



## Preface

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This preface describes the audience, organization, and conventions of the *Cisco MDS 9000 Family Configuration Guide*. It also provides information on how to obtain related documentation.

## Audience

This guide is for experienced network administrators who are responsible for configuring and maintaining the Cisco MDS 9000 Family of multilayer directors and fabric switches.

## Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	Product Overview	Presents an overview of the Cisco MDS 9000 Family of multilayer switches and directors.
Chapter 2	Before You Begin	Describes the command-line interface (CLI).
Chapter 3	Obtaining and Installing Licenses	Describes license types, procedure, installation, and management for the Cisco MDS SAN-OS software.
Chapter 4	Initial Configuration	Provides initial switch configuration options and switch access information.
Chapter 5	Configuring High Availability	Describes the high availability feature including switchover mechanisms.
Chapter 6	Software Images	Describes how to upgrade Cisco MDS 9000 Family switches, install software image files, use the Flash file system on the supervisor engine, and recover a corrupted bootflash image.
Chapter 7	Managing Modules	Explains how to display and analyze the status of each module and specifies the power on and power off process for modules.

Chapter	Title	Description
Chapter 8	Managing System Hardware	Explains switch hardware inventory, power usage, power supply, module temperature, fan and clock modules, and environment information.
Chapter 9	Configuring and Managing VSANs	Describes how virtual SANs (VSANs) work, explains the concept of default VSANs, isolated VSANs, VSAN IDs, and attributes, and provides details on how to create, delete, and view VSANs.
Chapter 10	Configuring Interfaces	Explains port and operational state concepts in Cisco MDS 9000 Family switches and provides details on configuring ports and interfaces.
Chapter 11	Configuring Trunking	Explains TE ports and trunking concepts.
Chapter 12	Configuring PortChannels	Explains PortChannels and load balancing concepts and provides details on configuring PortChannels, adding ports to PortChannels, and deleting ports from PortChannels.
Chapter 13	Configuring and Managing Zones	Defines various zoning concepts and provides details on configuring a zone set and zone management features.
Chapter 14	Configuring Inter-VSAN Routing	Provides details on sharing resources across VSANs using the inter-VSAN Routing (IVR) feature.
Chapter 15	Managing FLOGI, Name Server, FDMI, and RSCN Databases	Provides name server and fabric login details required to manage storage devices and display registered state change notification (RSCN) databases.
Chapter 16	Configuring Switch Security	Discusses the AAA parameters, user profiles, RADIUS authentication, SSH services, and SNMP security options provided in all switches in the Cisco MDS 9000 Family and provides configuration information for these options.
Chapter 17	Configuring Fabric Security	Describes the security protocols used in Cisco MDS switches to provide switch-switch and host-switch authentication for enterprise-wide fabrics.
Chapter 18	Configuring Port Security	Provides details on port security features that can prevent unauthorized access to a switch port in the Cisco MDS 9000 Family.
Chapter 19	Configuring Fibre Channel Routing Services and Protocols	Provides details and configuration information on Fibre Channel routing services and protocols.
Chapter 20	Configuring IP Services	Provides details on IP over Fibre Channel (IPFC) services and provides configuring IPFC, virtual router, and DNS server configuration information.

Chapter	Title	Description
Chapter 21	Configuring FICON	Provides details on the Fibre Channel (FICON) interface, fabric binding, and the Registered Link Incident Report (RLIR) capabilities in Cisco MDS switches.
Chapter 22	Configuring IP Storage	Provides details on extending the reach of Fibre Channel SANs by connecting separated SAN islands together through IP networks using FCIP, and allowing IP hosts to access FC storage using the iSCSI protocol.
Chapter 23	Configuring Call Home	Provides details on the Call Home service and includes information on Call Home, event triggers, contact information, destination profiles, and e-mail options.
Chapter 24	Configuring Domain Parameters	Explains the Fibre Channel domain (fcdomain) feature, which includes principal switch selection, domain ID distribution, FC ID allocation, and fabric reconfiguration functions.
Chapter 25	Configuring Traffic Management	Provides details on the quality of service (QoS) and Fibre Channel Congestion Control (FCC) features.
Chapter 26	Configuring System Message Logging	Describes how system message logging is configured and displayed.
Chapter 27	Discovering SCSI Targets	Describes how the SCSI LUN discovery feature is started and displayed.
Chapter 28	Monitoring Network Traffic Using SPAN	Describes the Switched Port Analyzer (SPAN), SPAN sources, filters, SPAN sessions, SD port characteristics, and configuration details.
Chapter 29	Advanced Features and Concepts	Describes the advanced configuration features—time out values, fctrace, fabric analyzer, world wide names, flat FC IDs, loop monitoring, and interoperating switches.
Chapter 30	Configuring Fabric Configuration Servers	Describes how the fabric configuration server (FCS) feature is configured and displayed.
Chapter 31	Monitoring System Processes and Logs	Provides information on displaying system processes and status. It also provides information on configuring core and log files, HA policy, heartbeat and watchdog checks, and upgrade resets.

# Document Conventions

Command descriptions use these conventions:

<b>boldface font</b>	Commands and keywords are in boldface.
<i>italic font</i>	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
[ x   y   z ]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Screen examples use these conventions:

screen font	Terminal sessions and information the switch displays are in screen font.
<b>boldface screen font</b>	Information you must enter is in boldface screen font.
<i>italic screen font</i>	Arguments for which you supply values are in italic screen font.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:



## Note

Means reader *take note*. Notes contain helpful suggestions or references to material not covered in the manual.



## Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

## Related Documentation

The documentation set for the Cisco MDS 9000 Family includes the following documents:

- *Cisco MDS 9000 Family Release Notes for Cisco MDS SAN-OS Releases*
- *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 VERITAS Storage Foundation for Networks Software*
- *Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family*
- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9216 Switch Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*
- *Cisco MDS 9000 Family Configuration Guide*
- *Cisco MDS 9000 Family Command Reference*
- *Cisco MDS 9000 Family Fabric Manager Configuration Guide*
- *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide*
- *Cisco MDS 9000 Family MIB Quick Reference*
- *Cisco MDS 9000 Family CIM Programming Reference Guide*
- *Cisco MDS 9000 Family System Messages Guide*
- *Cisco MDS 9000 Family Troubleshooting Guide*
- *Cisco MDS 9000 Family Port Analyzer Adapter 2 Installation and Configuration Note*
- *Cisco MDS 9000 Family Port Analyzer Adapter Installation and Configuration Note*

For information on VERITAS Storage Foundation™ for Networks for the Cisco MDS 9000 Family, refer to the VERITAS website: <http://support.veritas.com/>

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/>

## 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/univercd/home/home.htm>

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](http://www.cisco.com/public/countries_languages.shtml)

## Ordering Documentation

You can find instructions for ordering documentation at this URL:

[http://www.cisco.com/univercd/cc/td/doc/es\\_inpk/pdi.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm)

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:  
<http://www.cisco.com/en/US/partner/ordering/index.shtml>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can send comments about technical documentation to [mdsfeedback-doc@cisco.com](mailto:mdsfeedback-doc@cisco.com).

You can submit comments 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.

## Obtaining Technical Assistance



### Note

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If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL:

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

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For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

## Cisco Technical Support Website

The Cisco Technical Support 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, 365 days a year at this URL:

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

Access to all tools on the Cisco Technical Support 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>

## 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 automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC 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 TAC 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

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)**—Your 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 operation 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 your network is impaired, but 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.

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

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

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

<http://cisco.com/univercd/cc/td/doc/pcat/>

- *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>

- *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>

- *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>

- 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>