



Release Notes for Cisco 7000 Family for Cisco IOS Release 12.2 DD

March 8, 2002

Cisco IOS Release 12.2(2)DD4

OL-1226-04



Note

You can find the most current Cisco IOS documentation on Cisco.com. This set of electronic documents may contain updates and modifications made after the hard-copy documents were printed.

These release notes for the Cisco 7000 family describe the enhancements provided in Cisco IOS Release 12.2(2)DD4. These release notes are updated as needed.

For a list of the software caveats that apply to Cisco IOS Release 12.2(2)DD4, see the [“Caveats” section on page 24](#) and *Caveats for Cisco IOS Release 12.2*. The caveats document is updated for every maintenance release and is located on Cisco.com and the Documentation CD-ROM.

Use these release notes with *Cross-Platform Release Notes for Cisco IOS Release 12.2* located on Cisco.com and the Documentation CD-ROM.

Contents

These release notes describe the following topics:

- [Early Deployment Releases, page 2](#)
- [System Requirements, page 3](#)
- [New and Changed Information, page 17](#)
- [MIBs, page 23](#)
- [Important Notes, page 24](#)
- [Caveats, page 24](#)
- [Related Documentation, page 30](#)



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- [Obtaining Documentation, page 36](#)
- [Obtaining Technical Assistance, page 37](#)

Early Deployment Releases

These release notes describe the Cisco 7000 family for Cisco IOS Release 12.2(2)DD4, which is an early deployment (ED) release based on Cisco IOS Release 12.2 T. Early deployment releases contain fixes for software caveats and support for new Cisco hardware and software features. [Table 1](#) shows recent early deployment releases for the Cisco 7000 family.

Table 1 *Early Deployment Releases for the Cisco IOS Release 12.2 DD*

ED Release	Maintenance Release	Additional Software Features	Additional Hardware Features	Availability
Cisco IOS Release 12.2 DD4	(2)DD4	Cisco IOS Release 12.2(2)DD4 contains no additional software or hardware features. Cisco IOS Release 12.2(2)DD4 includes caveat fixes only. For more information, see the “Caveats” section on page 24		03/08/2002
Cisco IOS Release 12.2 DD3	(2)DD3	Cisco IOS Release 12.2(2)DD3 contains no additional software or hardware features. Cisco IOS Release 12.2(2)DD3 includes caveat fixes only. For more information, see the “Caveats” section on page 24		02/07/2002
Cisco IOS Release 12.2 DD2	(2)DD2	Cisco IOS Release 12.2(2)DD2 contains no additional software or hardware features. Cisco IOS Release 12.2(2)DD2 includes caveat fixes only. For more information, see the “Caveats” section on page 24		02/07/2002

Table 1 Early Deployment Releases for the Cisco IOS Release 12.2 DD (continued)

ED Release	Maintenance Release	Additional Software Features	Additional Hardware Features	Availability
Cisco IOS Release 12.2 DD1	(2)DD1	Cisco IOS Release 12.2(2)DD1 contains no additional software or hardware features. Cisco IOS Release 12.2(2)DD1 includes caveat fixes only. For more information, see the “Caveats” section on page 24		12/03/2001
Cisco IOS Release 12.2 DD	(2)	Direct-Request (Domain Stripping) VRF Aware Per VRF AAA PPPoE over Gigabit Ethernet PPPoE Session Limit Quality of Service Features for Parallel Express Forwarding (PXF) Virtual Template Limit Expansion to 200 VLAN Range VPDN Group Session Limiting VRF in Server Group	7401 ASR PA-2FE PA-8PRI PA-MC-8TE1+	08/13/2001

System Requirements

This section describes the system requirements for Cisco IOS Release 12.2 DD and includes the following sections:

- [Memory Recommendations, page 4](#)
- [Supported Hardware, page 11](#)
- [Determining the Software Version, page 12](#)
- [Upgrading to a New Software Release, page 12](#)
- [Feature Set Tables, page 12](#)

Memory Recommendations

Table 2 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD4

Platforms	Feature Sets	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco 7200 Series	IP Standard Feature Set	IP	c7200-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7200-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7200-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7200-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7200-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7200-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7200-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7200-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7200-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7200-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7200-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7200-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7200-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7200-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7200-dk8s-mz	16 MB	128 MB	RAM
	Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7200-do3s-mz	16 MB	128 MB	RAM
		Desktop/IBM/FW/IDS IPSec 56	c7200-dk8o3s-mz	16 MB	128 MB	RAM
		Desktop/IBM/FW/IDS IPSec 3DES	c7200-dk9o3s-mz	16 MB	128 MB	RAM

Table 2 *Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD4 (continued)*

Cisco 7400 Series	IP Standard Feature Set	IP	c7400-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7400-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7400-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7400-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7400-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7400-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7400-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7400-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7400-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7400-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7400-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7400-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7400-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7400-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7400-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7400-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7400-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7400-dk9o3s-mz	16 MB	128 MB	RAM	

Table 3 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD3

Platforms	Feature Sets	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco 7200 Series	IP Standard Feature Set	IP	c7200-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7200-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7200-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7200-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7200-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7200-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7200-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7200-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7200-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7200-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7200-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7200-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7200-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7200-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7200-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7200-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7200-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7200-dk9o3s-mz	16 MB	128 MB	RAM	

Table 3 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD3 (continued)

Cisco 7400 Series	IP Standard Feature Set	IP	c7400-is-mz	16 MB	128 MB	RAM
		IP IPsec 56	c7400-ik8s-mz	16 MB	128 MB	RAM
		IP IPsec 3DES	c7400-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7400-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPsec 56	c7400-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPsec 3DES	c7400-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7400-js-mz	16 MB	128 MB	RAM
		Enterprise IPsec 56	c7400-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPsec 3DES	c7400-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7400-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7400-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPsec 56	c7400-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPsec 3DES	c7400-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7400-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPsec 56	c7400-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7400-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPsec 56	c7400-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPsec 3DES	c7400-dk9o3s-mz	16 MB	128 MB	RAM	

Table 4 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD2

Platforms	Feature Sets	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco 7200 Series	IP Standard Feature Set	IP	c7200-is-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7200-js-mz	16 MB	128 MB	RAM
Cisco 7400 Series	IP Standard Feature Set	IP	c7400-is-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7400-js-mz	16 MB	128 MB	RAM

Table 5 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD1

Platforms	Feature Sets	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco 7200 Series	IP Standard Feature Set	IP	c7200-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7200-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7200-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7200-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7200-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7200-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7200-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7200-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7200-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7200-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7200-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7200-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7200-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7200-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7200-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7200-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7200-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7200-dk9o3s-mz	16 MB	128 MB	RAM	

