



# Release Notes for the Cisco PDSN 1.2 Feature in Cisco IOS Release 12.2(8)ZB

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## December 2002

Cisco IOS Release 12.2(8)ZB is a special release that is based on Cisco IOS Release 12.2, with the addition of enhancements to the Cisco Packet Data Serving Node (Cisco PDSN) feature. The Cisco IOS Release 12.2(8)ZB is a release optimized for the Cisco PDSN Release 1.2 feature on the Cisco 7206VXR router, and Cisco 6500 Catalyst Switch platform. 7206VXR images will be available starting with first maintenance release, 12.2(8)ZB1. The current image for the 7206VXR routers is 12.2(8)BY2.

## Contents

These release notes include important information and caveats for the Cisco PDSN software feature provided in Cisco IOS 12.2(8)ZB for the Cisco 7206VXR series router and Cisco 6500 Catalyst 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 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:

- [System Requirements, page 2](#)
- [Packet Data Serving Node Software Features in Release 12.2\(8\)ZB, page 5](#)
- [Caveats, page 5](#)
- [Related Documentation, page 11](#)
- [Obtaining Documentation, page 16](#)
- [Obtaining Technical Assistance, page 16](#)



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# Introduction

Cisco PDSN is an IOS software feature that enables a Cisco 7206VXR router or a Multi-Processor WAN Application Module (MWAM) on a Catalyst 6500 Switch to function as a gateway between the wireless Radio Access Network (RAN) and the Internet. With Cisco PDSN enabled on a router, a stationary or roaming mobile user can access the Internet, a corporate network intranet, or Wireless Application Protocol (WAP) services. Cisco PDSN supports both Simple IP operation and Mobile IP operation.

## System Requirements

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

- [Memory Requirements, page 2](#)
- [Hardware Supported, page 3](#)
- [Software Compatibility, page 3](#)
- [Determining the Software Version, page 3](#)
- [Upgrading to a New Software Release, page 3](#)
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## Memory Requirements

[Table 1](#) shows the memory requirements for the PDSN Software Feature Set that supports the Cisco 7206VXR 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 7206VXR Router and MWAM on the 6500 Catalyst Switch

Platform	Software Feature Set	Image Name	Flash Memory Required	DRAM Memory Required	Runs From
Cisco 7206VXR Router	PDSN Software Feature Set	c7200-c5is-mz.122-8-BY2 c7200-c5ik9s-mz.122-8-BY2 c7200-c6is-mz.122-8-BY2 c7200-c6ik9s-mz.122-8-BY2	20 MB	512 MB	RAM
Cisco 6500 Catalyst Switch	PDSN Software Feature Set	c6svc-mwam-c6is-v12.bin	20MB	512MB	RAM

## Hardware Supported

Cisco IOS Release 12.2(8)ZB is optimized for PDSN Release 1.2 on the Cisco 7206VXR router, and the MWAM card on the Cisco 6500 Catalyst Switch platform.

A Hardware-Software Compatibility Matrix is available on CCO for users with CCO login accounts. This matrix allows users to search for supported hardware components by entering a Cisco platform and IOS Release. The Hardware-Software Compatibility Matrix tool is available at the following URL:

<http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswwmatrix.cgi>

## Software Compatibility

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

Cisco IOS Release 12.2(8)ZB supports the same features that are in Cisco IOS Release 12.2, with the addition of the PDSN 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-C6IS-M), Version 12.2(8)ZB, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 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](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

**Table 2** *Deprecated and Replacement MIBs (continued)*

Deprecated MIB	Replacement
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)ZB supports the same feature sets as Cisco Release 12.2, with the exception that Cisco Release 12.2(8)ZB includes the PDSN feature. The PDSN feature is optimized for the Cisco 7206VXR router, and the Cisco MWAM card on the 6500 Catalyst Switch.



