

Cisco MDS 9000 Family Release Notes for Storage Services Interface Image Release 2.1(2i)

Release Date: December 15, 2005

Text Part Number: OL-8017-05 B0

This document describes the caveats and limitations for the Storage Service Interface (SSI) software for the Cisco MDS Storage Services Module (SSM). Use this document in conjunction with the documents listed in the [“Related Documentation”](#) section on page 7.

[Table 1](#) shows the on-line change history for this document.

Table 1 **Online History Change**

Revision	Date	Description
A0	12/15/2005	Created release notes
B0	03/03/2006	Added DDTs CSCsd27581 and CSCsd42944

Contents

This document includes the following sections:

- [Introduction, page 2](#)
- [System Requirements, page 2](#)
- [Image Upgrade, page 5](#)
- [New Features, page 5](#)
- [Limitations, page 5](#)
- [Compatibility Matrix, page 5](#)
- [Caveats, page 5](#)
- [Related Documentation, page 7](#)

[Send documentation comments to mdsfeedback-doc@cisco.com](mailto:mdsfeedback-doc@cisco.com)

- [Obtaining Documentation, page 8](#)

Introduction

The SSM provides distributed intelligent storage services for the Cisco MDS 9000 Family and supports up to 32 Fibre Channel ports. It provides the following:

- Network-based volume management
- Management and copy services
- Network assisted storage applications via SANTap
- 32 autosensing 1-Gbps/2-Gbps Fibre Channel interfaces
- Hot-swappable Fibre Channel small form-factor pluggable (SFP) transceiver connectivity
 - Short wavelength (SWL) for connectivity up to 500 m
 - Long wavelength (LWL) for connectivity up to 10 km
 - Coarse wavelength-division multiplexing (CWDM) for connectivity up to 100 km and aggregation of up to 8 ports onto a single optical fiber
- Fibre Channel Write Acceleration (FC-WA) and SCSI Flow Statistics
- Network-Accelerated Serverless Backup (NASB)

System Requirements

This section describes the system requirements for Cisco MDS SAN-OS Release 2.1(2i) and includes the following topics:

- [Components Supported, page 2](#)
- [Determining the Software Version, page 5](#)

Components Supported

[Table 2](#) lists the software and hardware components supported by the Cisco MDS 9000 Family.

Table 2 Cisco MDS 9000 Family Supported Software and Hardware Components

Component	Part Number	Description	Applicable Products
Software	M95S1K9-2.1.2d	MDS 9500 Supervisor/Fabric-I, SAN-OS software SAN-OS	MDS 9500 Series only
	M92S1K9-2.1.2d	MDS 9216 Supervisor/Fabric-I, SAN-OS Software	MDS 9216 only
	SSI-M9K9-2.1.2i ¹	MDS 9000 Storage Services Interface	MDS 9500 Series and MDS 9216

Send documentation comments to mdsfeedback-doc@cisco.com

Table 2 *Cisco MDS 9000 Family Supported Software and Hardware Components (continued)*

Component	Part Number	Description	Applicable Products
License	M9500ENT1K9	Enterprise package	MDS 9500 Series
	M9200ENT1K9	Enterprise package	MDS 9200 Series
	M9100ENT1K9	Enterprise package	MDS 9100 Series
	M9500FIC1K9	Mainframe package	MDS 9500 Series
	M9200FIC1K9	Mainframe package	MDS 9200 Series
	M9100FIC1K9	Mainframe package	MDS 9100 Series
	M9500FMS1K9	Fabric Manager Server package	MDS 9500 Series
	M9200FMS1K9	Fabric Manager Server package	MDS 9200 Series
	M9100FMS1K9	Fabric Manager Server package	MDS 9100 Series
	M9500EXT1K9	SAN Extension over IP package for IPS-8 module	MDS 9500 Series
	M9200EXT1K9	SAN Extension over IP package for IPS-8 module	MDS 9200 Series
	M9500EXT14K9	SAN Extension over IP package for IPS-4 module	MDS 9500 Series
	M9200EXT14K9	SAN Extension over IP package for IPS-4 module	MDS 9200 Series
	M9500EXT12K9	SAN Extension over IP package for MPS-14/2 module	MDS 9500 Series
	M9200EXT12K9	SAN Extension over IP package for MPS-14/2 module	MDS 9200 Series
	M9500SSE1K9	Storage Services Enabler package	MDS 9500 Series with SSM
	M9200SSE1K9	Storage Services Enabler package	MDS 9200 Series with SSM
Chassis	DS-C9509	MDS 9509 director, base configuration (9-slot modular chassis includes 7 slots for switching modules and 2 slots for supervisor modules—SFPs sold separately)	MDS 9509 only
	DS-C9506	MDS 9506 director (6-slot modular chassis includes 4 slots for switching modules and 2 slots for supervisor modules—SFPs ² sold separately)	MDS 9506 only
	DS-C9216-K9	MDS 9216 16-port semi-modular fabric switch (includes 16 1-Gbps /2-Gbps Fibre Channel ports, power supply, and expansion slot—SFPs sold separately)	MDS 9216 only
	DS-C9216A-K9	MDS 9216A 16-port semi-modular fabric switch (includes 16 1-Gbps/2-Gbps Fibre Channel ports, power supply, and expansion slot—SFPs sold separately).	MDS 9216A only
	DS-C9216i-K9	MDS 9216i 16-port semi-modular fabric switch (includes 14 1-Gbps/2-Gbps Fibre Channel ports, 2 Gigabit Ethernet ports, power supply, and expansion slot—SFPs sold separately).	MDS 9216i only
Supervisor modules	DS-X9530-SF1-K9	MDS 9500 Supervisor/Fabric-I, module	MDS 9500 Series only