Table 5 *Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD1 (continued)*

Cisco 7400 Series	IP Standard Feature Set	IP	c7400-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7400-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7400-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7400-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7400-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7400-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7400-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7400-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7400-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7400-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7400-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7400-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7400-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7400-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7400-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7400-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7400-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7400-dk9o3s-mz	16 MB	128 MB	RAM	

Table 6 Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD

Platforms	Feature Sets	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco 7200 Series	IP Standard Feature Set	IP	c7200-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7200-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7200-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7200-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7200-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7200-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7200-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7200-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7200-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7200-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7200-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7200-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7200-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7200-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7200-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7200-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7200-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7200-dk9o3s-mz	16 MB	128 MB	RAM	

Table 6 *Images and Memory Recommendations for Cisco IOS Release 12.2(2)DD (continued)*

Cisco 7400 Series	IP Standard Feature Set	IP	c7400-is-mz	16 MB	128 MB	RAM
		IP IPSec 56	c7400-ik8s-mz	16 MB	128 MB	RAM
		IP IPSec 3DES	c7400-ik9s-mz	16 MB	128 MB	RAM
	IP Firewall Standard Feature Set	IP/FW/IDS	c7400-io3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 56	c7400-ik8o3s-mz	16 MB	128 MB	RAM
		IP/FW/IDS IPSec 3DES	c7400-ik9o3s-mz	16 MB	128 MB	RAM
	Enterprise Standard Feature Set	Enterprise	c7400-js-mz	16 MB	128 MB	RAM
		Enterprise IPSec 56	c7400-jk8s-mz	16 MB	128 MB	RAM
		Enterprise IPSec 3DES	c7400-jk9s-mz	16 MB	128 MB	RAM
	Enterprise MCM Feature Set	Enterprise MCM	c7400-jx2-mz	16 MB	128 MB	RAM
	Enterprise Firewall Standard Feature Set	Enterprise/FW/IDS	c7400-jo3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 56	c7400-jk8o3s-mz	16 MB	128 MB	RAM
		Enterprise/FW/IDS IPSec 3DES	c7400-jk9o3s-mz	16 MB	128 MB	RAM
	Desktop/IBM Standard Feature Set	Desktop/IBM	c7400-ds-mz	16 MB	128 MB	RAM
		Desktop/IBM IPSec 56	c7400-dk8s-mz	16 MB	128 MB	RAM
Desktop/IBM Firewall Standard Feature Set	Desktop/IBM/FW/IDS	c7400-do3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 56	c7400-dk8o3s-mz	16 MB	128 MB	RAM	
	Desktop/IBM/FW/IDS IPSec 3DES	c7400-dk9o3s-mz	16 MB	128 MB	RAM	

Supported Hardware

Cisco IOS Release 12.2(2)DD4 supports the following Cisco 7000 family platforms:

- Cisco 7200 series routers (including the Cisco 7202, Cisco 7204, Cisco 7206, Cisco 7204VXR, and Cisco 7206VXR)
- Cisco 7401 ASR routers

For detailed descriptions of the new hardware features, see the [“New and Changed Information”](#) section on page 17.

Determining the Software Version

To determine the version of Cisco IOS software running on your Cisco 7000 family router, log in to the Cisco 7000 family router and enter the **show version** EXEC command. The following sample **show version** command output is from a router running a Cisco 7200 series software image with Cisco IOS Release 12.2(2)DD4:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.2 DD Software (c7200-is-mz), Version 12.2(2)DD4, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, refer to *Software Installation and Upgrade Procedures* located at the following URL:

http://www.cisco.com/warp/public/130/upgrade_index.shtml

Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features.

Cisco IOS Release 12.2(2)DD4 supports the same feature sets as Cisco IOS Release 12.2, but Cisco IOS Release 12.2(2)DD4 can include new features supported by the Cisco 7000 family.



Caution

Cisco IOS images with strong encryption (including, but not limited to, 168-bit Triple Data Encryption Standard [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 because of United States government regulations. When applicable, purchaser and 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.

[Table 7](#) lists the features and feature sets supported by the Cisco 7000 series routers in Cisco IOS Release 12.2(2)DD4 and uses the following conventions:

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



Note

This table might not be cumulative or list all the features in each image. You can find the most current Cisco IOS documentation on Cisco.com. These electronic documents may contain updates and modifications made after the hard-copy documents were printed. If you have a Cisco.com login account, you can find image and release information regarding features prior to Cisco IOS Release 12.2(2)DD4 by using the Feature Navigator tool at <http://www.cisco.com/go/fn>.

Table 7 Feature List by Feature Set for the Cisco 7200 Series, Part 1

Features	In	Software Images by Feature Sets			
		IP	IP IPSec 56	IP IPSec 3DES	IP/FW/IDS
Dial					
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes
Quality of Service					
Quality of Service Features for Parallel Express Forwarding (PXF)	(2)	Yes	Yes	Yes	Yes
Miscellaneous					
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL					
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes
Security					
Per VRF AAA	(2)	Yes	Yes	Yes	Yes

Table 8 Feature List by Feature Set for the Cisco 7200 Series, Part 2

Features	In	Software Images by Feature Sets			
		IP/FW/IDS IPSec 56	IP/FW/IDS IPSec 3DES	Enterprise	Enterprise IPSec 56
Dial					
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes
Quality of Service					
Quality of Service Features for Parallel Express Forwarding (PXF)	(2)	Yes	Yes	Yes	Yes
Miscellaneous					
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL					
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes
Security					
Per VRF AAA	(2)	Yes	Yes	Yes	Yes

Table 9 Feature List by Feature Set for the Cisco 7200 Series, Part 3

Features	In	Software Images by Feature Sets			
		Enterprise IPSec 3DES	Enterprise/FW/ IDS	Enterprise/ FW/IDS IPSec 56	Enterprise /FW/IDS IPSec 3DES
Dial					
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes
Quality of Service					
Quality of Service Features for Parallel Express Forwarding (PXF)	(2)	Yes	Yes	Yes	Yes
Miscellaneous					
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL					
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes
Security					
Per VRF AAA	(2)	Yes	Yes	Yes	Yes