### 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](mailto:export@cisco.com).

# Packet Data Serving Node Software Features in Release 12.2(8)ZB

The Cisco IOS Release 12.2(8)ZB supports the same feature sets as Cisco Release 12.2, with the exceptions that Cisco Release 12.2(8)ZB includes the PDSN feature. The PDSN 1.2 feature is optimized for the Cisco 7206VXR router, and the Cisco MWAM card on the 6500 Catalyst Switch, and includes the following features:

- PDSN Cluster Controller / Member Architecture
- Prepaid Billing
- Conditional Debugging
- Electronic Serial Number (ESN) in Billing
- 3 DES Encryption
- 1xEV-DO Support
- Mobile IP IPsec

All other software features in Cisco IOS Release 12.2 are described in the documentation for Cisco IOS Release 12.2, which can be found at:

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

## 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 section describes possible unexpected behavior in Cisco IOS Release 12.2(8)ZB:

- CSCdv63387  
The PDSN drops packets during moderate traffic conditions, thus NDR throughput is very low when compared with the maximum throughput. This degradation is observed when AHDLC fragmentation is configured on the PCF.  
There is no workaround.
- CSCdx55143  
Quota requests should not be sent for a non-prepaid user if the user registers over an already existing session which has a prepaid flow active.  
As a workaround, register the non-prepaid user over a new session.
- CSCdx80222  
MobileIP flow will not come up, if IPCP renegotiation is initiated by the MN after the session is up.  
There is no workaround.
- CSCdy73279  
On a Cisco router running a PDSN R1.2 image, NDR drops down to a lower value after the box is stressed for some amount of time.  
There is no work around.
- CSCdy75288  
PPP data packets received at the PDSN from the mobile get switched to the Pi interface even if the flow for the corresponding mobile is not yet created. Therefore, they do not get accounted for. This problem happens only when the RP session has been established between PCF and PDSN, and an ahdlc channel has been allocated to the mobile. Thus, it occurs only for a short period of time before the flow gets created, or the flow fails to get established.  
There is no workaround.
- CSCdz48954  
Tracebacks occur when PDSN is reloaded with the following is configured "aaa accounting system default start-stop broadcast group radius" and the interface towards radius server is shut.  
As a workaround, ensure that the interface towards the radius server is up on reload, and not configured as shut.
- CSCdz51686  
On a Cisco router running the PDSN IOS image, out Access-list does not work blocking traffic over Mobile IP flows with cef switching.  
There is no workaround.

- CSCdz54041
 

The PDSN reloads due to a software forced crash with MALLOCFAIL. This occurs when the AAA server name is misconfigured using the following commands:

```
aaa group server radius XXXX
```

```
aaa accounting network pdsn start-stop group YYYY
```

This causes memory leaks on the PDSN, and eventually the PDSN runs out of memory and reloads. As a workaround, configure the correct aaa accounting server's name and address.
- CSCdz62795
 

The PDSN occasionally sends LCP-CONFREQ before sending the A11 RRP under high call setup rates.

There is no workaround.
- CSCin22657
 

The SNMP query to cCdmaPdsnSystemInfo object-group does not returns anything. If the PDSN is configured to be a Controller, the query to this OBJECT-GROUP fails.

There is no workaround.
- CSCin26759
 

In a PDSN Clustering environment, if a member is configured with maximum session of less than 20, A11 RRQ's will be rejected by the controller with insufficient resources for that member.

As a workaround, configure the maximum session on the member at least 20, and in it's multiples.
- CSCin27609
 

Airlink attributes E1 (cdma-user-id) and I4 (cdma-airlink-qos), sent by the new PCF during a PCF-PCF handoff, are not stored correctly in the UDR. The old values for the attributes, stored earlier, are sent in the Accounting Start Record to the RADIUS/AAA.

There is no workaround.
- CSCin27136
 

Sessions opened on the PDSN will fail when the Mobile Node applies ACFC on packets during the authentication phase of PPP. This problem occurs when a "ppp acfc local request" is configured on the PDSN virtual template and applied by Mobile Node at the authentication phase of PPP.

