



Implementing Cisco Storage Networking Solutions

Length
5 days

Format
Lecture/lab

Track
Support

Version
3.0

Course Description

This 5-day hands-on class gives you the essential knowledge and skills that you need to deploy the Cisco MDS 9000 Family using SAN-OS 3.0. Course topics include installing and bringing up the switch, configuring Virtual SANs (VSANs), domains, interfaces, and zones, implementing PortChannels, configuring management security, and basic troubleshooting. You will also learn how to configure highly available FCIP tunnels and tune the performance of your FCIP links.

In the lab, you will configure the switch from an out-of-the-box state, perform non-disruptive software upgrade, configure VSANs and zones, and implement a high-availability SAN design using FCIP.

Who Should Attend

This course provides in-depth technical training for system engineers, network engineers, and field engineers who need to deploy, configure, and manage MDS 9000 Series switches.

Recommended Prerequisites

Understanding of basic data storage components and protocols and Fibre Channel SANs is recommended.

Related Training

This course replaces the *MDS 9000 Configuration and Troubleshooting Extended Edition (MDSCTX)* course.

ICSNS

Learning Objectives

After you complete this course, you will be able to:

- Identify the components, services, and features of the MDS 9000 platform
- Install the switch hardware and perform the initial software configuration process
- Configure virtual SANs (VSANs), dynamic VSANs, and manage domains
- Configure and zone FC interfaces
- Configure intelligent addressing
- Secure management interfaces
- Configure PortChannels and FSPF
- Explain how to implement FCC and QoS to reduce congestion and prioritize traffic flows
- Configure high-availability SAN extension with FCIP
- Implement inter-VSAN routing (IVR) for FCIP
- Tune FCIP performance
- Diagnose SAN problems and common configuration errors





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Course Outline

Fibre Channel Overview

- The SCSI Protocol
- FC Protocol Concepts
- FC Layers
- FC Flow Control
- FC Login
- FC Error Recovery
- FC Switched Fabric

Module 1: MDS 9000 Platform Overview

Lesson 1: Introducing MDS 9000 Platform Components

- The MDS 9000 Platform
- MDS 9000 Modules
- Modular Design Scalability

Lesson 2: Using Intelligent Network Services

- SAN Scalability Features
- Multiprotocol Support
- High Availability Features
- Traffic Engineering Features
- Security Features
- Interoperability Features
- CFS Infrastructure

Lesson 3: Implementing Integrated Management

- Command Line Interface
- Cisco Fabric Manager
- Cisco Device Manager
- Fabric Manager Server
- Performance Manager and Traffic Analyzer
- CiscoWorks Resource Manager Essentials

Lesson 4: Introducing the MDS 9000 System Architecture

- Crossbar and Supervisor Module Architecture
- MDS Line Card Module Architectures
- Fabric-Based Application Services
- FAIS Overview
- SANTap Overview
- NASB Overview

Module 2: System Installation and Initial Configuration

Lesson 1: Installing Switch Hardware

- Installation Guidelines
- Cabinet and Rack Options
- Configuring Power Supplies
- Installing Fan Modules
- Installing Supervisor and Line Card Modules

Lesson 2: Performing the Initial Switch Configuration

- Completing the Initial Setup
- Setup Defaults
- Configuring Management Interfaces
- Installing Cisco Fabric Manager
- Quickstart Overview

Lesson 3: Installing and Licensing SAN-OS

- Software Licensing
- Installation / Upgrade Prerequisites
- Software Upgrade Methods
- Switch Software Upgrades Using Fabric Manager
- Version Downgrade Procedure

Lesson 4: Using Call Home

- Call Home Services
- Call Home Messages
- Call Home Output Options
- Configuring Call Home
- Customized Alert Group Messages





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Course Outline

Module 3: Building Virtual SANs

Lesson 1: Configuring VSANs

- VSAN Overview
- VSAN and Zone Comparison
- Creating VSANs
- Displaying VSAN Information
- The Default and Isolated VSANs
- VSAN Recommended Practices

Lesson 2: Managing Domains

- The Domain Configuration Process
- Displaying the Domain Database
- Configuring the Domain ID
- Merging Fabrics
- Configuring Switch Priority
- Restarting Domains
- Configuring Fabric Merge Options
- CFS Support for Allowed Domain ID Lists

Lesson 3: Configuring Interfaces

- Configuring Fibre Channel Interfaces
- Fibre Channel Interface States
- Configuring Trunking
- Configuring Advanced Parameters
- Generation-2 Port Bandwidth Reservation

Lesson 4: Configuring Dynamic VSANs

- DPVM Overview
- Configuring DPVM Entries
- Using DPVM Autolearning
- Configuring DPVM Distribution

Lesson 5: Using Intelligent Addressing

- Displaying the FCNS Database
- FCID Allocation
- Persistent FCIDs
- Static FCIDs
- Device Alias Features
- Comparing Zone and Device Aliases
- Configuring Device Aliases
- Configuring Device Aliases in a Multi-Switch Fabric
- Importing Zone Aliases
- N_Port Identifier Virtualization