Table 10 Feature List by Feature Set for the Cisco 7200 Series, Part 4

Features	In	Software Images by Feature Sets				
		Desktop/IBM	Desktop/IBM IPSec 56	Desktop/ IBM/FW/IDS	Desktop/IBM /FW/IDS IPSec 56	Desktop/IBM /FW/IDS IPSec 3DES
Dial						
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes	Yes
Quality of Service						
Quality of Service Features for Parallel Express Forwarding (PXF)	(2)	Yes	Yes	Yes	Yes	Yes
Miscellaneous						
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL						
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes	Yes

Table 10 Feature List by Feature Set for the Cisco 7200 Series, Part 4 (continued)

Features	In	Software Images by Feature Sets				
		Desktop/IBM	Desktop/IBM IPSec 56	Desktop/ IBM/FW/IDS	Desktop/IBM /FW/IDS IPSec 56	Desktop/IBM /FW/IDS IPSec 3DES
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes	Yes
Security						
Per VRF AAA	(2)	Yes	Yes	Yes	Yes	Yes

Table 11 Feature List by Feature Set for the Cisco 7400 Series, Part 1

Features	In	Software Images by Feature Sets				
		IP	IP IPSec 56	IP IPSec 3DES	IP/FW/IDS	
Dial						
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes	
Miscellaneous						
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes	
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes	
VRF in Server Group	(2)	Yes	Yes	Yes	Yes	
Multiservice Applications - Broadband DSL						
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes	
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes	
VLAN Range	(2)	Yes	Yes	Yes	Yes	
Security						
Per VRF AAA	(2)	Yes	Yes	Yes	Yes	

Feature List by Feature Set for the Cisco 7400 Series, Part 2

Features	In	Software Images by Feature Sets				
		IP/FW/IDS IPSec 56	IP/FW/IDS IPSec 3DES	Enterprise	Enterprise IPSec 56	
Dial						
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes	
Miscellaneous						
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes	
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes	
VRF in Server Group	(2)	Yes	Yes	Yes	Yes	
Multiservice Applications - Broadband DSL						

Feature List by Feature Set for the Cisco 7400 Series, Part 2

PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes
Security					
Per VRF AAA	(2)	Yes	Yes	Yes	Yes

Table 12 Feature List by Feature Set for the Cisco 7400 Series, Part 3

Features	In	Software Images by Feature Sets			
		Enterprise IPSec 3DES	Enterprise/FW/IDS	Enterprise/FW/IDS IPSec 56	Enterprise/FW/IDS IPSec 3DES
Dial					
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes
Miscellaneous					
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL					
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes
Security					
Per VRF AAA	(2)	Yes	Yes	Yes	Yes

Table 13 Feature List by Feature Set for the Cisco 7400 Series, Part 4

Features	In	Software Images by Feature Sets				
		Desktop/IBM	Desktop/IBM IPSec 56	Desktop/IBM/FW/IDS	Desktop/IBM/FW/IDS IPSec 56	Desktop/IBM/FW/IDS IPSec 3DES
Dial						
VPDN Group Session Limiting	(2)	Yes	Yes	Yes	Yes	Yes
Miscellaneous						
Direct-Request (Domain Stripping) VRF Aware	(2)	Yes	Yes	Yes	Yes	Yes
Virtual Template Limit Expansion to 200	(2)	Yes	Yes	Yes	Yes	Yes
VRF in Server Group	(2)	Yes	Yes	Yes	Yes	Yes
Multiservice Applications - Broadband DSL						

Table 13 Feature List by Feature Set for the Cisco 7400 Series, Part 4 (continued)

Features	In	Software Images by Feature Sets				
		Desktop/IBM	Desktop/IBM IPSec 56	Desktop/ IBM/FW/IDS	Desktop/IBM /FW/IDS IPSec 56	Desktop/IBM /FW/IDS IPSec 3DES
PPPoE over Gigabit Ethernet	(2)	Yes	Yes	Yes	Yes	Yes
PPPoE Session Limit	(2)	Yes	Yes	Yes	Yes	Yes
VLAN Range	(2)	Yes	Yes	Yes	Yes	Yes
Security						
Per VRF AAA	(2)	Yes	Yes	Yes	Yes	Yes

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 7000 family for Cisco IOS Release 12.2 DD.

New Hardware Features in Cisco IOS Release 12.2(2)DD4

There are no new hardware features supported in Cisco IOS Release 12.2(2)DD4.

New Software Features in Cisco IOS Release 12.2(2)DD4

There are no new software features supported in Cisco IOS Release 12.2(2)DD4.

New Hardware Features in Cisco IOS Release 12.2(2)DD3

There are no new hardware features supported in Cisco IOS Release 12.2(2)DD3.

New Software Features in Cisco IOS Release 12.2(2)DD3

There are no new software features supported in Cisco IOS Release 12.2(2)DD3.

New Hardware Features in Cisco IOS Release 12.2(2)DD2

There are no new hardware features supported in Cisco IOS Release 12.2(2)DD2.

New Software Features in Cisco IOS Release 12.2(2)DD2

There are no new software features supported in Cisco IOS Release 12.2(2)DD2.

New Hardware Features in Cisco IOS Release 12.2(2)DD1

There are no new hardware features supported in Cisco IOS Release 12.2(2)DD1.

New Software Features in Cisco IOS Release 12.2(2)DD1

There are no new software features supported in Cisco IOS Release 12.2(2)DD1.

New Hardware Features in Cisco IOS Release 12.2(2)DD

The following new hardware features are supported by the Cisco 7000 family for Cisco IOS Release 12.2(2)DD:

7401 ASR

Platform: Cisco 7401 ASR router

The Cisco 7400ASR delivers exceptional price/performance to meet the requirements of both enterprise and service providers. With its combination of scalable performance, density, and low per-port pricing, the Cisco 7400ASR allows network-layer capabilities to be extended to a much wider range of network configurations and environments. Customers can now gain the advantages of high-performance network-layer switching and services, including security, QoS, and traffic management to more locations throughout the network.

- Form Factor (Stackable 1 rack unit, low power (under 50W), front to back airflow)
- Hardware accelerated network application service with PXF processing
- Cost effective GE to GE Layer 2- 7 network services
- Ideal new world CPE with full MPLS and MPLS VPN support
- Flexible WAN connectivity with over 40 interfaces
- (Serial, Channelized, ISDN, Frame, ATM, IP, 64K to OC3)

The Cisco 7400ASR delivers the full suite of Cisco IOS software services for managing network security, allocating QoS among applications or users, and providing value-added services such as NetFlow accounting and encryption. QoS applications such as committed access rate (CAR), Weighted Random Early Detection (WRED), and Weighted Fair Queuing (WFQ) can be flexibly applied to provide precedence across IP addresses, applications, or specific users with a high level of granularity.