As a workaround, do not configure "ppp acfc local request" on the PDSN virtual template.
- CSCin27127
 

If payload compression is enabled, and if CCP negotiation fails, the cCdmaPppPdsnReleases and cCdmaPppTotalReleases counters get incremented.

There is no workaround.
- CSCin27340
 

When the PPP session for the mobile is terminated, the PDSN sends IRDP Agent Advertisement messages to the mobile with IRDP lifetime = 0. These packets get dropped in the PDSN, due to the link going down, but get accounted for in G16 counter at the PDSN.

There is no workaround.

- CSCin27978  
If the packet from the Mobile Node needs to be fragmented, and the DF bit is set, the PDSN will reload while forwarding the packet on the tunnel (if reverse Tunneling is enabled) if fast switching is disabled on the Tunnel (and “no ip mobile tunnel route-cache” is configured).  
As a workaround, do not disable the fast switching on the IP mobile tunnel.

## Resolved Caveats

The following DDTs were resolved in the 12.2(8)ZB release.

- CSCdz02438  
The following error message appears when performing any nv operation (write, dir, etc.), and indicates that the nvram is being corrupted  
“Bad configuration memory structure -- try rewriting.”  
This problem occurs when a CPU is reloaded from both the direct and sup console at almost the same time (within a difference of a few seconds).  
As a workaround, save the configuration again by doing a “write memory.”
- CSCdz04605  
Under average and high traffic conditions, the 6500, MWAM-based PDSN drops lot of packets.  
There is no workaround.
- CSCdz19118  
When a ping is made over MIP flow with reverse tunnel and compression, the downstream packets to the MN are dropped at the PDSN.  
As a workaround, disable CEF, and the ping goes through over the flow.
- CSCdz20719  
A new CLI **[no] cdma pdsn a11 dormant ppp-idle-timeout send-termreq** is implemented that allows during dormant sessions (on ppp idle timeout) a ppp termreq to be sent.  
Disabling this behaviour will avoid traffic channel allocation use for cleaning up ppp sessions at the mobile.
- CSCdz21896  
A PDSN member, configured under the Controller-Member architecture might reload while opening sessions.  
As a workaround, do not configure the PDSN as a member under Controller-Member clustering.
- CSCdz23611  
For MIP with header compression and CEF enabled, the compression counters are incorrect when TCP packets are sent over the MIP flow.  
As a workaround, disable CEF, and the header compression counters work properly.
- CSCdx86482  
Point-to-Point Tunneling Protocol (PPTP) tunneling may not function, and data sent by a PPTP network server (PNS) may have invalid PPTP headers. This symptom is observed after a virtual private dial-up network (VPDN) session comes up.  
There is no workaround.

- CSCdy34961  
Spurious memory access may be observed at the VPDN SSS process. This symptom is observed on a Cisco 7200 series when the Point-to-Point Tunnel Protocol (PPTP) is tested with Subscriber Service Switching (SSS).  
There is no workaround.
- CSCdz10507  
When router mobile is disabled and the re-enabled, Tunnel Fast-switching is not enabled by default. As a workaround, enable Tunnel Fast-switching before disabling MIP on the box.
- CSCdz18122  
When using a Cisco IOS PDSN image, when a Mobile transitions from a active to dormant state, the corresponding Accounting-Stop record does not have a release indicator (F13) attribute.  
There is no workaround.
- CSCdz18145  
When using a Cisco IOS PDSN image, the first active-dormant-active transition of MobileNode after a handoff does not produce any radius accounting records.  
There is no workaround.
- CSCdz23255  
When using Cisco IOS as PDSN, the compulsory tunnel indicator attribute for VPDN flows is 0 instead of 1.  
There is no workaround.
- CSCdz38529  
Accounting for VPDN sessions is excluding the PPP STATION (FF03) bytes from packets to PDSN and packets from LNS to PDSN. The PDSN is not accounting the PPP STATION bytes (2 bytes) in packets received from Mobile, and Packets received from the LNS.  
There is no workaround.
- CSCdz42623  
Acct-Input-Packets appear twice, and Acct-Input-Octets do not appear in Radius Acct Stop messages. The Acct-Input-Octets are incorrectly encoded as Acct-Input-Packets.  
There is no workaround.
- CSCin23552  
On a c7200 running Cisco IOS 12.2B-based PDSN, when a PPP session (for Simple IP service) comes up without IP address, neither the cCdmaPppConnectionSuccesses nor the cCdmaPppConnectionFailures counter get incremented.  
There is no workaround.
- CSCin23557  
On a c7200 running Cisco IOS 12.2B-based PDSN, when a PPP negotiation fails during IPCP phase because of IP address shortage, the cCdmaPppIpcpFailures counter doesn't get incremented.  
There is no workaround.

