

Troubleshooting Cisco Data Center Infrastructure v6.0 (DCIT)

Course Summary

Description

Troubleshooting Cisco Data Center Infrastructure (DCIT) v6.0 is a five-day instructor-led 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 troubleshooting of LAN, SAN, Cisco Data Center Unified Fabric, Cisco Unified Computing System (UCS), and Cisco Application Centric Infrastructure (ACI). The course provides rich, hands-on experience in resolving problems on Cisco MDS switches, Cisco Nexus switches, Cisco fabric extenders (FEXs), Cisco UCS, and Cisco ACI.

Objectives

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

- Troubleshoot Layer 2 technologies, such as STP, port channels, vPC, Cisco FabricPath, and FEX
- Troubleshoot first-hop redundancy, routing, and CFS in the data center
- Troubleshoot virtualization solutions, such as OTV, VRF, and VXLAN
- Troubleshoot storage area networks, including Fibre Channel, FCoE, zoning, NPV, and NPIV
- Troubleshoot data center unified computing

Topics

- Troubleshooting the Data Center LAN Network
- Troubleshooting Data Center SAN
- Troubleshooting Data Center Unified Computing
- Troubleshooting Data Center ACI

Audience

This course is designed for:

- Data center administrators and engineers
- Network administrators and engineers
- Consulting systems engineers
- Cisco integrators and partners
- Data center designers and managers
- Network designers and managers
- Systems engineers

Prerequisites

Students considered for this training should have attended the following classes or obtained equivalent level of knowledge:

- Introducing Cisco Data Center Networking (DCICN) v6.0
- Introducing Cisco Data Center Technologies (DCICT) v6.0
- Implementing Cisco Data Center Infrastructure (DCII) v6.0
- Implementing Cisco Data Center Virtualization and Automation (DCVAI) v6.0
- Implementing Cisco Data Center Unified Computing (DCUCI) v6.0

Duration

Five days

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Course Outline

- I. **Troubleshooting the Data Center LAN Network**
 - A. Overview of the Troubleshooting Process
 - 1. General Troubleshooting Model
 - 2. Overview of the Troubleshooting Process
 - 3. Gathering General Device Information
 - 4. Verifying Physical Ports
 - 5. Verifying Layer 2 Connectivity
 - 6. Verifying Layer 3 Connectivity
 - 7. Troubleshooting Device Modules
 - 8. Using the Right Tools to Troubleshoot Observed Symptoms
 - 9. Asking the Right Questions
 - 10. Problems Related to Software Upgrade
 - 11. Copying Files and Configuration
 - 12. Preparing Information for a TAC Case
 - 13. Challenge
 - B. Understanding CLI Troubleshooting Tools
 - 1. Ping, Pong, and Traceroute
 - 2. Using the ping Command
 - 3. Using the pong Command
 - 4. Using the traceroute Command
 - 5. CLI Debug
 - 6. Debug Logging
 - 7. Debug Filters
 - 8. Event History
 - 9. Monitor System, Processes, and CPU
 - 10. Switched Port Analyzer
 - 11. Encapsulated Remote SPAN
 - 12. Ethalyzer
 - 13. Using Ethalyzer
 - 14. Ethalyzer Examples
 - 15. Ethalyzer Capture and Display Filters
 - 16. Cisco Nexus 7000 Data Plane Sampling Capture
 - 17. System Messages
 - 18. Logging Location
 - 19. Logging Configuration
 - 20. Logging Verification
 - 21. Onboard Failure Logging
 - 22. Cisco Generic Online Diagnostics
 - 23. Configuring Cisco GOLD Tests
 - 24. Running On-Demand GOLD Tests
 - 25. Verifying Cisco GOLD
 - 26. Blue Beacon Feature
 - 27. Simple Network Management Protocol
 - 28. Using SNMP
 - 29. Cisco Embedded Event Manager
 - C. Troubleshooting VLANs and Private VLANs
 - 1. VTP Configuration and Guidelines
 - 2. VTP Version 3
 - 3. Verifying the VTP Status Information
 - 4. Common Problems with VTP Configuration
 - 5. Troubleshooting Layer 2 Issues
 - 6. Verifying Layer 2 Connectivity
 - 7. Determining and Verifying the Layer 2 Path
 - 8. Tracking Device MAC Addresses
 - 9. VLANs
 - 10. Switch Virtual Interface
 - 11. VLAN Troubleshooting Checklist
 - 12. Common VLAN Issues
 - 13. Troubleshooting Private VLANs
 - 14. Lab: Troubleshoot LAN—RSTP**
 - 15. Challenge
 - D. Troubleshooting Port Channels and Virtual Port Channels
 - 1. Port Channel Overview
 - 2. Port-Channel Load Balancing
 - 3. Troubleshooting Port Channels
 - 4. Common Port Channel Issues
 - 5. LACP Overview
 - 6. LACP Channel Modes
 - 7. Verifying LACP Status
 - 8. Troubleshooting LACP
 - 9. vPC Overview
 - 10. vPC Considerations
 - 11. vPC Peer Link Supported Topologies
 - 12. Verifying vPC Status
 - 13. Cisco Fabric Services
 - 14. Verifying vPC Consistency
 - 15. Troubleshooting vPCs
 - 16. vPC Troubleshooting Commands
 - 17. Common vPC Issues
 - 18. Lab: Troubleshoot LAN—LACP**
 - 19. Lab: Learning Lab: Troubleshoot LAN—vPC**
 - 20. Challenge
 - E. Troubleshooting Cisco FabricPath
 - 1. Cisco FabricPath: Ethernet Fabric
 - 2. Cisco FabricPath: Ethernet Fabric Components
 - 3. Cisco FabricPath Control Plane Components
- 30. RMON Alarms and Events
- 31. Lab: Document the Network Baseline**
- 32. Challenge

