



Designing Cisco Storage Networking Solutions

Length
5 days

Format
Lecture/lab

Track
Support

Version
3.2

Course Description

DCSNS is a 5-day hands-on workshop that starts with the basics of the MDS 9000 platform and covers everything you'll need to prepare for the Cisco Storage Networking Design Specialist (CSNDS) certification exam.

You will learn about the key features of the MDS 9000 platform, and how to leverage these features to build highly available, extensible, intelligent SANs.

This course includes hands-on labs to familiarize you with basic MDS 9000 configuration procedures, and design workshops where you will learn to design multiprotocol SANs and SAN extension solutions.

Who Should Attend

This course provides in-depth technical training for pre-sales engineers, system engineers, and network engineers who need to design SAN fabrics using 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 following courses:

- CMSNF
- CSDE

DCSNS

Learning Objectives

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

- Select MDS 9000 platform components to meet SAN design objectives
- Describe the MDS system architecture
- Identify host and storage connectivity and performance requirements
- Design a SAN topology that optimizes fan-in and fan-out, oversubscription, port usage, and redundancy
- Simplify device management with FCID assignment and DDAS
- Explain the options for interoperating with Brocade and McDATA fabrics
- Discuss how key MDS 9000 technologies enable and simplify SAN consolidation
- Explain how to segregate, load-balance, and prioritize application data flows to improve performance
- Design an MDS 9000 iSCSI configuration for mid-range application hosts
- Describe common SAN security vulnerabilities and mitigation techniques
- Discuss key concepts in disaster recovery and business continuity planning
- Design SAN extension solutions using FCIP, WDM, and TDM networks
- Design SAN extension solutions to meet application reliability and performance requirements



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Course Outline

Module 1: MDS 9000 Platform Overview

Lesson 1: MDS 9000 Platform Components

- The MDS 9000 Platform
- MDS 9000 Supervisor Modules
- Oversubscription
- MDS 9000 Modules
- Installation Guidelines
- Configuring Power Supplies

Lesson 2: Intelligent Network Services

- VSAN Overview
- DPVM Overview
- Multiprotocol Support
- High Availability Features
- Traffic Engineering Features
- Security Features

Lesson 3: Integrated Management

- Command Line Interface
- Cisco Fabric Manager
- Cisco Device Manager
- Fabric Manager Server
- Performance Manager and Traffic Analyzer
- License Packages

Lesson 4: Initial Switch Configuration

- System Memory Areas
- Boot Sequence
- Initial Setup
- Installing Fabric Manager

Lesson 5: System Architecture

- Crossbar and Supervisor Module Architecture
- MDS Line Card Module Architectures
- Virtual Output Queues
- Port Bandwidth Reservation
- Exercise: Selecting the Optimum Line Card

Module 2: Designing SAN Fabrics

Lesson 1: SAN Design Overview

- The SAN Design Methodology
- Small and Midrange Deployments
- Enterprise Data Center Deployments

Lesson 2: Application Architecture

- Application Architecture Tiers
- Presentation Tier Design
- Application Tier Design
- Storage Tier Design
- High-Performance Computing

Lesson 3: Designing Host Connectivity

- Applications and Latency
- Measuring IOPS
- Host I/O Throughput
- Selecting the Optimum Port Type
- Exercise: Calculating Host I/O Requirements

Lesson 4: Designing Storage Connectivity

- Array Architecture Overview
- RAID Overview
- Selecting the Optimum Port Type
- LUN Masking on the Array
- LUN Mapping on the Host
- Single Initiator Zoning
- LUN Zoning
- SAN Device Virtualization
- RSCN Issues

Lesson 5: Building the SAN

- Fabric Design Considerations
- Collapsed Core Architecture
- Core-Edge Fabrics
- PortChannels
- Selecting the Correct Switch Port Type

