



Release Notes for the Cisco Home Agent 1.2 Feature in Cisco IOS Release 12.2(8)ZB6

June 2003

Cisco IOS Release 12.2(8)ZB6 is a special release that is based on Cisco IOS Release 12.2, with the addition of enhancements to the Cisco Home Agent feature. The Cisco IOS Release 12.2(8)ZB6 is a release optimized for the Cisco Home Agent Release 1.2 feature on the Cisco 7206VXR router platform, and for the Cisco Multi-Processor WAN Application Module on the Cisco 6500 Catalyst Switch platform, and the 7600 Internet Router platform.

Contents

These release notes include important information and caveats for the Cisco PDSN software feature provided in Cisco IOS 12.2(8)ZB6 for the Cisco 7206 series router platform, and the Catalyst 6500 and 7600 Series Switch platforms.

Caveats for Cisco IOS Releases 12.2 can be found on CCO at:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cavs/122mcavs.htm>

Release notes for Cisco 7000 Family for Release 12.2T can be found on CCO at:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122reInt/7000/rn7000t.htm>

Release notes for the Cisco 6000 and 7600 Family for 12.2T can be found on CCO at:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122reInt/cat6000/index.htm>

This release note includes the following topics:

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Introduction

The Home Agent (HA) maintains mobile user registrations and tunnels packets destined for the mobile to the PDSN/FA. It supports reverse tunneling, and can securely tunnel packets to the PDSN using IPSec. Broadcast packets are not tunneled. Additionally, the HA performs dynamic home address assignment for the mobile. Home address assignment can be from address pools configured locally, through either DHCP server access, or from the AAA server.

System Requirements

This section describes the system requirements for Cisco IOS Release 12.2(8)ZB6:

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Memory Requirements

[Table 1](#) shows the memory requirements for the PDSN Software Feature Set that supports the Cisco 7206 router. The table also lists the memory requirements for the IP Standard Feature Set (for the Home Agent [HA]).

Table 1 Memory Requirements for the Cisco 7206 Router and the MWAM on the 6500 Catalyst Switch and 7600 Router

Platform	Software Feature Set	Image Name	Flash Memory Required	DRAM Memory Required	Runs From
Cisco 7206VXR Router	Home Agen Software Feature Set	c7200-h1is-mz.zb5 c7200-h1ik9s-mz.zb5	20 MB	512 MB	RAM
Cisco 6500 Catalyst Switch	Home Agent Software Feature Set	c6svc-mwam-h1is-v12 (This is a bundled image)	40MB	512MB	RAM
Cisco 7600 Internet Router	Home Agent Software Feature	c6svcmwam-h1is-v12 (This is a bundled image)	40MB	512MB	RAM

Hardware Supported

The Cisco IOS Release 12.2(8)ZB6 is a release optimized for the Cisco Home Agent Release 1.2 feature on the Cisco 7206VXR router platform, and for the Cisco Multi-Processor WAN Application Module on the Cisco 6500 Catalyst Switch platform and the 7600 Internet Router platform.

For recommended hardware configuration, and for a complete list of supported interfaces on the 7200 platform, refer to the 12.2(8)ZB Product Bulletin. If you require a different configuration you should consult with your Cisco representative before you order.

The recommended hardware configuration for Home Agent Release 1.2 is based on a Catalyst 6500 or 7600 chassis with a SUP2/MSFC2, and 512 MB of DRAM.

An IPSec Services Module (VPNSM) is required for hardware support of IPSec.

For a complete list of interfaces supported on 6500 and 7600 platforms, please refer to the on-line product information at Cisco.com home page. For hardware details on the 6500 and 7600 platforms, please refer to the Catalyst 6500 product specifications at <http://www.cisco.com/en/US/products/hw/switches/ps708/index.html>.

Software Compatibility

Cisco IOS Release 12.2(8)ZB6 is a special release that is developed on Cisco IOS Release 12.2.

Cisco IOS Release 12.2(8)ZB6 supports the same features that are in Cisco IOS Release 12.2, with the addition of the Cisco Home Agent Release 1.2 feature.