The Cisco 7400ASR offers scalable density with a very wide range of interfaces including:

- Ethernet, Fast Ethernet, 100VG-AnyLAN, and Gigabit Ethernet
- Serial and Multi-channel
- OC3 POS and OC3 ATM
- SDN Primary Rate Interface (PRI), Basic Rate Interface (BRI), High-Speed Serial Interface (HSSI), packet over T3/E3, multichannel T1/E1/T3, and ATM

The Cisco 7400ASR uses the same port adapters as the Cisco 7500 Versatile Interface Processor (VIP), thus protecting customer investment in interfaces and simplifying sparing.

The Cisco 7400ASR sets new standards in price/performance/ rack density, meeting requirements for high-performance Layer 3 services at an affordable price. The NSE-1 engine powers the Cisco 7400ASR. Network Services Engine (NSE-1) takes advantage of parallel processing in order to offer unprecedented price/performance. NSE-1 delivers wire rate OC3 throughput while running concurrent high-touch WAN edge services. It is the first Cisco processing engine to offer integrated hardware acceleration increasing Cisco 7400ASR system performance by 50-300% for combined “high touch” edge services. NSE-1 takes advantage of a new technology called Parallel eXpress Forwarding (PXF).

PA-2FE

Platform: Cisco 7200 series and Cisco 7401 ASR routers

The PA-2FE provides two 10/100-Mbps, 10/100BaseT Fast Ethernet/Inter-Switch Link (ISL) interfaces and supports both full-duplex and half-duplex operation. The PA-2FE comes in two models, the PA-2FE-TX and the PA-2FE-FX.

Each Fast Ethernet port on the PA-2FE-TX has an RJ-45 connector to attach to Category 5 unshielded twisted-pair (UTP) cable for 100BaseTX. Each Fast Ethernet port on the PA-2FE-FX has an SC-type fiber-optic connector for 100BaseFX.

PA-8PRI

Platforms: Cisco 7200 VXR and Cisco 7401 ASR routers

The multichannel E1/PRI port adapters (PA-MC-2E1 and PA-MC-8E1) integrate data service unit (DSU) functionality and E1 channel support into the Cisco router.

The PA-MC-2E1 or PA-MC-8E1 port adapter provides two or eight independent E1 (120-ohm) connections via RJ-48C connectors. (See Figure 1-1 and Figure 1-2.) The PA-MC-8E1 port adapter can provide up to 128 separate full-duplex High-Level Data Link Control (HDLC) channelized E1, fractional E1, full E1, or unframed E1 interfaces and the PA-MC-2E1 port adapter can provide up to 62 separate full-duplex HDLC channelized E1, fractional E1, full E1, or unframed E1 interfaces.

PA-MC-8TE1+

Platforms: Cisco 7200 series and Cisco 7401 ASR routers

The PA-MC-8TE1+ port adapter is a multichannel port adapter that provides eight DSX-1/DS1 or eight G.703 interfaces. The PA-MC-8TE1+ interfaces can be channelized, fractional, ISDN PRI, or nonframed.

The PA-MC-8TE1+ supports Facility Data Link (FDL) in Extended Superframe (ESF) framing on T1 networks, as well as network and payload loopbacks. Bit error rate testing (BERT) is supported on each of the T1 or E1 links. BERT can be run only on one port at a time.

The PA-MC-8TE1+ port adapter does *not* support the aggregation of multiple T1s or E1s (called *inverse muxing* or *bonding*) for higher bandwidth data rates. The multichannel PA-MC-8TE1+ port adapter supports Cisco HDLC, Frame Relay, PPP, and Switched Multimegabit Data Service (SMDS) Data Exchange Interface (DXI) encapsulations over each T1 or E1 link. For SMDS only, DXI is sent on the T1 or E1 line, so it needs to connect to an SMDS switch that has direct DXI input.

New Software Features in Cisco IOS Release 12.2(2)DD

The following new software features are supported by the Cisco 7000 family for Cisco IOS Release 12.2(2)DD:

Direct-Request (Domain Stripping) VRF Aware

Platform: Cisco 7200 series and Cisco 7401 ASR routers

Using the Direct-Request (Domain Stripping) VRF Aware feature, you can enable VRF aware domain-stripping configurations. Use domain-stripping to strip (truncate) the domain from the username. For example, if you configure Direct-Request (Domain Stripping) where the username is user1@cisco.com, only 'user1' will be sent out as the username.

Configure this feature using the **radius-server domain-stripping** command. Domain stripping can be applied to any particular VRF or non-VRFs users. See the Per VRF AAA feature module for more details.

Per VRF AAA

Platforms: Cisco 7200 series and Cisco 7401 ASR routers

Using the Per VRF AAA feature Internet Service Providers (ISPs) can partition authentication, authorization, and accounting (AAA) services based on Virtual Route Forwarding (VRF). This permits the Virtual Home Gateway (VHG) to communicate directly with the customer RADIUS server associated with the customer VPN, without having to go through a RADIUS proxy. Thus, ISPs can scale their VPN offerings more efficiently because they no longer need to proxy AAA to provide their customers the flexibility demanded.

To support per VRF AAA, AAA must be VRF aware. ISPs must be able to define multiple instances of the same operational parameters—such as AAA server groups, method lists, system accounting, and protocol specific parameters—and secure the parameters to the VRF partitions.

If an AAA configuration, such as a method list, is uniquely defined many times across the network access server (NAS), the specification of the AAA server, which is based on IP addresses and port numbers, may create an overlapping of private addresses between VRFs. Securing AAA method lists to a VRF can be accomplished from one or more of the following sources:

Virtual Template—used as a generic interface configuration

Service Provider AAA server—used to associate a remote user with a specific VPN based on the domain name or DNIS. The server then provides the VPN-specific configuration for the virtual access interface, which includes the IP address and port number of the customer's AAA server.

Customer VPN AAA server—used to authenticate the remote user and to provide user-specific configurations for the virtual access interface.

Global AAA accounting configurations and some AAA protocol-specific parameters cannot be logically grouped under the Virtual Template configuration.

PPPoE over Gigabit Ethernet

Platforms: Cisco 7200 series and Cisco 7401 ASR routers

The PPPoE over Gigabit Ethernet feature enhances PPP over Ethernet (PPPoE) functionality by adding support for PPPoE and PPPoE over IEEE 802.1Q VLANs on Gigabit Ethernet interfaces. The PPPoE over Gigabit Ethernet feature is supported on Cisco 7200 series routers with Gigabit Ethernet line cards.