Lesson 6: Redundant Fabric Design

- Redundancy and High Availability
- Redundant Fabrics
- Load Balancing Methods
- Calculating Throughput
- Restricted Bandwidth
- Virtual Fabrics

Lesson 7: Simplifying Device Management

- FCID Assignment
- Distributed Device Alias Services
- CFS Infrastructure



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Course Outline

Module 3: Consolidating Storage in the Data Center

Lesson 1: Consolidating Storage in the Data Center

- The Benefits of Consolidation
- Server Virtualization
- Network Consolidation
- Storage Consolidation
- Storage Virtualization
- FAIS Overview
- Snapshots and Replication
- Array Based Replication
- SANTap Overview
- Backup Overview
- NASB Overview

Lesson 2: Designing Interoperable SANs

- Interoperability Modes
- MultiVendor SANs
- Data Migration
- Migrating from Brocade and McDATA Fabrics

Lesson 3: iSCSI Host Usage

- Addressing Midrange Application Requirements
- iSCSI Overview
- iSCSI Performance
- When to Deploy iSCSI
- Native iSCSI Deployment
- iSCSI Gateways
- iSCSI Gateway Function
- MDS 9000 iSCSI Options
- MDS 9000 iSCSI High-Availability

Module 4: Securing the SAN

Lesson 1: Securing the SAN Fabric

- Discussion: How Secure is a SAN?
- Loss of Privacy
- AAA Overview
- SAN Vulnerabilities-Data Theft and Integrity
- Zoning Overview
- LUN Masking and LUN Zoning
- Impersonation
- Denial of Service

Module 5: Designing SAN Extension Solutions

Lesson 1: Analyzing Business Objectives

- RTO and RPO
- Recovery Methods
- Synchronous and Asynchronous Replication
- The RDBMS Recovery process
- Latency and Distance Limitations
- Snapshots and Continuous Data Protection

Lesson 2: Connecting SANs with Optical Networks

- Dark Fiber
- DWDM
- CWDM
- SONET and SDH
- ONS 15454 MSTP

Lesson 3: Connecting SANs with IP Networks

- FCIP Protocol Overview
- FCIP Specifications
- FCIP Topologies
- Comparing SAN Extension Solutions
- Exercise: Selecting an Appropriate Platform

Lesson 4: Improving Performance, Availability, and Security

- Protecting Remote SANs with IVR
- Planning for High Availability
- High Availability Solutions
- Performance Overview
- Buffer Credit Overview
- Credits and Buffers
- Exercise: Calculating Buffer Credits
- FC Write Acceleration
- TCP Performance Tuning
- Encrypting Data
- FCIP Write Acceleration
- FCIP Tape Acceleration
- FCIP Tape Read Acceleration
- FCIP Compression
- Encrypting Data in Transit
- Exercise: Calculating WAN Throughput



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Course Outline

Appendix A: SCSI Overview

- SCSI Protocol
- SCSI Addressing
- SCSI Architecture Model
- SCSI Commands
- Building an I/O Request
- Error Handling

Appendix B: Fibre Channel Overview

- Fibre Channel Topologies
- Fibre Channel Ports
- Cisco MDS Ports
- FC Layers
- FC Frame Structure
- FC Data Constructs
- FC Flow Control
- Allocating Buffer Credits
- FC Addressing
- Fibre Channel Login
- Zoning Overview
- Fabric Services
- Well-Known Addresses
- FSPF Routing
- FC Error Handling

Appendix C: MDS 9000 Hardware Installation Reference

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

Course Labs

- Lab 1-1: Initial Switch Configuration
- Lab 1-2: Accessing Fibre Channel-Attached Disks
- Case Study 2-1: Designing a Fibre Channel SAN
- Case Study 3-1: Designing an Enterprise SAN
- Lab 5-1: Configuring High-Availability SAN Extension
- Lab 5-2: Configuring IVR for SAN Extension
- Case Study 5-1: Designing SAN Extension Solutions



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