Determining the Software Version

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

```
Router#show version
Cisco Internetwork Operating System Software
IOS (tm) MWAM Software (MWAM-H1IS-M), Version 12.2(8)ZB6, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1) Synched to technology version 12.2(7.6)T
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2003 by cisco Systems, Inc.
```

Upgrading to a New Software Release

For information on upgrading to a new software release, see the product bulletin *Cisco IOS Software Upgrade Ordering Instructions* located at:

http://www.cisco.com/warp/public/cc/pd/iosw/prodlit/957_pp.htm

MIBs

Old Cisco Management Information Bases (MIBs) will be replaced in a future release. Currently, OLD-CISCO-* MIBs are being converted into more scalable MIBs—without affecting existing Cisco IOS products or NMS applications. You can update from deprecated MIBs to the replacement MIBs as shown in [Table 2](#).

Table 2 *Deprecated and Replacement MIBs*

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	To be decided
OLD-CISCO-DECNET-MIB	To be decided
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB CISCO-QUEUE-MIB
OLD-CISCO-IP-MIB	To be decided
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBs)
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB
OLD-CISCO-TS-MIB	To be decided
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	To be decided

Cisco IOS Feature Sets

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.

Cisco IOS Release 12.2(8)ZB6 supports the same feature sets as Cisco Release 12.2, with the exceptions that Cisco Release 12.2(8)ZB6 includes the Cisco Home Agent Release 1.2 feature. The Home Agent Release 1.2 feature is optimized for the Cisco 7206 router, the Cisco 6500 Catalyst Switch, and the 7600 Internet Router.



Caution

Cisco IOS images with strong encryption (including, but not limited to 168-bit (3DES) data encryption feature sets) are subject to United States government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay due to United States government regulations. When applicable, purchaser/user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Caveats

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

Caveats for Cisco IOS Releases 12.2 can be found on CCO at <http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cavs/122mcavs.htm>

The “Open Caveats” section lists open caveats that apply to the current release and might also apply to previous releases.

The “Resolved Caveats” section lists caveats resolved in a particular release, which may have been open in previous releases.



Note

If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: Cisco Bug Toolkit: Cisco Bugtool Navigator II**, or at <http://www.cisco.com/support/bugtools>.

Open Caveats

The following caveats are unresolved in Cisco Release 12.2(8)ZB6:

- CSCea04605

On a Cisco 7200, running Cisco’s Mobile Wireless Home Agent, the rate at which calls are brought up is low with static address assignment.

The workaround is to use dynamic home address assignment for better call setup rates.

- CSCin41426

On a Cisco PDSN router, when enabled for Foreign Agent service and Mobile IP session is opened by the Mobile. If the Mobile IP registration request contains Home Address 255.255.255.255 and PDSN is configured to include a Foreign-Home Authentication Extension to the Home Agent, PDSN doesnot add the extension.

Workaround is not to configure PDSN to add the Foreign-Home Authentication extension.

Resolved Caveats

This section lists bugs that are resolved or closed in Cisco IOS Release 12.2(8)ZB6.

- CSCea02355

Cisco routers and switches running Cisco IOS software and configured to process Internet Protocol version 4 (IPv4) packets are vulnerable to a Denial of Service (DoS) attack. A rare sequence of crafted IPv4 packets sent directly to the device may cause the input interface to stop processing traffic once the input queue is full. No authentication is required to process the inbound packet. Processing of IPv4 packets is enabled by default. Devices running only IP version 6 (IPv6) are not affected. A workaround is available.

Cisco has made software available, free of charge, to correct the problem.

This advisory is available at

<http://www.cisco.com/warp/public/707/cisco-sa-20030717-blocked.shtml>

- CSCin36374
When the MFCE extension is present, the Home agent will do HA-CHAP authentication for every Registration Request.
There is no workaround.
- CSCin43935
In the following scenario, the PDSN sends a Mobile IP registration request to the Home Agent, and the HA sends a registration response to the PDSN. The HomeAgent address field in the registration response is set to an address different from what the PDSN set in the registration request. In this case the PDSN creates a tunnel with the Home Agent address as in the registration request.
Instead, the PDSN should create tunnel with HomeAgent address as in registration response.
As a workaround, the PDSN and HA should perform dynamic home agent assignment.
- CSCin46162
The Home Agent will send the home address in Framed-IP-Address if the **ip mobile home-agent send-mn- address** command is configured.
There is no workaround. This is an enhancement.
- CSCin46318
This is an enhancement. If AAA returns a home IP address in “framed-ip-address” attribute in the HA-CHAP response, the home ip address is checked against a pool specified by the **authorized-pool pool name** command. If the address is verified, it will be assigned to the mobile, otherwise, a registration reject is sent to mobile.

