP	RIP/EIGRP	RIP/EIGRP/IPXWAN	RIP/EIGRP
	Snapshot	Snapshot	Snapshot	Snapshot
Tunneling		GRE	GRE	GRE
X.25			X.25	X.25
SNTP (time)		SNTP	SNTP	SNTP
Multicast		IP Multicast Forwarding	IP Multicast Forwarding	IP Multicast Forwarding
Management	SNMP	SNMP/SYSLOG	SNMP/SYSLOG	SNMP/SYSLOG

New and Changed Information

The following sections list the new features supported by the Cisco 800 series routers in Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1.

New Software Features

The following new features in Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1 are available for the Cisco 800 series routers. These Cisco IOS releases also support the features in Cisco IOS Release 12.0(1)T, which are described in the *Release Notes for Cisco IOS Release 12.0T*. To access this document, see the “Related Documentation” section later in this document.

Voice Features Over ISDN

The Cisco 800 series routers support the connection of analog telephones, fax machines, and modems. These devices are connected to basic telephone services through the ISDN line. The routers support the following supplementary services, which can be ordered from the telephone service provider:

- Call holding and retrieving (North America only)
- Call waiting (North America only)
- Three-way call conferencing (North America only)
- Call transferring (North America only)
- Call forwarding (Sweden and Finland only)

The ISDN voice priority feature controls the priority of data and voice calls for the devices connected to the router telephone ports. If an ISDN circuit endpoint is busy with a data call or calls, and either a voice call comes in or you attempt to place a voice call, the data call is handled per the voice priority setting.

Automatic Detection of ISDN Switch and SPIDs

This feature applies to North America only. The Cisco 800 series routers can detect the ISDN switch that supports the ISDN line and the service profile identifiers (SPIDs) assigned by the telephone service provider. SPIDs identify the ISDN B channels. The SPID format is generally an ISDN telephone number with numbers added to it, for example, 40855522220101. Depending on the switch that supports the ISDN line, the ISDN line could be assigned zero, one, or two SPIDs.

Important Notes

This section describes warnings and cautions about using the Cisco IOS Release 12.0(1)XB software.

B Channel Activation

When a call comes in, a B channel is activated. If the amount of traffic on the B channel exceeds a threshold, the other B channel is activated. If the amount of traffic falls below the threshold, one of the B channels is deactivated. The B channel that is initially activated when the call comes in is not necessarily B1 nor is the B channel that is deactivated when the traffic level lessens necessarily B2.

Dial Peer Limitation

The **isdn answer1** and **isdn answer2** commands determine which called telephone numbers, for example, 555-1111 and 555-2222, a Cisco 800 series router can answer. Using these commands limits a router to using the two dial peers that contain the telephone numbers 555-1111 and 555-2222. (When not using these commands, a router can use up to six dial peers.)

A sample scenario in which the **isdn answer1** and **isdn answer2** commands are used is when a Cisco 801 or Cisco 803 router is connected with other ISDN devices to an ISDN S-bus.

Excessive ISDN Line Activation

The following protocols send updates that can cause an ISDN line to be activated excessively thereby increasing your monthly ISDN line cost:

- IP
- User Datagram Protocol (UDP)
- IPX
- Cisco Discovery Protocol (CDP)
- Simple Network Time Protocol (SNTP)

For information on preventing this situation, refer to the *Cisco 800 Series Routers Software Configuration Guide*. This guide contains information on setting up extended access lists to prevent IP, UDP, IPX, and SNTP updates from activating the ISDN line. For CDP, make certain that you enter the **no cdp enable** command to disable CDP.

Phone Mate Answering Machine Model 9200

Phone Mate answering machine model 9200 failed to recognize the ringing signal sent by AMD R79 ringing SLIC. This was confirmed by testing against Phone Mate model 3750 and newer model 9300.

Open Caveats

This section describes possibly unexpected behavior by Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1. This section describes only severity 1 and 2 caveats.

In addition, some caveats in Cisco IOS Releases 12.0(1) T apply to Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1. For descriptions of Cisco IOS Release 12.0 T caveats, see the *Cisco IOS Software Release 12.0 T Caveats*. To access this document, see the section, “Related Documentation.”

- After the Cisco 800 series router is reloaded without any configuration and **no shut** is issued at the BRI interface, autodetection of the 5ESS Custom line fails. The N1 and DMS lines are detected successfully.

