Implementing Cisco Data Center Infrastructure (DCII)

Course Summary

Description

Implementing Cisco Data Center Infrastructure (DCII) is a course that is designed to help students prepare for the Cisco CCNP Data Center certification and for professional-level data center roles. The focus of this skills-building course is implementation of LAN, SAN, and Data Center Unified Fabric using Cisco MDS switches, Cisco Nexus switches, and Cisco Nexus 2000 Series Fabric Extenders (FEXs). The course provides rich, hands-on experience of implementing Cisco data center infrastructure.

Objectives

By the end of this course, students will be able to:

- Configure RSTP, MST, and port channels and implement Cisco FabricPath, OTV, VXLAN, and LISP
- Configure first-hop redundancy, routing, and multicast in the data center
- Configure user management and implement system security features on Nexus switches
- Perform basic Fibre Channel configuration, manage Fibre Channel domains, and implement Fibre Channel port security and binding
- Configure FCoE
- Configure distributed device aliases, zoning, NPV, and FCIP
- Configure system management and infrastructure monitoring

Topics

- Data Center Protocols
- Layer 3 Switching Features in the Data Center
- Data Center Infrastructure Security
- Data Center Infrastructure Storage Fabric
- FCoE Unified Fabric
- Data Center Infrastructure Storage Services
- Data Center Infrastructure Maintenance, Management, and Operations

Audience

This course is designed for:

- Systems and field engineers, consulting systems engineers, technical solutions architects, and Cisco integrators and partners who install and implement the Cisco Nexus 7000 and 5000 Series switches and the Cisco Nexus 2000 Series fabric extenders
- Data center engineers and managers, program managers, and project managers

Prerequisites

The knowledge and skills that a learner should have before attending this course:

- Describe data center networking concepts
- Describe data center storage concepts
- Describe data center virtualization
- Describe Cisco Unified Computing System
- Describe data center automation and orchestration with the focus on Cisco ACI and UCS Director
- Identify products in the Cisco Data Center Nexus and MDS families
- Describe network fundamentals and build simple LANs, including switching and routing

Duration

Five days

Implementing Cisco Data Center Infrastructure (DCII)

Course Outline

I. Data Center Protocols

A. Configuring Spanning Tree Protocol
1. Rapid PVST+ Overview
2. MST Overview
3. Implementing Cisco Data Center Infrastructure (DCII) Cisco Systems, Inc.
4. MST Regions
5. STP Instances with MST
6. MST Recommended Practices
7. Cisco Nexus STP Toolkit
8. STP Edge Port
9. Securing an STP Edge Port with BPDU Guard
10. Disabling STP with BPDU Filter
11. Protecting STP Topology with Root Guard
12. Problem with Unidirectional Links
13. Protecting Against Loops
14. **Lab: Configure Layer 2 Switching**

B. Configuring Port Channels
1. Port Channels Overview
2. Port Channels and LACP
3. Port Channel Load Balancing
4. vPC Overview
5. vPC Building Blocks
6. vPC at Multiple Layers
7. vPC Guidelines
8. vPC Peer-Gateway
9. vPC Peer-Switch
10. **Lab: Configure Port Channels**
11. Challenge

C. Configuring Fabric Extenders
1. Cisco Nexus 2000 FEX Overview
2. FEX and VN-Tag
3. FEX Deployment Models
4. FEX with Static Pinning
5. FEX with Dynamic Pinning
6. Active/Active FEX
7. Enhanced vPC Overview
8. **Lab: Configure FEX**
9. Challenge

D. Implementing Cisco FabricPath
1. Cisco FabricPath Overview
2. Cisco FabricPath Header
3. Conversational MAC Learning
4. Cisco FabricPath Data Plane
5. vPC+ Overview
6. Cisco FabricPath Benefits
7. Cisco FabricPath in the Core
8. Cisco FabricPath as Site Interconnect
9. Cisco FabricPath Support
10. Cisco DFA Overview
11. Cisco DFA Topology
12. Cisco DFA Control Plane Protocols
13. Cisco DFA Management and Orchestration
14. **Lab: Configure Cisco FabricPath**
15. Challenge

E. Understanding Cisco Overlay Transport Virtualization
1. Cisco OTV Overview
2. Cisco OTV Components
3. Guidelines and Limitations for Cisco OTV
4. FHRP Filtering for Extended VLANs
5. **Lab: Configure OTV**
6. Challenge