PPPoE Session Limit

Platform: Cisco 7200 series and Cisco 7401 routers

The PPPoE Session Limit feature enables you to limit the number of PPPoE sessions that can be created on a router or on an ATM PVC, PVC range, or VC class.

Before the introduction of this feature, there was no way to limit the number of PPPoE sessions that could be created on a router. Not having a limit was potentially a problem because it was possible that the router could create so many PPPoE sessions that it would run out of memory.

To prevent the router from using too much memory for virtual access, the PPPoE Session Limit feature introduces a new command and a modification to an existing command that enable you to specify the maximum number of PPPoE sessions that can be created. The new **pppoe limit max-sessions** command limits the number of PPPoE sessions that can be created on the router. The modified **pppoe max-sessions** command limits the number of PPPoE sessions that can be created on an ATM PVC, PVC range, VC class, or Ethernet subinterface.

Quality of Service Features for Parallel Express Forwarding (PXF)

Platform: Cisco 7200 VXR using a Network Services Engine (NSE) and Cisco 7401 ASR routers

The Modular Quality of Service Command-Line Interface (Modular QoS CLI) and many of the associated class-based QoS features are now available on PXF.

The following class-based QoS features are being introduced for PXF:

- Traffic Policing —the **police** command in policy map class configuration mode.
- Class-Based Weighted Fair Queueing (CBWFQ) —the **bandwidth** and **fair-queue** commands in policy map class configuration mode.
- Low Latency Queueing (LLQ) —the **priority** command used in policy map class configuration mode.
- Class-Based Marking —the **set** command used in policy map class configuration mode. Class-Based Marking support is limited to 32 traffic classes per traffic policy, and the QoS group marking (**set qos-group**) is not supported.
- Class-Based Weighted Random Early Detection (CBWRED) and Differentiated Services-Compliant Weighted Random Early Detection (DiffServ-Compliant WRED)—the **random-detect** command used simultaneously with the **bandwidth** command in policy map class configuration mode.
- Flow-Based Weighted Random Early Detection—the **random-detect** command used simultaneously with the **bandwidth** command in policy map class configuration mode.

The Committed Access Rate (CAR) feature configured to use an access list with rate-limiting policies (the **access-list rate-limit** command in interface configuration mode) is also now available on PXF. If you wish to rate-limit traffic without using an ACL, use the Modular QoS CLI to configure the Traffic Policing feature.

Because of the addition of the Modular QoS CLI, traditional WRED (the **random-detect** command in interface configuration mode) and Fair Queueing (the **fair-queue** command in interface configuration mode) are no longer configurable. If you would like to configure WRED or Fair Queueing, you can use the Modular QoS CLI to configure Class-Based WRED or Class-Based Weighted Fair Queueing on a per-class rather than a per-interface basis.

The Modular QoS CLI on PXF does not currently support the following match criteria that are available on other Modular QoS CLI-supported platforms:

- Destination address
- Input Interface
- Internet Protocol (IP) values
- Multi Protocol Label Switching (MPLS) values
- Protocol
- Quality of Service (QoS) group values
- Source address

For additional information on the Modular QoS CLI, see the Modular Quality of Service Command-Line Interface document.

Virtual Template Limit Expansion to 200

Platform: Cisco 7200 series and Cisco 7401 ASR routers

The Virtual Template Limit Expansion to 200 feature increases the maximum number of virtual template interfaces from 25 to 200.

See the Per VRF AAA feature module for more details.

VLAN Range

Platforms: Cisco 7200 series and Cisco 7401 ASR routers

Using the VLAN Range feature, you can group VLAN subinterfaces together so that any command entered in a group applies to every subinterface within the group. This simplifies configurations and reduces command parsing.

VPDN Group Session Limiting

Platforms: Cisco 7200 series and Cisco 7401 ASR routers

Before the introduction of the VPDN Group Session Limiting feature, you could only globally limit the number of VPDN sessions on a router with limits applied equally to all VPDN groups. Using the VPDN Group session limiting feature, you can limit the number of VPDN sessions allowed per VPDN group. This feature is implemented with the introduction of the **session-limit number** command in VPDN configuration mode. VPDN group session limiting is applied after the global VPDN session limiting (which is configured via the **vpdn session-limit session** command in configuration mode) is enforced.

VRF in Server Group

Platform: Cisco 7200 series and Cisco 7401 ASR routers

Before the introduction of VRF in Server Group feature, per VRF AAA configurations did not allow dial users to utilize AAA servers in different VRFs. The dial user VRF was referred to whenever AAA requests were sent to the servers. This simplifies the configuration but limits users to utilizing AAA servers in the same routing domains.

With the introduction of VRF in Server Group feature, AAA servers have their own configurable per server-group VRF references. See the Per VRF AAA feature module for more details.

MIBs

Current MIBs

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

Deprecated and Replacement MIBs

Old Cisco 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 network management system (NMS) applications. You can update from deprecated MIBs to the replacement MIBs as shown in [Table 14](#).

Table 14 *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 determined
OLD-CISCO-DECNET-MIB	To be determined
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 determined
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 determined
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	To be determined

Important Notes

Image Obsolescence, Cisco IOS Release 12.1(7)E

All Cisco 7200 series and Cisco 7400 series images in Cisco IOS Releases 12.2(2)DD have been obsoleted from manufacturing.

These images are now available in Cisco IOS Release 12.2(2)DD1.



Note

Disclaimer: In order to increase network availability, Cisco recommends that you upgrade affected IOS images with the suggested replacement software images. Cisco will discontinue manufacturing shipment of affected IOS images. Any pending order will be substituted by the replacement software images. PLEASE BE AWARE THAT FAILURE TO UPGRADE THE AFFECTED IOS IMAGES MAY RESULT IN NETWORK DOWNTIME. The terms and conditions that governed your rights and obligations and those of Cisco, with respect to the deferred images, will apply to the replacement images.

Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. Severity 3 caveats are moderate caveats, and only select severity 3 caveats are included in the caveats document.

This section contains only open and resolved caveats for the current Cisco IOS maintenance release.

All caveats in Cisco IOS Release 12.2 and Cisco IOS Release 12.2 are also in Cisco IOS Release 12.2(2)DD4.

For information on caveats in Cisco IOS Release 12.2, see *Caveats for Cisco IOS Release 12.2*.

For information on caveats in Cisco IOS Release 12.2 T, see *Caveats for Cisco IOS Release 12.2 T*, which lists severity 1 and 2 caveats and select severity 3 caveats and is located on Cisco.com and the Documentation CD-ROM.