Resolved Caveats in Releases Prior to 12.2(8)ZB6

This section lists bugs that are resolved or closed prior to Cisco IOS Release 12.2(8)ZB6

- CSCeb07800
Issuing **show ip mobile aaa requests host nai**, or **show ip mobile aaa requests host ipaddr** will reload the box when there are outstanding AAA requests on a Home Agent router.
There is no workaround.

Resolved Caveats in Releases Prior to 12.2(8)ZB5

This section lists bugs that were resolved or closed prior to Cisco IOS Release 12.2(8)ZB5

- CSCea45778
Cisco Home Agent router reloads when two or more mobiles with the same Network Access Identifier (NAI) have opened bindings with different Static Home Address. The Home Agent reloads when the realm based security configuration is done on the Home Agent. The command to configure realm based security configuration is **ip mobile secure host nai @realm spi spi-value key {hex | ascii} key-value**.
The workaround to this issue is to download security for the Mobile from the AAA by using the command **ip mobile host nai @realm ... aaa** command. An alternate way to prevent the reload is to configure security for an individual user on the Cisco Home Agent by issuing the **ip mobile secure host nai username@realm spi spi-value key** command.

- CSCin36308
HA will reload only when “ip mob secure host nai @realm/@” is configured on the HA, and the MN retries with Mobile IP Registration retry requests before AAA server authentication failure/timeout response.
As a workaround, you can perform one of the following tasks:
 - Do not configure the **ip mob secure host nai realm** command on the HA and use AAA.
 - Have MN Mobile IP Registration retry timeout greater than AAA response/timeout value.
- CSCin36361
When Mobile IP bindings are added with Group NAI security associations configured for a mobile that is requesting a static ip address, then the binding is added incorrectly. The username in the NAI is stripped off, therefore only the *realm* portion is added to the binding.
The command used to configure a group nai based security association is **ip mobile secure host nai @realm spi spi-value key ascii key-value**
The workaround is do not use group nai security association for static IP address case.

Resolved Caveats in Releases Prior to 12.2(8)ZB2

This section lists bugs that are resolved or closed prior to Cisco IOS Release 12.2(8)ZB2

- CSCea01803
A memory leak is observed in the HomeAgent when MIP calls are setup and torn down.
There is no workaround.
- CSCdz88565
On a Cisco IOS 12.2-ZB1 based HA software, an error code of 70 (Poorly Formed Request) is included in the Registration deny message. This should have been error code 134 (as per RFC-2002 and 3220).
Additionally, the MIB counter value may not get incremented, and the statistics for “Bad Request Form” within **sh ow mobile traffic** may not increment either.
There is no workaround.
- CSCin24042
On the HA, data packets sent to MN immediately after the session establishment will be dropped. This happens only for the first MN on the tunnel, and with the tunnel scalability feature enabled.
There is no workaround.
- CSCin28187
In HA, the tunnel input bytes in **show ip mobile tunnel** shows wrong value (some extra bytes) when CEF is enabled.
There is no workaround.

This section lists bugs that were resolved or closed prior to Cisco IOS Release 12.2(8)ZB1

- CSCdy52820
When multiple, redundant, RADIUS servers are configured for authentication on the HA, and the primary RADIUS server fails, MoIP sessions fail to come up. RRQs are rejected with “Identification Mismatch”.

The HA compares the RRQ's timestamp with its own timestamp only after receiving an Access-Accept. In the abnormal case where the Access-Accept is delayed, the RRQ is rejected.

As a workaround, the timeout for the radius server may be set to a value less than the replay protection period.

- CSCdz32147

While opening and closing MOIP sessions using 6500 MWAM PDSN, the HA reloads when the **show ip mobile tunnel** command is issued.

There is no workaround.

- CSCdz37266

In the case of HA Redundancy, whenever a packet to the MN needs to be fragmented, but the DF bit is set, ICMP unreachable packet will not be sent to the sender of the packet.

A workaround is to disable the Tunnel scalability feature.

Related Documentation

Except for feature modules, documentation is available as printed manuals or electronic documents. Feature modules are available online on CCO and the Documentation CD-ROM.