[Send documentation comments to mdsfeedback-doc@cisco.com](mailto:mdsfeedback-doc@cisco.com)

Table 2 Cisco MDS 9000 Family Supported Software and Hardware Components (continued)

Component	Part Number	Description	Applicable Products
Switching modules	DS-X9016	MDS 9000 16-port 1-Gbps /2-Gbps Fibre Channel module (SFPs sold separately)	MDS 9500 Series and 9216
	DS-X9032	MDS 9000 32-port 1-Gbps /2-Gbps Fibre Channel module (SFPs sold separately)	
Services modules	DS-X9308-SMIP	8-port Gigabit Ethernet IP Storage Services module	
	DS-X9304-SMIP	4-port Gigabit Ethernet IP Storage Services module	
	DS-X9032-SSM	MDS 9000 32-Port 1-Gbps/2-Gbps Fibre Channel Storage Services Module (SSM)	
LC-type fiber-optic SFP	DS-SFP-FC-2G-SW	1-Gbps /2-Gbps Fibre Channel — short wavelength SFP	MDS 9000 Family
	DS-SFP-FC-2G-LW	1-Gbps /2-Gbps Fibre Channel — long wavelength SFP	
	DS-SFP-FCGE-SW	1-Gbps Ethernet and 1-Gbps /2-Gbps Fibre Channel—short wavelength SFP	
	DS-SFP-FCGE-LW	1-Gbps Ethernet and 1-Gbps /2-Gbps Fibre Channel — long wavelength SFP	
CWDM ³	CWDM-SFP-xxxx-2G	Gigabit Ethernet and 1-Gbps /2-Gbps Fibre Channel SFP LC interface xxxx nm, where xxxx = 1470, 1490, 1510, 1530, 1550, 1570, 1590, or 1610 nm	MDS 9000 Family
	CWDM-MUX-4	Add/drop multiplexer for 4 CWDM wavelengths	
	CWDM-MUX-8	Add/drop multiplexer for 8 CWDM wavelengths	
	CWDM-CHASSIS-2	Two slot chassis for CWDM add/drop multiplexer(s)	
Power supplies	DS-CAC-300W	300-W ⁴ AC power supply	MDS 9100 Series only
	DS-CAC-845W	845-W AC power supply	MDS 9216 only
	DS-CAC-2500W	2500-W AC power supply	MDS 9509 only
	DS-CDC-2500W	2500-W DC power supply	
	DS-CAC-4000W-US	4000-W AC power supply for US (cable attached)	
	DS-CAC-4000W-INT	4000-W AC power supply international (cable attached)	MDS 9506 only
	DS-CAC-1900W	1900-W AC power supply	
	DS-CDC-1900W	1900-W DC power supply	
CompactFlash	MEM-MDS-FLD512M	MDS 9500 supervisor Compact Flash disk, 512 MB	MDS 9500 Series only
Port analyzer adapter	DS-PAA	A standalone Fibre Channel-to-Ethernet adapter that allows for simple, transparent analysis of Fibre Channel traffic in a switched fabric	MDS 9000 Family
	DS-PAA-2		

1. Supports the Storage Services Module (SSM) only. The last SSI image supported on the ASM is SSI-M9K9-2.1.1.
2. SFP = small form-factor pluggable
3. CWDM = coarse wavelength division multiplexing
4. W = Watt

Send documentation comments to mdsfeedback-doc@cisco.com

Determining the Software Version



Note

We strongly recommend that you use the latest available software release supported by your vendor for all Cisco MDS 9000 Family products.