- CSCin23921  
The accounting for VSA attributes Acct-Input-Octets, Acct-Output-Octets, Acct-Input-Packets and Acct-Output-Packets is incorrect between 2 accounting stops. The packets/bytes are counted only between the last accounting start and accounting stop. The packets/bytes between the last accounting stop and accounting start are not counted.  
There is no workaround.
- CSCin23928  
LNS will fail to process VPDN data packets with packets incorrectly encapsulated error, when ACFC is negotiated and applied by the Mobile Node. This problem occurs on a L2tp session when a “ppp acfc local request” is configured on the PDSN (Virtual template configuration), and ACFC is applied by a Mobile Node when sending a VPDN data pack.  
As a workaround, do not configure a “ppp acfc local request” on the PDSN virtual-template.
- CSCin24256  
On a Cisco PDSN, in some scenarios a visitor is deleted without decrementing the visitor count of FA; therefore, the visitor count will be greater than the active visitors.  
There is no workaround.
- CSCin24500  
PPTP tunneling is broken. After the VPDN control path comes up, data sent by the PNS has invalid PPTP headers. This happens when a user attempts a PPTP session from a PPTP client and PDSN as PNS.  
There is no workaround.
- CSCin24976  
The service option-based RP statistics do get incremented for PPP failures, and do not tally with box level RP statistics.  
There is no workaround.
- CSCin25071  
The PDSN reloads during handoff if there is no route to the new pcf on the PDSN. If the route to pcf is available, handoff is successful.  
There is no workaround.
- CSCin25669  
After executing the **cdma pdsn failure-history table-size** command for resizing the failure-history table, the cCdmaFailHistInfo table becomes empty.  
There is no workaround.

## 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 11](#)
- [Platform-Specific Documents, page 12](#)
- [Feature Modules, page 12](#)
- [Cisco IOS Software Documentation Set, page 12](#)

## Release-Specific Documents

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

- *Packet Data Serving Node (PDSN) Release 1.2* at the following url:  
<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zb8/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**




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**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>.

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

**Technical Documents**

## Platform-Specific Documents

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

- On CCO at: **Cisco Product Documentation: Core/High-End Routers: Cisco 7206**
- On the Documentation CD-ROM at: **Cisco Product Documentation: Core/High-End Routers: Cisco 7206**

## 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"> <li>• <i>Cisco IOS Configuration Fundamentals Configuration Guide</i></li> <li>• <i>Cisco IOS Configuration Fundamentals Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Cisco IOS User Interfaces</li> <li>Cisco IOS File Management</li> <li>Cisco IOS System Management</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume I</i></li> <li>• <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume II</i></li> </ul>	<ul style="list-style-type: none"> <li>Using Cisco IOS Software</li> <li>Overview of SNA Internetworking</li> <li>Bridging</li> <li>IBM Networking</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Dial Services Configuration Guide: Terminal Services</i></li> <li>• <i>Cisco IOS Dial Services Configuration Guide: Network Services</i></li> <li>• <i>Cisco IOS Dial Services Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Preparing for Dial Access</li> <li>Modem Configuration and Management</li> <li>ISDN and Signalling Configuration</li> <li>PPP Configuration</li> <li>Dial-on-Demand Routing Configuration</li> <li>Dial-Backup Configuration</li> <li>Terminal Service Configuration</li> <li>Large-Scale Dial Solutions</li> <li>Cost-Control Solutions</li> <li>Virtual Private Networks</li> <li>X.25 on ISDN Solutions</li> <li>Telco Solutions</li> <li>Dial-Related Addressing Services</li> <li>Interworking Dial Access Scenarios</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Interface Configuration Guide</i></li> <li>• <i>Cisco IOS Interface Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Interface Configuration Overview</li> <li>Configuring LAN Interfaces</li> <li>Configuring Serial Interfaces</li> <li>Configuring Logical Interfaces</li> </ul>

