



Preface

This document is intended to provide guidance for troubleshooting issues that may appear when deploying a storage area network (SAN) using the Cisco MDS 9000 Family of switches. This document introduces tools and methodologies to recognize a problem, determine its cause, and find possible solutions.

Document Organization

This document is organized into the following chapters:

Chapter	Title	Description
Chapter 1	Troubleshooting Overview	Describes basic concepts, methodology, and tools to use for troubleshooting.
Chapter 2	Troubleshooting Installs, Upgrades, and Reboots	Describes how to identify and resolve problems that might occur when installing, upgrading, or rebooting Cisco MDS 9000 Family hardware.
Chapter 3	Managing Storage Services Modules	Describes how to identify and resolve problems that might occur when installing, replacing, or upgrading storage services modules (SSMs).
Chapter 4	Troubleshooting Hardware	Describes how to identify and resolve problems that might occur when replacing modules, fans, chassis, power supplies or other hardware.
Chapter 5	Troubleshooting Mixed Generation Hardware	Describes procedures used to troubleshoot mixed generation hardware.
Chapter 6	Troubleshooting Licensing	Describes procedures used to troubleshoot licensing issues.
Chapter 7	Troubleshooting Cisco Fabric Services	Describes procedures used to troubleshoot Cisco Fabric Services (CFS) problems.
Chapter 8	Troubleshooting Ports	Describes how to identify and resolve problems that might occur when using port interfaces.
Chapter 9	Troubleshooting N-Port Virtualization	Describes how to identify and resolve problems that might occur when using NPV.

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Chapter	Title	Description
Chapter 10	Troubleshooting PortChannels and Trunking	Describes how to identify and resolve problems that might occur when using PortChannels or trunking.
Chapter 11	Troubleshooting VSANs, Domains, and FSPF	Describes how to identify and resolve problems that might occur when using Virtual Storage Area Networks (VSANs).
Chapter 12	Troubleshooting SAN Device Virtualization	Describes how to identify and resolve SAN device virtualization configuration issues.
Chapter 13	Troubleshooting IVR	Describes how to debug and resolve Inter-VSAN Routing (IVR) configuration issues.
Chapter 14	Troubleshooting Zones and Zone Sets	Describes how to identify and resolve problems that might occur while implementing zones and zone sets.
Chapter 15	Troubleshooting Distributed Device Alias Services	Describes how to troubleshoot and resolve problems that might occur when using device aliases
Chapter 16	Troubleshooting FICON	Describes procedures to troubleshoot FICON.
Chapter 17	Troubleshooting RADIUS and TACACS+	Describes procedures to troubleshoot RADIUS and TACACS+.
Chapter 18	Troubleshooting Users and Roles	Describes procedures to troubleshoot role-based access control.
Chapter 19	Troubleshooting FC-SP, Port Security, and Fabric Binding	Describes procedures to troubleshoot FC-SP, port security, and fabric binding.
Chapter 20	Troubleshooting IP Storage Services	Describes how to identify and resolve problems that might occur when using IP Services.
Chapter 21	Troubleshooting IP Access Lists	Describes procedures to troubleshoot IP ACLs.
Chapter 22	Troubleshooting IPsec	Describes procedures used to troubleshoot IP security (IPsec) and Internet Key Exchange (IKE) encryption issues.
Chapter 23	Troubleshooting SANTap	Describes procedures to troubleshoot SANTap Intelligent Storage Services feature.
Chapter 24	Troubleshooting Digital Certificates	Describes procedures to troubleshoot IKE digital certificates.
Chapter 25	Troubleshooting Call Home	Describes procedures to troubleshoot Call Home.
Chapter 26	Troubleshooting Fabric Manager	Describes procedures used to troubleshoot Fabric Manager.
Appendix A	Before Contacting Technical Support	Describes the steps to perform before calling for technical support with any Cisco MDS 9000 Family product.

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Chapter	Title	Description
Appendix B	Troubleshooting Tools and Methodology	Describes the troubleshooting tools and methodology available for the Cisco MDS 9000 Family product.
Appendix C	Configuration Limits for Cisco MDS SAN-OS Release 3.x	Lists configuration limits for Cisco MDS SAN-OS features.

Document Conventions

Command descriptions use these conventions:

Convention	Description
boldface font	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.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Screen examples use these conventions:

screen font	Terminal sessions and information the switch displays are in screen font.
boldface screen font	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.

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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 this website:

http://www.cisco.com/en/US/docs/storage/san_switches/mds9000/roadmaps/doclocator.htm

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

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 9000 Storage Services Module 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 9124 Multilayer Fabric Switch Quick Start Guide*
- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*
- *Cisco MDS 9020 Fabric Switch Hardware Installation Guide*

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Cisco Fabric Manager

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

Command-Line Interface

- *Cisco MDS 9000 Family Software Upgrade and Downgrade Guide*
- *Cisco MDS 9000 Family Storage Services Module Software Installation and Upgrade 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*
- *Cisco 10-Gigabit Fibre Channel X2 Transceiver Module Installation Note*

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Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New* in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>