

## **Configuring Cisco MDS 9000 Series Switches v3.1 (DCMDS)**

**Modality: Virtual Classroom**

**Duration: 5 Days**

**CLC: 37 Units**

### **About this Course:**

This course intends to discuss the features of each MDS 9000 Series product family of switches such as 9100, 9200, 9500, and 9700 models and the Fibre Channel, Fibre Channel over Ethernet (FCoE), along with the support of service modules. The basic topics cover the content on 8-Gbps Fibre Channel, 16-Gbps Fibre Channel, Fibre Channel over IP (FCIP), multihop FCoE, upgrading the Cisco NX-OS, and the simple handling tool Cisco Prime Data Center Network Manager (DCNM).

The course further explores the understanding the SAN configuration for traits including interface configuration, Cisco N-Port Virtualizer (NPV), N-Port ID Virtualization (NPIV), virtual SAN (VSAN) and domain setup, SAN zoning, and SAN extension using FCIP and Inter-VSAN Routing (IVR).

The topics included will also talk about centralized SAN services through the employment of the Cisco MDS 9222i Multiservice Modular Switch and Cisco MDS 9250i Multiservice Fabric Switch for Cisco I/O Acceleration (IOA) and Cisco Data Mobility Manager (DMM), alongside management security and role-based access control (RBAC) training.

The end goal of the course is to help students learn about the installation, configuration and management of the Cisco MDS 9000 Series switch platform in a measurable, easily available environment.

A Cisco Certified Network Engineer makes an average salary of **\$77,484** per year.

### **Course Objectives:**

- Explain the MDS 9000 Series switch platform, Cisco NX-OS, and the characteristics associated with Cisco Prime DCNM.
- Discuss the concepts and techniques that will help the students perform the initial software configuration of a Cisco MDS 9000 Series switch, carry the system software upgrade, and enable the licensing system.
- Explain the configurations involved in building a Cisco Fibre Channel SAN fabric including interfaces, VSANs, domains, port channels, device aliases, NPV, NPIV, and zones.
- Explain and perform the configuration of smart SAN fabric services on exclusive Cisco MDS 9000 Series switches along with the tools that are available.
- Understand and explain the FCoE protocol and the incorporation of FCoE modules on the Cisco MDS 9500 Series Multilayer Director and Cisco MDS 9700 Series Multilayer Director as

a Fibre Channel forwarder within a single-hop and multihop design.

- Explain the procedure of implementing the configuration of security features on Cisco MDS 9000 Series switches in order to secure the system from unauthorized access, intrusion, and data theft, and to protect the data integrity in an enterprise SAN environment.
- Understand the steps used for the fundamental FCIP configuration, high availability implementation, and accomplishing a fault tolerant SAN extension through the IVR feature.

## **Audience:**

- Data center engineers, data center administrators, and system engineers
- The secondary-level audience interested in this course will be data center managers, network engineers, and consulting system engineers

## **Prerequisites:**

- A fundamental understanding of data storage hardware components and protocols such as SCSI and Fibre Channel
- An essential learning of network protocols such as Ethernet and IP
- Suggested pursuance of a Cisco CCNA certification

## **Course Outline:**

### **Module 1: Cisco MDS 9000 Series Switch Platforms**

#### **Lesson 1: Introducing Cisco MDS 9000 Series Switches**

- Cisco MDS 9000 Platform
- Cisco MDS 9700 Series Director Class Switches and Components
- Cisco MDS 9200 Series Multiservice Switch and Service Modules
- Cisco MDS 9100 Series Fabric Modules

#### **Lesson2: Implementing Integrated Management**

- Cisco NX-OS
- Cisco NX-OS CLI Command Set and Structure
- Cisco Prime DCNM
- Cisco Prime DCNM Components
- Licensing Cisco Prime DCNM
- Cisco MDS Device Manager
- DCNM Federated Server

- Cisco Prime DCNM VM Awareness

## **Module 2: System Installation and Initial Configuration**

### **Lesson 1: Performing the Initial Switch Configuration**

- Describe the boot sequence and purpose of each of the system memory areas
- Describe the steps necessary to complete the initial setup routine on a newly installed switch
- Describe the essential CLI show commands
- Explain the setup of the classroom lab environment

### **Lesson 2: Installing and Licensing Cisco NX-OS Software**

- Describe software licensing practices for Cisco MDS 9000 Series switches
- Describe the Cisco NX-OS image installation and upgrade process
- Explain the Cisco NX-OS version downgrade procedure

## **Module 3: Building a SAN Fabric**

### **Lesson 1: Using FLOGI and FCNS Databases**

- Describe the device login sequence
- Describe the use of the FLOGI and FCNS databases for device registration
- Describe the function of FCID persistence

### **Lesson 2: Configuring Interfaces**

- Describe the basic interface configuration that is required on the switch
- Explain consequences and recommendations for slow drain detection
- Explain how to configure dedicated or shared bandwidth on each of the interfaces within port groups on the switching modules
- Explain how to configure interface buffer-to-buffer credits (BB\_Credits) on Fibre Channel interfaces
- Explain how to configure the trunking feature of Cisco MDS 9000 Series switches

### **Lesson 3: Configuring Port Channels**

- Describe the purpose and use of port channel functionality on the Cisco MDS 9000 Series Multilayer Switches
- Explain how to configure port channels with expansion (E) and TE Ports
- Describe how to configure fabric (F) and TF port channels