Use these release notes with these documents:

- [Release-Specific Documents, page 8](#)
- [Platform-Specific Documents, page 9](#)
- [Feature Modules, page 9](#)
- [Cisco IOS Software Documentation Set, page 10](#)

Release-Specific Documents

The following documents are specific to Cisco IOS Release 12.2(8)ZB2:

- *Cisco Mobile Wireless Home Agent* at the following url:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zb1/index.htm>

The following documents are specific to Release 12.2 and are located on CCO and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.2*

On CCO at:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: Cross-Platform Release Notes

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Cross-Platform Release Notes

- *Caveats for Cisco IOS Release 12.1 T*

See *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2T*, which contain caveats applicable to all platforms for all maintenance releases of Release 12.2 and Release 12.2 T.

On CCO at:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Caveats

On the Documentation CD-ROM at:

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



Note If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: Cisco Bug Toolkit: Cisco Bugtool Navigator II**, or at <http://www.cisco.com/support/bugtools>.

- Product bulletins, field notices, and other release-specific documents on CCO at:

Technical Documents

Platform-Specific Documents

Documentation specific to the Cisco 7206 Router is located at the following locations:

- On CCO at: <http://www.cisco.com/univercd/cc/td/doc/product/core/7200vx/index.htm>
- On the Documentation CD-ROM at: **Cisco Product Documentation: Core/High-End Routers: Cisco 7206**

Documentation specific to the Cisco 7600 Router is located at the following location:

- On CCO at: <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7600/index.htm>

Documentation specific to the Cisco Catalyst 6500 Switch is located at the following location:

- <http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/index.htm>

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.

On CCO at:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.2: New Feature Documentation

On the Documentation CD-ROM at:

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

Cisco IOS Software Documentation Set

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

Documentation Modules

Each module in the Cisco IOS documentation set consists of two books: a configuration guide and a corresponding command reference. Chapters in a configuration guide describe protocols, configuration tasks, Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On CCO and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On CCO at:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS 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 3](#) describes the contents of the Cisco IOS Release 12.2 software documentation set, which is available in electronic form and in printed form when ordered.



Note

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

On CCO at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2

On the Documentation CD-ROM at:

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

Table 3 Cisco IOS Software Release 12.2 Documentation Set

Books	Major Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> • <i>Cisco IOS Configuration Fundamentals Command Reference</i> 	Cisco IOS User Interfaces Cisco IOS File Management Cisco IOS System Management
<ul style="list-style-type: none"> • <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i> • <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume I</i> • <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume II</i> 	Using Cisco IOS Software Overview of SNA Internetworking Bridging IBM Networking
<ul style="list-style-type: none"> • <i>Cisco IOS Dial Services Configuration Guide: Terminal Services</i> • <i>Cisco IOS Dial Services Configuration Guide: Network Services</i> • <i>Cisco IOS Dial Services Command Reference</i> 	Preparing for Dial Access Modem Configuration and Management ISDN and Signalling Configuration PPP Configuration Dial-on-Demand Routing Configuration Dial-Backup Configuration Terminal Service Configuration Large-Scale Dial Solutions Cost-Control Solutions Virtual Private Networks X.25 on ISDN Solutions Telco Solutions Dial-Related Addressing Services Interworking Dial Access Scenarios
<ul style="list-style-type: none"> • <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Reference</i> 	Interface Configuration Overview Configuring LAN Interfaces Configuring Serial Interfaces Configuring Logical Interfaces
<ul style="list-style-type: none"> • <i>Cisco IOS IP and IP Routing Configuration Guide</i> • <i>Cisco IOS IP and IP Routing Command Reference</i> 	IP Addressing and Services IP Routing Protocols IP Multicast
<ul style="list-style-type: none"> • <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i> • <i>Cisco IOS AppleTalk and Novell IPX Command Reference</i> 	AppleTalk and Novell IPX Overview Configuring AppleTalk Configuring Novell IPX
<ul style="list-style-type: none"> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i> 	Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Overview Configuring Apollo Domain Configuring Banyan VINES Configuring DECnet Configuring ISO CLNS Configuring XNS
<ul style="list-style-type: none"> • <i>Cisco IOS Multiservice Applications Configuration Guide</i> • <i>Cisco IOS Multiservice Applications Command Reference</i> 	Multiservice Applications Overview Voice Video Broadband