For example, the following sequence of events causes a failure:

- Bring up the box without any configuration
- Followed by the following commands:

```
no shut
isdn spid1 0 4081234567
isdn spid2 0 4081234568
isdn autodetect
```

The proper sequence of events is as follows:

- Bring up the box without any configuration
- Enter the following commands:

```
isdn spid1 0 4081234567
isdn spid2 0 4081234568
isdn autodetect
```

[CSCdk44854]

- The router could unexpectedly reset when showing the IP nat tables. This problem is fixed in Cisco IOS Release 12.0(1)XB1. [CSCdk67122 and CSCdk70045]
- Cisco 800 series routers configured for multilink and STAC compression experience a page leak after prolonged usage. Performance degrades until the router runs so slowly that no useful work is accomplished. This is accompanied by continuous and heavy blinking of the OK LED. This condition is rare (roughly 1 in 50 units experience it) and may take several days to manifest, depending on the number of calls. To work around this problem, disable multilink or disable STAC compression. A soft or hard reset (for example, reload command or power cycle) is the only way to clear the problem after it occurs. This problem is fixed in Cisco IOS Release 12.0(1)XB1. [CSCdk67834]
- Layer 1 is deactivated on some Euro-ISDN switches. This problem is fixed in Cisco IOS Release 12.0(1)XB1. [CSCdk77273]
- If a User Datagram Protocol (UDP) packet with an invalid length is sent to port 514 (the “syslog” port) on an IOS device, the device is likely to reload. In this situation, a stack trace might not be saved. Such packets are sent by the popular nmap port scanning program.

You can work around this vulnerability by preventing any affected Cisco IOS device from receiving or processing UDP datagrams addressed to its port 514. This can be done either using packet filtering on surrounding devices, or by using input access list filtering on the affected IOS device itself.

If you use an input access list, that list should be applied to all interfaces to which attackers may be able to send datagrams. This includes not only physical LAN and WAN interfaces, but virtual subinterfaces of those physical interfaces, as well as virtual interfaces and/or interface templates corresponding to GRE, L2TP, L2F, and other tunnelling protocols.

The input access list must block traffic destined for any of the Cisco IOS device's own IP addresses, as well as for any broadcast or multicast addresses on which the Cisco IOS device may be listening. It's important to remember to block old-style "all-zeroes" broadcasts as well as new-style "all-ones" broadcasts.

There is no single input access list that will work in all configurations. It is very important that you understand the effect of your access list in your specific configuration before you activate the list.

The following example shows a possible access list for a three-interface router, along with the configuration commands needed to apply that access list. The example assumes no need for input filtering other than as a workaround for this vulnerability.

```
! Deny all multicasts, and all unspecified-net broadcasts, to port 514
access-list 101 deny udp any 224.0.0.0 31.255.255.255 eq 514
! Deny old-style unspecified-net broadcasts
access-list 101 deny udp any host 0.0.0.0 eq 514
! Deny network-specific broadcasts. This example assumes that all of
! the local interfaces are on the class B network 172.16.0.0, subnetted
! everywhere with mask 255.255.255.0. This will differ from network
! to network. Note that we block both new-style and old-style broadcasts.
access-list 101 deny udp any 172.16.0.255 0.0.255.0 eq 514
access-list 101 deny udp any 172.16.0.0 0.0.255.0 eq 514
! Deny packets sent to the addresses of our own network interfaces.
access-list 101 deny udp any host 172.16.1.1 eq 514
access-list 101 deny udp any host 172.16.2.1 eq 514
access-list 101 deny udp any host 172.16.3.3 eq 514
! Permit all other traffic (default would be to deny)
access-list 101 permit ip any any

! Apply the access list to the input side of each interface
interface ethernet 0
ip address 172.16.1.1 255.255.255.0
ip access-group 101 in

interface ethernet 2
ip address 172.16.2.1 255.255.255.0
ip access-group 101 in

interface ethernet 3
ip address 172.16.3.3 255.255.255.0
ip access-group 101 in
```

It can be complicated to list all possible addresses, and especially all possible broadcast addresses, to which attack packets might be sent. If you do not expect to receive any legitimate syslog traffic on an interface, you may wish to simply block all syslog traffic arriving on that interface. Remember that this will affect traffic routed through the Cisco IOS device as well as traffic destined to the device.

Input access lists have an impact on system performance, and should be installed with a degree of caution, especially on systems that are running very near their capacity limits. [CSCdk77426]

Related Documentation

The following sections describe the documentation available for the Cisco 800 series routers. Typically these documents consist of hardware installation guides, software installation guide guides, Cisco IOS configuration and command references, system error messages, and feature modules, which are updates to the Cisco IOS documentation. Documentation is available as printed manuals or electronic documents, except for feature modules, which 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.

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

- Cisco IOS Software Documentation
- Platform-Specific Documents
- Software Documents

Cisco IOS Software Documentation

The release notes for Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1 should be used in conjunction with the *Release Notes for Cisco IOS Release 12.0 T*. This document describes the release from which the current special release is derived.

