# CISCO MULTILAYER DIRECTOR SWITCH (MDS) ADMINISTRATION

Course Code: 860059

This intensive 4-Day training program delivers comprehensive, hands-on instruction in the deployment, configuration, management, and optimization of Cisco MDS (Multilayer Director Switch) storage networking solutions. Designed for storage and network professionals, this course equips participants with the skills necessary to build and maintain high-performance, secure, and scalable Storage Area Networks (SANs) using Cisco's MDS 9000 Series switches.

Participants will gain deep technical knowledge across a wide array of MDS topics, including foundational switch configuration, advanced SAN analytics, smart licensing, deep packet inspection, dynamic congestion management (DIRL), and Unified Nexus Dashboard integration. Real-world lab exercises reinforce concepts, offering practical experience with technologies such as zoning, telemetry, FCIP, NVMe/FC, and SAN performance optimization.

## What You'll Learn

Key Learning Areas:

- Overview and setup of Cisco MDS fabric and director-class switches (9124V, 9148V, 9700 series)
- Cisco Smart Licensing for scalable, centralized license management
- Integration and policy management through Nexus Dashboard Fabric Controller (NDFC)
- Deep packet visibility, telemetry streaming, and real-time SAN Analytics
- Advanced congestion management with Dynamic Ingress Rate Limiting (DIRL) and Fabric Performance Impact Notifications (FPINs)
- SAN security features including secure boot, encryption, zoning, and RBAC
- Best practices for VSAN segmentation, virtualized environment integration, and disaster recovery using FCIP
- Troubleshooting methodologies using analytics-driven root cause analysis tools

## Who Needs to Attend

This course is ideal for SAN administrators, storage engineers, and IT professionals responsible for managing Cisco storage networks in enterprise and data center

environments. It emphasizes operational best practices and prepares attendees to optimize SAN performance, improve resilience, and simplify network management.

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| CLASSROOM LIVE | $5,595 CAD | 4 Day |

## Classroom Live Outline

**Module 1 Cisco MDS Intent-based SAN Automation**

- Lesson 1: Cisco MDS Intent-based SAN Automation
- Lesson 2: Automated SAN Network Analytics

**Module 2: Overview of Cisco MDS SAN Switches**

- Lesson 1: Cisco MDS Switching Portfolio Overview
- Lesson 2: Cisco MDS 9124V (Cont.) and 9148V Switches
- Lesson 3: MDS 9700 Series Switches
- Lesson 4: Key Features of Cisco MDS Switches
- Lesson 5: High-Availability, Redundancy and Reliability
- Lesson 6: Use Cases for Cisco MDS SAN Switches

**Module 3: CISCO (NDFC) Nexus Dashboard Fabric Controller Overview**

- Lesson 1: NDFC Overview
- Lesson 2: NDFC Architecture & Integration
- Lesson 3: NDFC Connectivity & Deployment
- Lesson 4: Deploying NDFC on ND
- Lesson 5: NDFC VMM Integration
- Lesson 6: Monitoring Fabric and Intended State
- Lesson 7: ND4.1 New Features

**Module 4: Cisco Smart Licensing Model**

- Lesson 1: Feature-Based Licensing and On-Demand Port Activation License
- Lesson 2: Smart Licensing Model
- Lesson 3: Smart Software Licensing Model using Policy (SLP)
- Lesson 4: Enabling SLP
- Lesson 5: SLP Deployment Models
- Lesson 6: Example of SLP on 9124V and 9148V

- Lesson 7: Converting Traditional Mode Licenses to Smart Mode
- Lesson 8: SLC Reports and Alerts

**Module 5: Designing & Implementing SAN Fabrics**

- Lesson 1: SAN Fabric Design Principles & Topologies
- Lesson 2: VSANs and Inter-VSAN Routing
- Lesson 3: Use Case and Benefits of Using Multiple VSANs
- Lesson 4: Implementing VSAN Fabric in NDFC
- Lesson 5: Zone, Zonesets and CFS Distribution
- Lesson 6: Configuring Zones, Autozones, Smart Zones and Zonesets in NDFC/CLI
- Lesson 7: Configuring ISL Trunking, Port Channeling and Load-Balancing in NDFC
- Lesson 8: Other NDFC Features: Device Alias, Image Managements, Event Analytics, Programmable Reporting, Alarms, Templates

