

Course Description

DCSD is a 3-day interactive workshop that teaches you how to apply the unique features of the Cisco MDS 9000 platform to Data Center SAN designs.

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 using NX-OS 4.2 or higher.

This course focuses on interactive 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 switches.

Recommended Prerequisites

This course is designed for students who have already taken the 2-day *Cisco Storage Design Fundamentals (CSDF)* course, or who have some real-world experience deploying the MDS 9000 platform and its key features.

Related Training

- Cisco Storage Design Fundamentals (CSDF)
- Designing Cisco Storage Networking Solutions (DCSNS)

DCSD

Learning Objectives

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

- 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

Data Center SAN Design

Lesson 1: MDS 9000 Platform Components and Architecture

- The MDS 9000 Platform
- The MDS 9000 Modules
- Crossbar and Supervisor Module Architecture
- MDS Switching Module Architectures
- MDS Switching Module Oversubscription
- Exercise: Selecting the Optimum Line Card
- Installation Guidelines
- Configuring Power Supplies
- Supervisor and Line Card Modules Installation

Lesson 2: Intelligent Fabric Services

- SMB and Enterprise SAN Requirements and Consolidation Methods
- The MDS 9000 Virtual SAN
- MDS Intelligent Services Modules
- I/O Acceleration
- FC-Redirect

Lesson 3: SAN Design Overview

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

Lesson 4: Application Architecture

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

Lesson 5: Designing Host Connectivity

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

Lesson 6: Designing Storage Connectivity

- Array Architecture Overview
- RAID Overview
- Selecting the Optimum Port Type

Lesson 7: Building the SAN

- Collapsed Core Architecture
- Core-Edge Fabrics
- Oversubscription Considerations
- PortChannels
- Traffic Engineering and QoS

Lesson 8: Redundant Fabric Design

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

Lesson 9: Consolidating Storage in the Data Center

- The Benefits of Consolidation
- SAN Fabric Consolidation with VSANs
- Fibre Channel Over Ethernet
- Server Consolidation and Virtualization
- Storage Consolidation
- Storage Virtualization
- FAIS Overview
- Array Based Replication
- Snapshots and Replication
- SANTap Overview
- Backup Overview

Lesson 10: Analyzing Business Objectives

- RTO and RPO
- Recovery Methods
- The RDBMS Recovery process
- Snapshots and Replication
- SANTap Overview
- Backup Overview
- Latency and Distance Limitations

Lesson 11: SAN Extension Solutions

- RTO and RPO
- Recovery Methods
- The RDBMS Recovery process
- Latency and Distance Limitations
- DWDM and CWDM
- Credits and Buffers
- SONET and SDH

Data Center SAN Design

Course Outline

Lesson 11 (continued)

- ONS 15454 MSTP
- FCIP Protocol Overview
- Planning for High Availability
- Exercise: Selecting an Appropriate Platform

Lesson 12: Migration and Interoperability

- Multi-Vendor SANs
- Migrating from Third Party Fabrics
- Data Migration
- Simplifying SAN Migration

Lesson 13: SCSI Overview

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

Lesson 14: 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

Lesson 15: Installing Switch Hardware

- Installation Guidelines
- Configuring Power Supplies
- Supervisor and Line Card Modules Installation

Course Labs

Lab 1: Initial Setup

Lab 2: Configuring Device Aliases and Zoning

Lab 3: Case Study 1 - Designing a Fibre Channel SAN

Lab 4: Case Study 2 - Designing an Enterprise SAN

Lab 5: Configuring High Availability SAN Extension

Lab 6: Configuring IVR for SAN Extension

Lab 7: Case Study Solutions