F. Implementing VXLAN
1. VXLAN Overview
2. VXLAN Encapsulation
3. VXLAN Control Plane: BIDIR-PIM
4. VXLAN Control Plane: MP-BGP EVPN
5. VXLAN Gateways
6. VXLAN VTEP Redundancy
7. **Lab: Configure VXLAN**
8. Challenge

G. Implementing LISP
1. LISP Overview
2. LISP Terms and Components
3. LISP Packet Flow
4. LISP Control Plane
5. LISP Host Mobility Overview
6. LISP Host Mobility Deployment Models
7. LISP Host Mobility with an Extended Subnet
8. Challenge

II. Layer 3 Switching Features in the Data Center

A. Configuring First-Hop Redundancy
1. Need for First-Hop Redundancy
2. HSRP Overview
3. HSRP and STP
4. HSRP and vPC
5. HSRP Load Balancing
6. Basic HSRP Configuration
7. HSRP Interface Tracking
8. VRRP Overview
9. GLBP Overview
10. GLBP Operation
11. GLBP Behavior with STP and vPC

Implementing Cisco Data Center Infrastructure (DCII)

Course Outline (cont'd)

12. Basic GLBP Configuration
13. GLBP Weights and Interface Tracking
14. FHRP for IPv6
15. **Lab: Configure VRRP**
16. Challenge

B. Configuring Routing
1. Routing Protocols on Cisco Nexus Devices
2. OSPFv2 Configuration
3. IS-IS Configuration
4. BGP Configuration
5. OSPFv3 Configuration
6. Bidirectional Forwarding Detection
7. BFD Configuration
8. **Lab: Configure OSPF**
9. Challenge

C. Configuring IP Multicast
1. Introduction to IP Multicast
2. IP Multicast in Data Center Networks
3. IP Multicast Group Membership Protocols
4. IGMP and MLD Configuration
5. IGMP and MLD Verification
6. IGMP Snooping
7. Source Distribution Tree
8. Shared Distribution Tree
9. IP Multicast Routing Protocols
10. Multicast on Cisco Nexus Switches
11. PIM RP Selection
12. PIM-SM Configuration
13. BIDIR-PIM and PIM-SSM Configuration
14. PIM Verification
15. IP Multicast Routing Table Verification
16. Challenge

III. Data Center Infrastructure Security

A. Configuring User Management
1. General Information About User Accounts
2. User Roles
3. SSH on Cisco NX-OS
4. AAA Overview
5. AAA on Cisco NX-OS
6. AAA Server Monitoring
7. **Lab: Configure User Management Security Features**
8. Challenge

B. Configuring System Security Features
1. Keychain Authentication
2. DHCP Spoofing Attacks
3. DHCP Snooping
4. DHCP Snooping Configuration
5. IP Source Guard
6. IP Source Guard Configuration
7. ARP Spoofing
8. Dynamic ARP Inspection
9. Dynamic ARP Inspection Configuration
10. Introducing uRPF
11. uRPF: Strict vs. Loose Mode
12. Port Security
13. Port Security Configuration
14. Access Lists on Cisco NX-OS
15. Introduction to MACsec
16. MACsec Configuration: Switch-to-Switch Manual Mode
17. Introduction to Control Plane Policing
18. CoPP on Cisco NX-OS
19. Rate Limiters
20. **Lab: Configure System Security Features**
21. Challenge

IV. Data Center Infrastructure Storage Fabric

A. Basic Fibre Channel Configuration
1. Basic Fibre Channel Interfaces
2. Device Registration Overview
3. FCID Format
4. FLOGI and FCNS Databases
5. Fibre Channel Buffer-to-Buffer Credits
6. Administrative and Operational States of an Interface
7. VSAN Overview
8. VSAN Trunks
9. SAN Port Channels Overview
10. Port Channel Load Balancing
11. Port Channel Modes
12. Port Channel Compatibility Parameters
13. **Lab: Configure Fibre Channel**
14. Challenge

B. Managing Domains
1. Domain Configuration Process
2. Principal Switch Selection
3. Domain ID Distribution
4. Merging Fabrics: Principal Switch
5. Merging Fabrics: Domain ID Overlap
6. FCID Persistence
7. **Lab: Manage Domains and Configure Persistent FCIDs**
8. Challenge

Implementing Cisco Data Center Infrastructure (DCII)

Course Outline (cont'd)

C. Implementing Port Security and Fabric Binding
   1. Fibre Channel Port Security Overview
   2. Fabric Binding for Fibre Channel Overview
   3. Fibre Channel Port Security vs. Fabric Binding
   4. Fibre Channel Port Security Configuration Options
   5. Lab: Configure Fabric Binding and Port Security
   6. Challenge