**Module 6: Automated SAN Analytics & Telemetry**

- Lesson 1: SAN Analytics Architecture and Solution Components
- Lesson 2: SAN Fabric Analytics Deployment
- Lesson 3: SAN Analytics Configuration and Verification using NDFC/CLI
- Lesson 4: Core Capabilities and Benefits of SAN Analytics
- Lesson 5: Key Performance Metrics in SAN Analytics/SAN Insights
- Lesson 6: NDI App Integration with Nexus Dashboard Fabric Controller
- Lesson 7: Use Cases for SAN Analytics/SAN Insights
- Lesson 8: Automated Proactive Fabric Monitoring, Predictive Analytics, Predicting and Avoiding Congestion

**Module 7: CLI-based Troubleshooting**

- Lesson 1: SAN Analytics & Troubleshooting
- Lesson 2: Automated Detection of SAN Congestion
- Lesson 3: Detection & Alerting of SAN Congestion
- Lesson 4: Automated Alerting of SAN Congestion on MDS using PMON
- Lesson 5: Automated Congestion Prevention
- Lesson 6: Congestion Prevention using DIRL
- Lesson 7: Congestion Prevention using FPIN
- Lesson 8: Troubleshooting SAN Congestion

**Module 8: Cisco MDS SAN Security**

- Lesson 1: Cisco MDS SAN Management Security
- Lesson 2: Fabric Target Access Security
- Lesson 3: Fabric Control Plane Security
- Lesson 4: FC & FCIP Link Security
- Lesson 5: Secure Boot & Anti-Counterfeit Technology
- Lesson 6: Secure Erase

**Module 9: SAN/MDS Programmability & Automation**

- Lesson 1: MDS 9000 Programmability Options
- Lesson 2: NX-API

- Lesson 3: MDS Python API
- Lesson 4: Cisco MDS SDK
- Lesson 5: Ansible
- Lesson 6: NDFC Automation

**Module 10: Appendix FC SAN Concepts**

- Lesson 1: Why FC Today
- Lesson 2: FC SAN Overview
- Lesson 3: FC-0
- Lesson 4: FC-1
- Lesson 5: FC-2
- Lesson 6: Login Parameters, Flow, and Class
- Lesson 7: FC Switch Fabric
- Lesson 8: Error Management
- Lesson 9: FC Zoning Concepts
- Lesson 10: FC SAN Flow Control
- Lesson 11: FC SAN Topology and Port Types
- Lesson 12: FC Services
- Lesson 13: NPV and NPIV
- Lesson 14: Device Alias
- Lesson 15: Port Channel
- Lesson 16: Introduction to SCSI and NVMe

## Classroom Live Labs

**Lab 1: Connect to the Lab Pod Environment**

**Lab 2: Introduction to Cisco MDS SAN Switches and Initial Setup**

- Task 1: Basic Setup
- Task 2: MDS 9124V & 9148V Configuration

**Lab 3A: NDFC SAN Controller**

- Tasks: Setup, Integration, Discovery

**Lab 3B: NDFC Virtualized Environment Integration**

- Tasks: VM Tagging, FPINs, VMware Integration

**Lab 4: Cisco Smart Licensing Model**

- Tasks: Configuration, Registration, Port Activation, Compliance

**Lab 5A: Implementing Fabrics in NDFC**

- Tasks: VSAN, Zoning, IVR, Reporting

**Lab 5B: AutoZone & Advanced Operations**

- Tasks: AutoZone, RBAC, Analytics, Multi-Tenant Design

**Lab 6A: VM-Aware Analytics**

- Tasks: VM-ID Tagging, FPINs, Segmentation

**Lab 6B: Telemetry Streaming**

- Tasks: DPI, Data Collection, Insights

**Lab 6C: SAN Analytics in NDFC**

- Tasks: Flow Analysis, Congestion, Proactive Monitoring

**Lab 7A: Guided Remediation**

- Tasks: DPI, FPIN, DIRL, Historical Analysis

**Lab 7B: Slow Drain Mitigation**

**Lab 7C: DIRL**

**Lab 7D: FPIN Integration**

**Lab 8A: Port-Level Security and Zoning**

**Lab 8B: Advanced SAN Protection**

- Tasks: FC-SP, RBAC, Secure Boot, Monitoring

**Lab 9: Automation Techniques**

- Task: Configure Embedded Event Manager (EEM)

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