Note

If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, **log in** to Cisco.com and click **Software Center: Cisco IOS Software: Bug Toolkit: Bug Navigator II**. Another option is to go to <http://www.cisco.com/support/bugtools/>.

Because Cisco IOS Release 12.2(2)DD1 is the initial base release, there are no resolved caveats. For a list of the resolved caveats, see the next set of release notes for this release version.

Table 15 Caveats Reference for Cisco IOS Release 12.2 DD

DDTS Number	Open in Release	Resolved in Release
CSCds55033		12.2(2)DD4
CSCdu33405	12.2(2)DD, 12.2(2)DD1	

Table 15 Caveats Reference for Cisco IOS Release 12.2 DD (continued)

CSCdu53438	12.2(2)DD	
CSCdu60311	12.2(2)DD, 12.2(2)DD1	
CSCdu63830	12.2(2)DD, 12.2(2)DD1	
CSCdu64444	12.2(2)DD	
CSCdu72839	12.2(2)DD1	
CSCdu74325	12.2(2)DD1	
CSCdu86681	12.2(2)DD	
CSCdu87365	12.2(2)DD	
CSCdu88327	12.2(2)DD1	
CSCdu88673	12.2(2)DD	
CSCdv01004	12.2(2)DD1	
CSCdv08146	12.2(2)DD1	
CSCdv35848	12.2(2)DD1	12.2(2)DD2
CSCdv37075	12.2(2)DD1	
CSCdv37414		12.2(2)DD4
CSCdv65315	12.2(2)DD1	
CSCdv70007	12.2(2)DD1	
CSCdw01472	12.2(2)DD1	
CSCdw03282	12.2(2)DD1	
CSCdw03871	12.2(2)DD1	
CSCdw42849		12.2(2)DD2
CSCdw65903		12.2(2)DD3

Open Caveats—Cisco IOS Release 12.2(2)DD4

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)DD4 and describes only severity 1 and 2 caveats and select severity 3 caveats.

There are no known open caveats for Cisco IOS Release 12.2(2)DD4.

Resolved Caveats—Cisco IOS Release 12.2(2)DD4

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(2)DD4. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCds55033

In heavy traffic situation, the packet being switched by Cisco Express Forwarding (CEF) may be corrupted.

Workaround: Disable CEF. However, this will increase the CPU load.

- CSCdv37414

A Cisco 7200 router running Cisco IOS Release 12.2(3) may experience packet loss if Cisco Express Forwarding (CEF) is configured over an Inter-Switch Link (ISL) trunk configured, which is configured on a PA-2FE-FX Two-Port Fast Ethernet port adaptor.

There are no known workarounds.

Open Caveats—Cisco IOS Release 12.2(2)DD3

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)DD3 and describes only severity 1 and 2 caveats and select severity 3 caveats.

There are no known open caveats for Cisco IOS Release 12.2(2)DD3.

Resolved Caveats—Cisco IOS Release 12.2(2)DD3

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(2)DD3. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdw65903

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

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

Open Caveats—Cisco IOS Release 12.2(2)DD2

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)DD2 and describes only severity 1 and 2 caveats and select severity 3 caveats.

There are no known open caveats for Cisco IOS Release 12.2(2)DD2.

Resolved Caveats—Cisco IOS Release 12.2(2)DD2

All the caveats listed in this section are resolved in Cisco IOS Release 12.2(2)DD2. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdv35848

A Cisco 7200 series router with an L2TP Network Server (LNS) might print out the following error message:

```
Sep 17 11:05:47.619 PST: %SCHED-2-WATCH: Attempt to enqueue uninitialized
watched queue (address 0).
-Process= "IP Input", ipl= 0, pid= 31
-Traceback= 6051D6F4 60CF22D4 60CE8958 605B15D0 605D7888 605D5900 605D5A14
605D5BA0 605046BC 605046A8
```

There are no known workarounds.

- CSCdw42849

On a Cisco 7200 series router, Point-to-Point Protocol (PPP) over Ethernet session may not be cleared normally. A session may become stuck in DOWN and if the next new session exceeds a session limit, the new session would not be created.

Workaround: Manually clear the Virtual Interface.

Open Caveats—Cisco IOS Release 12.2(2)DD1

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)DD1 and describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdu33405

A Cisco 7400 series router may unexpectedly reload when online insertion and removal (OIR) of PA-A3-OC3 is performed with bidirectional traffic running.

There are no known workarounds.

- CSCdu60311

A Cisco 7200 series router configured with Quality of Service (QOS) may not have queuing info/stats in the Parallel Express Forwarding (PXF) path when issuing the **show queue** command.

There are no known workarounds.

- CSCdu63830

A Cisco 7200 series router using the Class Based Weighted Random Early Detection (CB-WRED) feature in the Parallel eXpress Forwarding (PXF) path on a Network Services Engine (NSE-1) may have the default threshold parameters differ from those that apply in the IOS path.

The parameters shown by the **show policy-map** command are those used in the IOS path. If parameters are defaulted for some precedences but not for others, the results may not be as expected.

Workaround: Default the thresholds for all precedences.

Alternative workaround: Prescribe the thresholds for all precedences.

- CSCdu72839

On a Cisco 7200 series router, configurating and then unconfigurating the atm bundle causes the interface to stop forwarding.

There are no known workarounds.

- CSCdu74325
On a Cisco 7400 series router, when “no keepalives” is set on a i82543 based Gig/Fast/Ethernet interface, IOS may fail to see a change in speed, duplex or link status on the cable.
Workaround: Enable keepalives via the “keepalive” command or to perform a shut and no shut on the interface.
- CSCdu88327
A Cisco router may not have a LINEPROTO-5-UPDOWN message printed even though the session is up.
There are no known workarounds.
- CSCdv01004
When **clear counters** command is executed on Cisco 7401 router, CPU utilization may reach 100%.
Workaround: Clear counters one by one instead all of them at one time.
- CSCdv08146
On a Cisco 7400 series router, when vpdn multihop is enabled, the input counters on a gigabit ethernet interface of a 7400 router do not increment for packets switched through the multihop interface.
There are no known workarounds.
- CSCdv35848
A Cisco 7200 series router with an L2TP Network Server (LNS) may have it print out the following error message:

```
Sep 17 11:05:47.619 PST: %SCHED-2-WATCH: Attempt to enqueue uninitialized
watched queue (address 0).
-Process= "IP Input", ipl= 0, pid= 31
-Traceback= 6051D6F4 60CF22D4 60CE8958 605B15D0 605D7888 605D5900 605D5A14
605D5BA0 605046BC 605046A8
```