V. FCoE Unified Fabric

A. Describing FCoE
   1. FCoE Overview
   2. FCoE Benefits
   3. Data Center Bridging
   4. IEEE 802.1Qbb PFC
   5. IEEE 802.1Qaz ETS
   6. IEEE 802.1az DCBX
   7. FCoE Elements and Ports
   8. Fabric-Provided MAC Address
   9. FCoE Initialization Protocol
   10. FIP Process
   11. FCoE Single-Hop Topology
   12. FCoE FEX Topology
   13. FCoE Remote-Attach Topology
   14. FCoE Multihop Topology
   15. Challenge

B. Implementing FCoE
   1. Support for FCoE on Cisco Devices
   2. Basic FCoE Configuration on Cisco Nexus 5000 Series
   3. Basic FCoE Configuration on Cisco Nexus 7000 Series
   4. FEXs and FCoE
   5. FCoE Verification
   6. Lab: Configure FCoE
   7. Challenge

VI. Data Center Infrastructure Storage Services

A. Configuring Distributed Device Aliases
   1. Distributed Device Alias Overview
   2. Device Alias Modes
   3. Device Alias Distribution
   4. Fibre Channel Aliases vs. Device Aliases
   5. Lab: Configure Device Aliases
   6. Challenge

B. Implementing Zoning
   1. Zoning Overview
   2. Zone Enforcement
   3. Full and Active Zone Sets
   4. Merging of Zones
   5. Recovering from Zone Merge Failures
   6. Enhanced Zoning Overview
   7. Enhanced Zoning Merge Behavior
   8. Challenges with Standard Zoning Approach
   9. Smart Zoning
   10. Recommended Zoning Practices
   11. Lab: Configure Zoning
   12. Challenge

C. Configuring NPIV and NPV
   1. NPIV Overview
   2. Fibre Channel Scalability Issues
   3. NPV Overview
   4. F and TF Port Channels
   5. Lab: Configure NPV
   6. Challenge

D. Configuring Fibre Channel Over IP
   1. FCIP Overview
   2. FCIP Configuration
   3. FCIP Verification
   4. FCIP High Availability: Port Channels
   5. FCIP High Availability: FSPF
   6. FCIP High Availability: VRRP
   7. FCIP and Inter-VSAN Routing
   8. Challenge
   9. Introduction to Cisco Fabric Services
   10. Cisco Fabric Services Regions
   11. Need for Accurate Time
   12. NTP and PTP
   13. PTP/NTP Stratum
   14. NTP Modes
   15. Basic NTP Design
   16. NTP Configuration on a Cisco Nexus Switch
   17. PTP Operation
   18. Rollbacks and Checkpoints
   19. Cisco ISSU Overview
   20. Cisco ISSU on Cisco Nexus 7000
   21. Cisco ISSU on Cisco Nexus 5000
   22. Need for Upgrading EPLDs
   23. Upgrading I/O Modules: In Sequence or Parallel?
   24. EPLD Upgrade Procedure
   25. ELPD Upgrade Verification
   26. Introduction to GIR
   27. GIR Custom Profiles

Implementing Cisco Data Center Infrastructure (DCII)

Course Outline (cont'd)

28. GIR Verification
29. **Lab: Configure System Management**
30. Challenge

VII. Data Center Infrastructure Maintenance, Management, and Operations

A. Lesson 1: Configuring System Management
1. Introduction to Cisco Fabric Services
2. Cisco Fabric Services Regions
3. Need for Accurate Time
4. NTP and PTP
5. PTP/NTP Stratum
6. NTP Modes
7. Basic NTP Design
8. NTP Configuration on a Cisco Nexus Switch
9. PTP Operation
10. Rollbacks and Checkpoints
11. Cisco ISSU Overview
12. Cisco ISSU on Cisco Nexus 7000
13. Cisco ISSU on Cisco Nexus 5000
14. Need for Upgrading EPLDs
15. Upgrading I/O Modules: In Sequence or Parallel?
16. EPLD Upgrade Procedure
17. ELPD Upgrade Verification
18. Introduction to GIR
19. GIR Custom Profiles
20. GIR Verification
21. **Lab: Configure System Management**
22. Challenge

B. Configuring Infrastructure Monitoring
1. Introduction to Logging
2. Syslog
3. SNMPv3
4. NetFlow Overview
5. NetFlow Terminology and Process
6. SPAN
7. RSPAN
8. ERSPAN
9. Introduction to Cisco Smart Call Home
10. Deploying Cisco Smart Call Home
11. **Lab: Implement Infrastructure Monitoring**
12. Challenge