Additional documentation for Cisco IOS Release 12.0 T is listed below.

To access release-specific documentation on the documentation CD-ROM, follow this path:

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

The following documents apply to Cisco IOS Releases 12.0(1)XB and 12.0(1)XB1:

- *Cisco IOS 12.0 Configuration Guides, Command References*
- *Cisco IOS 12.0 Dial Solutions Quick Configuration Guide*
- *Cisco IOS 12.0 System Error Messages*
- *Cisco IOS 12.0 Debug Command Reference*
- *Cisco IOS 12.0 Command Summary*
- *Cisco IOS 12.0 New Features*
- *Release Notes for Cisco IOS Release 12.0*
- *Product Specific Release Notes for Cisco IOS Release 12.0*
- *Cisco IOS Software Release 12.0 and 12.0 T Caveats*
- *Cisco IOS 12.0 T New Features*
- *CIP Microcode Release Note and Upgrade Instructions*
- *Feature Pack Information*
- *Channel Port Adapter Microcode Release Notes*

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

Platform-Specific Documents

Hardware documentation for the Cisco 800 series routers is listed below. These documents ship with the Cisco 800 series routers.

To access hardware documents on CCO, follow this path:

Products and Ordering: Cisco Documentation: Cisco Product Documentation/Access Servers and Access Routers/Fixed Access Routers/Cisco 800

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

Cisco Product Documentation: Cisco Product Documentation/Access Servers and Access Routers/Fixed Access Routers/Cisco 800

The following documents are specific to the Cisco 800 series routers:

- *Cisco 800 Series Routers Hardware Installation Guide*
- *Quick Start Guide — Setting up Cisco 800 Series Routers*
- *Regulatory Compliance and Safety Info For Cisco 800 Series*
- *Cisco 800 Series Routers Software Configuration Guide*
- *Release Notes for Cisco 800 Series Routers*

Software Documents

Cisco IOS software documentation is listed in Table 5. Software documentation consists of the Cisco IOS configuration guides and command references and also includes several supporting documents. These documents are shipped with the Cisco 800 series routers in electronic form on the Documentation CD-ROM, unless you specifically ordered the printed version of the documents.

To access software documents on CCO, follow this path:

Products and Ordering: Cisco Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0

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

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

Table 5 Software Documents for Cisco 800 Series Routers

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Configuration Fundamentals Configuration Guide</i> • <i>Configuration Fundamentals Command Reference</i> 	Configuration Fundamentals Overview Cisco IOS User Interfaces File Management Interface Configuration System Management
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 1</i> • <i>Network Protocols Command Reference, Part 1</i> 	IP Addressing IP Services IP Routing Protocols
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 2</i> • <i>Network Protocols Command Reference, Part 2</i> 	AppleTalk Novell IPX
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 3</i> • <i>Network Protocols Command Reference, Part 3</i> 	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
<ul style="list-style-type: none"> • <i>Wide-Area Networking Configuration Guide</i> • <i>Wide-Area Networking Command Reference</i> 	ATM Frame Relay SMDS X.25 and LAPB
<ul style="list-style-type: none"> • <i>Security Configuration Guide</i> • <i>Security Command Reference</i> 	AAA Security Services Security Server Protocols Traffic Filtering Network Data Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options
<ul style="list-style-type: none"> • <i>Dial Solutions Configuration Guide</i> • <i>Dial Solutions Command Reference</i> 	Dial Business Solutions and Examples Dial-In Port Setup DDR and Dial Backup Remote Node and Terminal Service Cost-Control and Large-Scale Dial Solutions VPDN
<ul style="list-style-type: none"> • <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i> 	Switching Paths for IP Networks Virtual LAN (VLAN) Switching and Routing

Table 5 Software Documents for Cisco 800 Series Routers (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Bridging and IBM Networking Configuration Guide</i> • <i>Bridging and IBM Networking Command Reference</i> 	<ul style="list-style-type: none"> Transparent Bridging 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
<ul style="list-style-type: none"> • <i>Cisco IOS Software Command Summary</i> • <i>Dial Solutions Quick Configuration Guide</i> • <i>System Error Messages</i> • <i>Debug Command Reference</i> 	

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

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—Cisco Configuration Cookbooks offer easy-to-follow “recipes” for sample router configurations. The first cookbook in this new series contains network diagrams, sample configurations, and troubleshooting commands designed to help you set up and use various 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.

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, select **Documentation**, and click **Enter the feedback form**. After you complete the form, click **Submit** to send it to Cisco. We appreciate your comments.

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

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