### **Lesson 4: Configuring Cisco NPV and NPIV**

- Describe the benefits of Cisco NPV
- Describe how NPIV provides a means to assign multiple FCIDs to a single N Port
- Describe how to configure F and TF port channels

### **Lesson 5: Configuring VSANs**

- Describe how VSANs provide logical separation of fabric services in a unified physical infrastructure
- Describe the process of creating VSANs and assigning interface members
- Describe the process for displaying the attributes of configured VSANs
- Present and describe the recommended practices for creating and managing VSANs

## **Lesson 6: Managing Domains**

- Describe how to configure domain IDs within a VSAN
- Configure the principal switch priority
- Describe the steps to manually configure domain ID settings
- Describe how to view configured and run-time fcdomain information from the CLI and Cisco Device Manager
- List and describe the configuration settings that determine if switches achieve adjacency or become isolated during a fabric merge event
- Describe the effects of configuring the autoreconfigure, rcf-reject, and fcdomain options for fabric merge

## **Lesson 7: Configuring Distributed Device Aliases**

- Describe the function of distributed device aliases
- Describe the function of existing zone aliases
- Explain how to configure the distributed device alias database
- Explain how to configure distributed device aliases in a multiswitch fabric
- Explain how to verify the distributed device alias database configuration

## **Lesson 8: Implementing Zoning**

- Describe the purpose and use of zoning within Fibre Channel SANs
- Describe the zone configuration process
- Explain how to verify the zone configuration
- Describe how to configure zone set distribution
- Explain how to merge zones and zone configurations without causing fabric disruption
- Explain how to recover from a zone merge failure
- Describe how to rename, clone, copy, back up, and restore a zone set
- Describe the enhanced zoning feature and configuration requirements
- Describe the process of committing configuration changes to the zone database in enhanced mode
- Describe the advantages of the Smart Zoning feature for SANs with large numbers of zones
- Describe recommended zoning practices

## **Module 4: Intelligent SAN Fabric Services**

### **Lesson 1: Implementing Cisco MDS Data Mobility Manager**

- Describe the purpose of Cisco DMM
- Describe Cisco DMM SAN topologies
- Describe how to install and configure Cisco DMM software and how to prepare for data migration.

- Describe how to use the Cisco DMM GUI for data migration.

## **Lesson 2: Monitoring Traffic Flow**

- Describe how to configure a SPAN session
- Explain the capabilities and limitations of RSPAN sessions
- Explain the use of the Cisco Fabric Analyzer feature
- Describe how to configure Wireshark to capture and view protocol traces

## **Module 5: FCoE Implementation**

### **Lesson 1: Describing FCoE**

- Describe the consolidation benefits of Unified I/O and the Cisco Data Center Ethernet enhancements that provide a lossless fabric
- Describe the enhancements to the Ethernet quality of service to support Fibre Channel traffic requirements
- Explain the FCoE protocol and how Fibre Channel frames are encapsulated in Ethernet frames
- Explain the FCoE addressing scheme and how an FCoE node can acquire a unique MAC address from the FCF
- Describe FIP

### **Lesson 2: Configuring FCoE on Cisco MDS 9500 and 9700 Series Multilayer Directors**

- Describe the use of FCoE modules on the Cisco MDS 9500 and 9700 Series Directors
- Describe the support of virtual expansion (VE) interfaces
- Describe how FCoE can be configured to enable FCoE frames to traverse a unified fabric

## **Module 6: Security Implementation**

### **Lesson 1: Improving Management Security**

- Describe the secure protocols that can be employed to provide secure access to Cisco MDS 9000 Series management ports
- Describe how to configure SSH services, including how digital certificates can be used to enhance scalability and management of SSH
- Describe the use of RBAC for secure SAN management and the RBAC configuration steps

### **Lesson 2: Configuring AAA Services**

- Describe the AAA solutions and services that are available on the Cisco MDS 9000 Series switch platform
- Describe the authentication process and how to implement AAA services
- Configure AAA service options for server monitoring and directed requests
- Explain the process of distributing AAA configurations when using Cisco Fabric Services
- Configure Network Time Protocol (NTP) services

### **Lesson 3: Implementing Port Security and Fabric Binding**

- Explain how to configure port security on Cisco MDS 9000 Series switches
- Explain the process of distributing and merging port security configurations when using Cisco Fabric Services
- Explain the fabric binding feature to support Fibre Connection (FICON) and Fibre Channel VSANs

#### **Lesson 4: Configuring FC-SP**

- Explain how switch-to-switch and host-to-switch authentication is implemented on the Cisco MDS 9000 Series switch
- Explain the purpose of CAs and digital certificates and how to configure them on Cisco MDS 9000 Series switches

#### **Lesson 5: Implementing Link Encryption**

- Describe IPsec and how to configure IPsec on the Cisco MDS 9000 Series switches
- Describe the Cisco LinkSec Encryption feature and its configuration

### **Module 7: FCIP Implementation**

#### **Lesson 1: Creating an FCIP Tunnel**

- Describe the process of configuring FCIP
- Describe the process of configuring Gigabit Ethernet interfaces and static IP routes
- Explain how to use the Cisco DCNM-SAN Client FCIP Wizard

#### **Lesson 2: Configuring FCIP High Availability?**

- Describe guidelines for using port channels with FCIP links
- Describe the steps to configure port channels with FCIP tunnels
- Describe how to use the CLI or Cisco DCNM-SAN Client to verify that the port channels are operational
- Describe addi