There are no known workarounds.
- CSCdv37075
A Cisco 7200 router with a Network Services Engine (NSE-1) and Parallel eXpress Forwarding (PXF) enabled doesn't perform the CBWFQ **priority** priority command when the bandwidth is specified as a percentage of the interface bandwidth.
Workaround: Configure the **priority** bandwidth explicitly.
- CSCdv65315
A Cisco 7200 series router using a PA-MC-8TE1+ port adapter and running IOS Version 12.2(02)DD might crash while booting with the following messages on the console:

```
%CHOPIN-3-INITFAIL: CHOPIN (bay 0), Init Failed at ../pas/if_pas_chopin.c -
line 3471 arg 738211F8
-Process= "Init", ipl= 3, pid= 2
-Traceback= 60411A6C 60413554 60582054 605821B8 60530AAC 6046F5AC 6046F7A0
6050EC5C 6050EC48
%PA-3-DEACTIVATED: port adapter in bay [3] powered off.
%ALIGN-1-FATAL: Corrupted program counter
pc=0x0, ra=0x60414194, sp=0x60DBE008

%ALIGN-1-FATAL: Corrupted program counter
pc=0x0, ra=0x60414194, sp=0x60DBE008

-Traceback= 0 60414194 60591C08 60592834 604137A8 60582054 605821B8 60530AAC
```

```

6046F5AC 6046F7A0 6050EC5C 6050EC48
signal= 0xA, code= 0x408, context= 0x60D82F60

=== Flushing messages (17:08:26 UTC Fri Oct 19 2001) ===
Free space check for bootflash:crashinfo_20011019-170826 failed (-1/1043)

-Traceback= 0 60414194 60591C08 60592834 604137A8 60582054 605821B8 60530AAC
6046F5AC 6046F7A0 6050EC5C 6050EC48

*** System received a Bus Error exception ***
signal= 0xa, code= 0x408, context= 0x60d82f60
PC = 0x6053c01c, Cause = 0x420, Status Reg = 0x34008002

```

There are no known workarounds.

- CSCdv70007

On a Cisco 7200 series router, the two CLI's, "sh isdn active" and "sh isdn status". do not match the active calls.

There are no known workarounds.

- CSCdw01472

The GE interface on an Cisco 7401 router may not count all input drops or throttles. When the input queue fills up on the GE interface new input packets are dropped. These dropped packets may not be reflected in the interface input drop or throttle counts.

There are no known workarounds.

- CSCdw03282

On a Cisco 7400 series router, some sessions stay at wt-con state until l2tp tunnel is torn down.

There are no known workarounds.

- CSCdw03871

A Cisco 7400 series router running IOS 12.2(2)DD and configured for L2TP tunnels, may crash by software forced crash when traffic is sent onto the tunnels.

There are no known workarounds.

Open Caveats—Cisco IOS Release 12.2(2)DD

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)DD and describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdu33405

A Cisco 7400 series router may unexpectedly reload when online insertion and removal (OIR) of PA-A3-OC3 is performed with bidirectional traffic running.

There are no known workarounds.

- CSCdu53438

On a Cisco 7200 series router, untagged packets arriving on an interface with dot1q subinterfaces may be treated as plain ethernet packets instead of native virtual LAN (VLAN) if the router is using a Network Services Engine (NSE-1) or 7400 with Parallel Express Forwarding (PXF) switching enabled. This will prevent input features on the subinterface from operating correctly.

There are no known workarounds.

- CSCdu60311
A Cisco 7200 series router configured with Quality of Service (QOS) may not have queuing info/stats in the Parallel Express Forwarding (PXF) path when issuing the **show queue** command.
There are no known workarounds.
- CSCdu63830
A Cisco 7200 series router using the Class Based Weighted Random Early Detection (CB-WRED) feature in the Parallel eXpress Forwarding (PXF) path on a Network Services Engine (NSE-1) may have the default threshold parameters differ from those that apply in the IOS path.
The parameters shown by the **show policy-map** command are those used in the IOS path. If parameters are defaulted for some precedences but not for others, the results may not be as expected.
Workaround: Default the thresholds for all precedences.
Alternative workaround: Prescribe the thresholds for all precedences.
- CSCdu64444
A Cisco 7400 series router with Inter-Switch Link (ISL) packets may not have those packets recognized by Cisco Express Forwarding (CEF) switching. This only occurs on PA-2FE, PA-GE, and Cisco 7400 GE and FE ports.
Workaround: Use any port adaptor other than PA-2FE, PA-GE, or Cisco 7400 GE and FE port adaptors.
- CSCdu86681
A Cisco 7400 series router configured as a L2TP Access Concentrator (LAC) may unexpectedly reload when performing L2TP failover to an alternate L2TP Network Server (LNS).
There are no known workarounds.
- CSCdu87365
A Cisco router with frame-relay encapsulation and is-is configured may unexpectedly reload or hang when passing ping packets.
There are no known workarounds.
- CSCdu88673
A Cisco 7200 series router configured as a L2TP Access Concentrator (LAC) may encounter a bus error when receiving data via Integrated Services Digital Network (ISDN).
There are no known workarounds.

Related Documentation

The following sections describe the documentation available for the Cisco 12.2(2)DD4. These documents consist of hardware and software installation guides, Cisco IOS configuration guides and command references, system error messages, feature modules, and other documents.

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

Use these release notes with these documents:

- [Release-Specific Documents, page 31](#)
- [Platform-Specific Documents, page 32](#)

- [Feature Modules](#), page 32
- [Cisco IOS Software Documentation Set](#), page 33

Release-Specific Documents

The following documents are specific to Cisco IOS Release 12.2 and are located on Cisco.com and the Documentation CD-ROM:

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

On Cisco.com at:

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

- Product bulletins, field notices, and other release-specific documents on Cisco.com at:

Technical Documents

- *Caveats for Cisco IOS Release 12.2*

As a supplement to the caveats listed in “[Caveats](#)” in these release notes, see *Caveats for Cisco IOS Release 12.2* document, which contains caveats applicable to all platforms for all maintenance releases of Cisco IOS Release 12.2.

- *Caveats for Cisco IOS Release 12.2 T*

As a supplement to the caveats listed in *Caveats for Cisco IOS Release 12.2 T*, which contains caveats applicable to all platforms for all maintenance releases of Cisco IOS Release 12.2 T.