To determine the version of the Cisco SAN-OS software currently running on a Cisco MDS 9000 Family switch using the CLI, log into the switch and enter the **show version EXEC** command.

To determine the version of the Cisco SAN-OS software currently running on a Cisco MDS 9000 Family switch using the Fabric Manager, from the Switches tab in the information pane, locate the switch using the IP address, logical name, or WWN, and then check its version in the Release column.

Image Upgrade

If SSMs are present in a Cisco MDS 9000 Family switch, several kinds of upgrade may be performed as required—upgrading a previously provided package, upgrading the SAN-OS image, or reformatting the SSM add-on image.

New Features

This section describes the new features introduced in this release. For more information about the features listed, refer to the documentation set listed in the “[Related Documentation](#)” section on page 7.

The SSI image release 2.1(2i) add-on image is compatible with the Cisco MDS SAN-OS Release 2.1(2b) and Cisco MDS SAN-OS Release 2.1(2d) images.

Limitations

There are no limitations for this release.

Compatibility Matrix

The latest *Cisco MDS SAN-OS Release Compatibility Matrix for Storage Service Interface Images* is available from the following Cisco Systems website.

http://www.cisco.com/en/US/products/ps5989/products_device_support_table09186a0080485272.html

Caveats

This section lists the open and resolved caveats for this release. Use [Table 3](#) to determine the status of a particular caveat. In the table, "O" indicates an open caveat and "R" indicates a resolved caveat.

Send documentation comments to mdsfeedback-doc@cisco.com

Table 3 ***Open and Resolved Caveats for Cisco MDS SAN-OS Release 2.1.2i***

DDTS Number	2.1(2i)
Severity 2	
CSCsd42944	O
Severity 3	
CSCsc03016	R
CSCsd27581	O

Resolved Caveats

- CSCsc03016

Symptom: If a cartridge is not loaded in the drive, the Tape Drive returns a CHECK_CONDITION with ASCQ=MEDIUM_NOT_PRESENT message. This should be interpreted as a success by the device discovery module in NASB but is declared as unreachable instead.

Workaround: None.

Open Caveats

- CSCsd42944

Symptom: If you make zoning changes while an intelligent application is performing normal storage related operations on the SSM, the console log may fill up with error messages. As a result of the large amount of data to be logged, the console may stop responding and the SSM may fail.

Workaround: Do not make zoning changes in the topology while normal operations are in progress. Make sure any intelligent application running on the SSM has stopped before making any configuration changes.

- CSCsd27581

Symptom: The upgrade of an SSM with a configured SSI image may fail under certain conditions. As a result, the **install all** command fails and all the modules installed in slot numbers greater than the SSM slot number are not upgraded.

This failure happens only if the SSM was initialized with the isapi_debug.conf file installed in the modflash: file system.

In addition, this failure happens if the configured SSI code is version 2.1(2), 2.1(2i), or 2.1(2j) and the user attempts to upgrade to a later version.

This problem does not occur if the SSM is started and is running without the configured SSI boot variable.

Workaround: Perform a disruptive upgrade of the SSM to ensure that the **install all** command completes successfully. Follow these steps:

1. Use the **delete modflash** command to remove the isapi_debug.conf file from the modflash: file system, as in this example:

```
switch# delete modflash://ssm-slot-number-1/isapi_debug.conf
```

2. Use the **reload module** command to reload the SSM module, as in this example:

```
switch# reload module://ssm-slot-number
```

Send documentation comments to mdsfeedback-doc@cisco.com

3. Verify that the **install all** command succeeds once the SSM reaches the OK state.

Related Documentation

The documentation set for the Cisco MDS 9000 Family includes the following documents. To find a document online, use the Cisco MDS SAN-OS Documentation Locator at:

http://www.cisco.com/en/US/products/ps5989/products_documentation_roadmap09186a00804500c1.html.

For information on IBM TotalStorage SAN Volume Controller Storage Software for the Cisco MDS 9000 Family, refer to the IBM TotalStorage Support website:

<http://www.ibm.com/storage/support/2062-2300/>

Release Notes

- *Cisco MDS 9000 Family Release Notes for Cisco MDS SAN-OS Releases*
- *Cisco MDS 9000 Family Release Notes for Storage Services Interface Images*
- *Cisco MDS 9000 Family Release Notes for Cisco MDS SVC Releases*
- *Cisco MDS 9000 Family Release Notes for Cisco MDS 9000 EPLD Images*