Lesson 6: Implementing Zones

- Zoning Overview
- Configuring the Default Zone Policy
- Creating Zones and Zone Sets
- Verifying Zone Configuration
- Configuring Zone Set Distribution
- Merging Zones Without Disruption
- Recovering From Zone Merge Failures
- Managing Zone Sets
- Enhanced Zoning Features
- Modifying the Enhanced Zone Database
- Creating Attribute Groups
- Configuring Read-Only Zones
- Configuring LUN Zones
- Configuring Broadcast Zoning
- Recommended Practices for Zoning

Lesson 7: Improving Management Security

- Securing Management Ports
- Configuring SSH
- Using Digital Certificates
- Role-Based Access Control
- Creating Roles and Users
- SNMP and CLI Security
- Centralizing Security Management
- Enhanced AAA Services

Module 4: Managing SAN Traffic

Lesson 1: Configuring PortChannels

- Creating PortChannels
- The PortChannel Protocol
- PortChannel Autocreation
- Modifying PortChannel Links
- Tracking and Redirecting Traffic

Lesson 2: Routing and Load Balancing

- FSPF Overview
- Configuring FSPF
- Displaying Routing and Forwarding Information
- Using FSPF with PortChannels
- Configuring Load Balancing
- In-Order Delivery

Lesson 3: Configuring Traffic Priority

- Virtual Output Queuing
- Fibre Channel Congestion Control
- Quality of Service Features
- Ingress-Based and Egress-Based QoS
- Port Rate Limiting





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Course Outline

Module 5: Implementing FCIP

Lesson 1: Protocol Overview

- The FCIP Protocol
- FC Frame Encapsulation
- FCIP Specifications
- FCIP Implementation on the IPS Modules
- IP Addressing
- IP Routing Protocols
- TCP/IP Protocol Headers

Lesson 2: Configuring FCIP

- IP Addressing Overview
- FCIP Configuration Overview
- Configuring Gigabit Ethernet Interfaces
- Configuring Static IP routes
- Enabling FCIP
- Configuring FCIP Profiles and Interfaces
- Verifying the FCIP Configuration
- Using the FCIP Wizard
- VLAN Overview
- Using VLAN Subinterfaces

Lesson 3: FCIP High Availability

- PortChannel Configuration Guidelines
- Using PortChannels with FCIP Tunnels
- Using the PortChannel Protocol
- Verifying the PortChannel Configuration
- Other High Availability Options

Lesson 4: Implementing IVR for SAN Extension

- IVR Overview
- IVR Zones and Zonesets
- IVR Configuration Steps
- Verifying the IVR Configuration
- IVR Recommended Practices

Lesson 5: Tuning FCIP Performance

- Overview of FCIP Tuning Parameters
- Configuring TCP Keepalive, Retransmit, and Selective Acknowledgement
- Configuring the MTU
- FCIP Flow Control
- Packet Shaping
- FCIP Compression
- FCIP Write Acceleration
- FCIP Tape Acceleration
- IP QoS Overview
- Configuring IP QoS
- Using the SAN Extension Tuner

Module 6: Troubleshooting Tools and Scenarios

Lesson 1: Diagnostic Tools and Methodologies

- SAN Fault Isolation Methodology
- Verifying Power
- Troubleshooting Interfaces
- Troubleshooting VSANs
- Using fcping and fctrace
- Fabric Manager Troubleshooting Tools
- FCIP Troubleshooting Overview
- Verifying Module Status
- Verifying Network Connectivity

Lesson 2: Capturing and Analyzing SAN Traffic

- SPAN and RSPAN Overview
- The Cisco Port Analyzer Adapter
- Using Ethereal
- SPAN Ports and Sessions
- Configuring SPAN
- Configuring Frame Encapsulation
- RSPAN Tunnels
- Configuring the PAA
- Installing and Configuring Ethereal
- Configuring SPAN Filters
- Cisco Fabric Analyzer
- Configuring the Fabric Analyzer

Lesson 3: Basic Troubleshooting Scenarios

- Troubleshooting Host-to-Switch Connectivity
- Troubleshooting ISLs
- Troubleshooting Fabric Merges
- FCIP Troubleshooting Scenarios





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Course Labs

- Lab 1: Quickstart Switch Configuration
- Lab 2: Configuring Call Home
- Lab 3: Creating VSANs
- Lab 4: Configuring Interfaces
- Lab 5: Configuring Zones
- Lab 6: Configuring PortChannels
- Lab 7: Implementing an FCIP Tunnel
- Lab 8: Configuring FCIP High Availability
- Lab 9: Implementing IVR for SAN Extension
- Lab 10: Tuning FCIP Performance
- Lab 11: Using SPAN and the Cisco Port Analyzer Adapter
- Lab 12: Challenge Lab
- Lab 13: Upgrading Switch Software