Table 3 Cisco IOS Software Release 12.2 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Quality of Service Solutions Configuration Guide</i> • <i>Cisco IOS Quality of Service Solutions Command Reference</i> 	Quality of Service Overview Classification Congestion Management Congestion Avoidance Policing and Shaping Signalling Link Efficiency Mechanisms Quality of Service Solutions
<ul style="list-style-type: none"> • <i>Cisco IOS Security Configuration Guide</i> • <i>Cisco IOS Security Command Reference</i> 	Security Overview Authentication, Authorization, and Accounting (AAA) Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Other Security Features
<ul style="list-style-type: none"> • <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i> 	Cisco IOS Switching Services Overview Cisco IOS Switching Paths Cisco Express Forwarding NetFlow Switching MPLS Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
<ul style="list-style-type: none"> • <i>Cisco IOS Wide-Area Networking Configuration Guide</i> • <i>Cisco IOS Wide-Area Networking Command Reference</i> 	Wide-Area Networking Overview Configuring ATM Configuring Frame Relay Configuring Frame Relay-ATM Interworking Configuring SMDS Configuring X.25 and LAPB
<ul style="list-style-type: none"> • <i>New Features in 12.1-Based Limited Lifetime Releases</i> • <i>New Features in Release 12.1 T</i> • Release Notes (Release note and caveat documentation for 12.1-based releases and various platforms) • <i>Cisco IOS Debug Command Reference</i> • <i>Cisco IOS Dial Services Quick Configuration Guide</i> 	



Note

Cisco Management Information Base (MIB) User Quick Reference is no longer published. If you have an account with CCO, you can find the current list of MIBs supported by Cisco. To reach the *Cisco Network Management Toolkit*, go to CCO, press **Login: Technical Support: Software Center: Network Mgmt Software: Cisco Network Management Toolkit: Cisco MIBs**.

Obtaining Documentation

World Wide Web

You can access the most current Cisco documentation on the World Wide Web (WWW) at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.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 is updated monthly. Therefore, it is probably more current than printed documentation. The CD-ROM package is available as a single unit or as part of an annual subscription.

Ordering Documentation

Registered CCO users can order the Documentation CD-ROM and other Cisco Product documentation through our online Subscription Services at <http://www.cisco.com/cgi-bin/subcat/kaojump.cgi>.

Nonregistered CCO users can order documentation through a local account representative by calling Cisco's corporate headquarters (California, USA) at 408 526-4000 or, in North America, call 800 553-NETS (6387).

Obtaining Technical Assistance

Cisco provides CCO as a starting point for all technical assistance. Warranty or maintenance contract customers can use the Technical Assistance Center (TAC). All customers can submit technical feedback on Cisco documentation using the web, e-mail, a self-addressed stamped response card included in many Cisco printed documents, or by sending mail to Cisco.

Cisco Connection Online

CCO 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.

CCO's broad range of features and services helps customers and partners to streamline business processes and improve productivity. Through CCO, you will find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online support services, 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 register on CCO to obtain additional personalized information and services. Registered users may order products, check on the status of an order and view benefits specific to their relationships with Cisco.

You can access CCO in the following ways:

- WWW: www.cisco.com
- Telnet: cco.cisco.com
- Modem using standard connection rates and the following terminal settings: VT100 emulation; 8 data bits; no parity; and 1 stop bit.
 - From North America, call 408 526-8070
 - From Europe, call 33 1 64 46 40 82

You can e-mail questions about using CCO to cco-team@cisco.com.

Technical Assistance Center

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

To display the TAC web site that includes links to technical support information and software upgrades and for requesting TAC support, use <http://www.cisco.com/public/support/tac>.

To contact by e-mail, use one of the following addresses:

Language	E-mail Address
English	tac@cisco.com
Hanzi (Chinese)	chinese-tac@cisco.com
Kanji (Japanese)	japan-tac@cisco.com
Hangul (Korean)	korea-tac@cisco.com
Spanish	tac@cisco.com
Thai	thai-tac@cisco.com

In North America, TAC can be reached at 800 553-2447 or 408 526-7209. For other telephone numbers and TAC e-mail addresses worldwide, consult the following web site: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>.

Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO login account, you can access the following URL, which contains links and tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/technotes/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO and click on this path: **Technical Assistance Center: Technical Tips**.

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.
- Field Notices—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- Frequently Asked Questions—Describes the most frequently asked technical questions about Cisco hardware and software.
- Hardware—Provides technical tips related to specific hardware platforms.
- Hot Tips—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888-50-CISCO (888-502-4726). From other areas, call 650-596-4408.
- Internetworking Features—Lists tips on using Cisco IOS software features and services.
- Sample Configurations—Provides actual configuration examples that are complete with topology and annotations.

Documentation Feedback

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