On Cisco.com at:

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

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: 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 Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, log in to Cisco.com and click **Software Center: Cisco IOS Software: Bug Toolkit: Bug Navigator II**. Another option is to go to <http://www.cisco.com/support/bugtools/bugtool.shtml>.

Platform-Specific Documents

These documents are available for the Cisco 7000 family of routers on Cisco.com and the Documentation CD-ROM:

- *Cisco 7000 Hardware Installation and Maintenance*
- *Cisco 7000 User Guide*
- *Cisco 7010 User Guide*
- *Cisco 7200 VXR Installation and Configuration Guide*
- Cisco 7200 VXR Quick Start Guide
- *Cisco 7202 Installation and Configuration Guide*
- *Cisco 7204 Installation and Configuration Guide*
- *Cisco 7206 Installation and Configuration Guide*
- Cisco 7206 Quick Start Guide
- Cisco 7401 ASR Installation and Configuration Guide
- Cisco 7401 ASR Quick Start Guide
- *Quick Reference for Cisco 7204 Installation*
- *Quick Start Guide Cisco 7100 Series VPN Router*

On Cisco.com at:

Technical Documents: Documentation Home Page: Core/High-End Routers

On the Documentation CD-ROM at:

Cisco Product Documentation: Core/High-End Routers

Feature Modules

Feature modules describe new features supported by Cisco IOS Release 12.2(2)DD4 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 Cisco.com at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: New Feature Documentation: New Features in 12.2-Based Limited Lifetime Releases: New Features in Release 12.2 DD

On the Documentation CD-ROM at:

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

Cisco IOS Software Documentation Set

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

Documentation Modules

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

On Cisco.com 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

Cisco IOS Release 12.2 Documentation Set Contents

[Table 16](#) lists the contents of the Cisco IOS Release 12.2 software documentation set, which is available in electronic form and in printed form if ordered.

**Note**

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

On Cisco.com at:

Technical Documents: 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 16 Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
<ul style="list-style-type: none"> Cisco IOS Configuration Fundamentals Configuration Guide Cisco IOS Configuration Fundamentals Command Reference 	Cisco IOS User Interfaces File Management System Management
<ul style="list-style-type: none"> Cisco IOS Bridging and IBM Networking Configuration Guide Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2 Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2 	Transparent Bridging SRB Token Ring Inter-Switch Link Token Ring Route Switch Module RSRB DLSW+ Serial Tunnel and Block Serial Tunnel LLC2 and SDLC IBM Network Media Translation SNA Frame Relay Access NCI Client/Server Airline Product Set DSPU and SNA Service Point SNA Switching Services Cisco Transaction Connection Cisco Mainframe Channel Connection CLAW and TCP/IP Offload CSNA, CMPC, and CMPC+ TN3270 Server
<ul style="list-style-type: none"> Cisco IOS Dial Technologies Configuration Guide: Dial Access Cisco IOS Dial Technologies Configuration Guide: Large-Scale Dial Applications Cisco IOS Dial Technologies Command Reference, Volume 1 of 2 Cisco IOS Dial Technologies Command Reference, Volume 2 of 2 	Dial Access Modem and Dial Shelf Configuration and Management ISDN Configuration Signaling Configuration Point-to-Point Protocols Dial-on-Demand Routing Dial Backup Dial Related Addressing Service Network Access Solutions Large-Scale Dial Solutions Cost-Control Solutions Internetworking Dial Access Scenarios
<ul style="list-style-type: none"> <i>Cisco IOS Interface Configuration Guide</i> <i>Cisco IOS Interface Command Reference</i> 	LAN Interfaces Serial Interfaces Logical Interfaces
<ul style="list-style-type: none"> Cisco IOS IP Configuration Guide Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols Cisco IOS IP Command Reference, Volume 3 of 3: Multicast 	IP Addressing IP Services IP Routing Protocols IP Multicast
<ul style="list-style-type: none"> Cisco IOS AppleTalk and Novell IPX Configuration Guide Cisco IOS AppleTalk and Novell IPX Command Reference 	AppleTalk Novell IPX

Table 16 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> • Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide • Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference 	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
<ul style="list-style-type: none"> • Cisco IOS Voice, Video, and Fax Configuration Guide • <i>Cisco IOS Voice, Video, and Fax Command Reference</i> 	Voice over IP Call Control Signaling Voice over Frame Relay Voice over ATM Telephony Applications Trunk Management Fax, Video, and Modem Support
<ul style="list-style-type: none"> • Cisco IOS Quality of Service Solutions Configuration Guide • <i>Cisco IOS Quality of Service Solutions Command Reference</i> 	Packet Classification Congestion Management Congestion Avoidance Policing and Shaping Signaling Link Efficiency Mechanisms
<ul style="list-style-type: none"> • Cisco IOS Security Configuration Guide • <i>Cisco IOS Security Command Reference</i> 	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options Supported AV Pairs
<ul style="list-style-type: none"> • Cisco IOS Switching Services Configuration Guide • Cisco IOS Switching Services Command Reference 	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
<ul style="list-style-type: none"> • Cisco IOS Wide-Area Networking Configuration Guide • <i>Cisco IOS Wide-Area Networking Command Reference</i> 	ATM Frame Relay SMDS X.25 and LAPB
<ul style="list-style-type: none"> • Cisco IOS Mobile Wireless Configuration Guide • Cisco IOS Mobile Wireless Command Reference 	General Packet Radio Service

Table 16 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> • Cisco IOS Terminal Services Configuration Guide • Cisco IOS Terminal Services Command Reference 	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
<ul style="list-style-type: none"> • <i>Cisco IOS Configuration Guide Master Index</i> • <i>Cisco IOS Command Reference Master Index</i> • Cisco IOS Debug Command Reference • Cisco IOS Software System Error Messages • <i>New Features in 12.2-Based Limited Lifetime Releases</i> • New Features in Release 12.2 T • Release Notes (Release note and caveat documentation for 12.2-based releases and various platforms) 	

Obtaining Documentation

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

World Wide Web

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

Documentation CD-ROM

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

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:
http://www.cisco.com/cgi-bin/order/order_root.pl
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

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

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

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

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

We appreciate your comments.

Obtaining Technical Assistance

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

Cisco.com

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

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

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

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

<http://www.cisco.com>

Technical Assistance Center

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

Contacting TAC by Using the Cisco TAC Website

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

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

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

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

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

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

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

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

Contacting TAC by Telephone

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

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

P1 and P2 level problems are defined as follows:

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

This document is to be used in conjunction with the documents listed in the “[Related Documentation](#)” section on page 30.

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