Compatibility Information

- *Cisco MDS 9000 SAN-OS Hardware and Software Compatibility Information*
- *Cisco MDS 9000 Family Interoperability Support Matrix*
- *Cisco MDS SAN-OS Release Compatibility Matrix for IBM SAN Volume Controller Software for Cisco MDS 9000*
- *Cisco MDS SAN-OS Release Compatibility Matrix for Storage Service Interface Images*

Regulatory Compliance and Safety Information

- *Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family*

Hardware Installation

- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*
- *Cisco MDS 9216 Switch Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*
- *Cisco MDS 9020 Fabric Switch Hardware Installation Guide*

Cisco Fabric Manager

- *Cisco MDS 9000 Family Fabric Manager Quick Configuration Guide*

Send documentation comments to mdsfeedback-doc@cisco.com

- *Cisco MDS 9000 Family Fabric Manager Configuration Guide*
- *Cisco MDS 9000 Fabric Manager Online Help*
- *Cisco MDS 9000 Fabric Manager Web Services Online Help*

Command-Line Interface

- *Cisco MDS 9000 Family Software Upgrade and Downgrade Guide*
- *Cisco MDS 9000 Family CLI Quick Configuration Guide*
- *Cisco MDS 9000 Family CLI Configuration Guide*
- *Cisco MDS 9000 Family Command Reference*
- *Cisco MDS 9000 Family Quick Command Reference*
- *Cisco MDS 9020 Fabric Switch Configuration Guide and Command Reference*
- *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide*

Troubleshooting and Reference

- *Cisco MDS 9000 Family Troubleshooting Guide*
- *Cisco MDS 9000 Family MIB Quick Reference*
- *Cisco MDS 9020 Fabric Switch MIB Quick Reference*
- *Cisco MDS 9000 Family SMI-S Programming Reference*
- *Cisco MDS 9000 Family System Messages Reference*
- *Cisco MDS 9020 Fabric Switch System Messages Reference*

Installation and Configuration Note

- *Cisco MDS 9000 Family SSM Configuration Note*
- *Cisco MDS 9000 Family Port Analyzer Adapter Installation and Configuration Note*

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

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

Send documentation comments to mdsfeedback-doc@cisco.com

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a comprehensive library of technical product documentation on a portable medium. The DVD enables you to access multiple versions of installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the same HTML documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .PDF versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Ordering Documentation

Registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Nonregistered Cisco.com users can order technical documentation from 8:00 a.m. to 5:00 p.m. (0800 to 1700) PDT by calling 1 866 463-3487 in the United States and Canada, or elsewhere by calling 011 408 519-5055. You can also order documentation by e-mail at tech-doc-store-mkpl@external.cisco.com or by fax at 1 408 519-5001 in the United States and Canada, or elsewhere at 011 408 519-5001.

Documentation Feedback

You can rate and provide feedback about Cisco technical documents by completing the online feedback form that appears with the technical documents on Cisco.com.

You can submit comments about Cisco documentation by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Send documentation comments to mdsfeedback-doc@cisco.com

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

<http://www.cisco.com/go/psirt>

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For Emergencies only — security-alert@cisco.com

An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For Nonemergencies — psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532



Tip

We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.x through 9.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT at the aforementioned e-mail addresses or phone numbers before sending any sensitive material to find other means of encrypting the data.

Send documentation comments to mdsfeedback-doc@cisco.com

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

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

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>



Note

Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

Send documentation comments to mdsfeedback-doc@cisco.com

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is down, or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired, while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco offerings. To order and find out more about the Cisco Product Quick Reference Guide, go to this URL:

<http://www.cisco.com/go/guide>

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

<http://www.cisco.com/go/marketplace/>

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

<http://www.ciscopress.com>

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

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

Send documentation comments to mdsfeedback-doc@cisco.com

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

<http://www.cisco.com/go/iqmagazine>

or view the digital edition at this URL:

<http://ciscoinq.texterity.com/ciscoinq/sample/>

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

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

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

<http://www.cisco.com/en/US/products/index.html>

- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

<http://www.cisco.com/discuss/networking>

- World-class networking training is available from Cisco. You can view current offerings at this URL:

<http://www.cisco.com/en/US/learning/index.html>

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

CCSP, CCVP, the Cisco Square Bridge logo, Follow Me Browsing, and StackWise are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, and iQuick Study are service marks of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, LightStream, Linksys, MeetingPlace, MGX, the Networkers logo, Networking Academy, Network Registrar, *Packet*, PIX, Post-Routing, Pre-Routing, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0601R)

Copyright © 2006 Cisco Systems, Inc. All rights reserved.

Send documentation comments to mdsfeedback-doc@cisco.com