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

Books	Major Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS IP and IP Routing Configuration Guide</i></li> <li>• <i>Cisco IOS IP and IP Routing Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>IP Addressing and Services</li> <li>IP Routing Protocols</li> <li>IP Multicast</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i></li> <li>• <i>Cisco IOS AppleTalk and Novell IPX Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>AppleTalk and Novell IPX Overview</li> <li>Configuring AppleTalk</li> <li>Configuring Novell IPX</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i></li> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Overview</li> <li>Configuring Apollo Domain</li> <li>Configuring Banyan VINES</li> <li>Configuring DECnet</li> <li>Configuring ISO CLNS</li> <li>Configuring XNS</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Multiservice Applications Configuration Guide</i></li> <li>• <i>Cisco IOS Multiservice Applications Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Multiservice Applications Overview</li> <li>Voice</li> <li>Video</li> <li>Broadband</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Quality of Service Solutions Configuration Guide</i></li> <li>• <i>Cisco IOS Quality of Service Solutions Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Quality of Service Overview</li> <li>Classification</li> <li>Congestion Management</li> <li>Congestion Avoidance</li> <li>Policing and Shaping</li> <li>Signalling</li> <li>Link Efficiency Mechanisms</li> <li>Quality of Service Solutions</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Security Configuration Guide</i></li> <li>• <i>Cisco IOS Security Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Security Overview</li> <li>Authentication, Authorization, and Accounting (AAA)</li> <li>Security Server Protocols</li> <li>Traffic Filtering and Firewalls</li> <li>IP Security and Encryption</li> <li>Other Security Features</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Switching Services Configuration Guide</i></li> <li>• <i>Cisco IOS Switching Services Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Cisco IOS Switching Services Overview</li> <li>Cisco IOS Switching Paths</li> <li>Cisco Express Forwarding</li> <li>NetFlow Switching</li> <li>MPLS Switching</li> <li>Multilayer Switching</li> <li>Multicast Distributed Switching</li> <li>Virtual LANs</li> <li>LAN Emulation</li> </ul>

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

Books	Major Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Wide-Area Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Wide-Area Networking Command Reference</i></li> </ul>	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"> <li>• <i>New Features in 12.1-Based Limited Lifetime Releases</i></li> <li>• <i>New Features in Release 12.1 T</i></li> <li>• Release Notes (Release note and caveat documentation for 12.1-based releases and various platforms)</li> <li>• <i>Cisco IOS Debug Command Reference</i></li> <li>• <i>Cisco IOS Dial Services Quick Configuration Guide</i></li> </ul>	

**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>.

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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.

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- WWW: [www.cisco.com](http://www.cisco.com)
- Telnet: [cco.cisco.com](http://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](mailto: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	<a href="mailto:tac@cisco.com">tac@cisco.com</a>
Hanzi (Chinese)	<a href="mailto:chinese-tac@cisco.com">chinese-tac@cisco.com</a>
Kanji (Japanese)	<a href="mailto:japan-tac@cisco.com">japan-tac@cisco.com</a>
Hangul (Korean)	<a href="mailto:korea-tac@cisco.com">korea-tac@cisco.com</a>
Spanish	<a href="mailto:tac@cisco.com">tac@cisco.com</a>
Thai	<a href="mailto:thai-tac@cisco.com">thai-tac@cisco.com</a>

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](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.

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