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Course Outline (cont'd)

4. Cisco FabricPath Interaction with STP
5. Cisco FabricPath Routing Table
6. Cisco FabricPath Data Encapsulation
7. Cisco FabricPath Data-Plane Header
8. Common Cisco FabricPath Issues
9. Cannot Enable the Cisco FabricPath Feature Set
10. Cisco FabricPath Disabled After 120 Days
11. Cannot Configure Cisco FabricPath on an Interface
12. Port to FabricPath Neighbor Is Not Coming Up
13. Port to Classical Ethernet Network Is Blocking
14. Cannot Switch Across the Cisco FabricPath Network
15. Cisco FabricPath Troubleshooting Procedure
16. Verify Basic Cisco FabricPath Settings
17. Examine Control Protocol Operation
18. Verify Cisco FabricPath MAC Address Table
19. Verify Cisco FabricPath Routing Table (IS-IS)
20. Verify vPC+
21. Use Cisco FabricPath OAM
- 22. Lab: Troubleshoot LAN—FabricPath**
23. Challenge
- F. Troubleshooting Cisco OTV
 1. Cisco OTV
 2. Cisco OTV Components
 3. OTV Control Plane
 4. Cisco OTV and Spanning Tree Protocol
 5. OTV Data Plane
 6. Multihomed Sites and Load Balancing
 7. Common Cisco OTV Issues
 8. Cisco OTV Troubleshooting Process
 9. Verifying OTV Adjacencies
 10. Verifying MAC Address Learning
 11. Verifying OTV Forwarding
 12. HSRP Isolation Between Data Centers Using Cisco OTV
 13. OTV FHRP Isolation
 - 14. Lab: Troubleshoot LAN—OTV**
 - 15. Lab: Troubleshoot LAN—OSPF**
 - 16. Lab: Troubleshoot LAN—FHRP**
 - 17. Lab: Troubleshoot LAN—VRF**
 18. Challenge
- G. Troubleshooting VXLAN
 1. VXLAN: Layer 3 Overlay
 2. VXLAN Components
 3. VXLAN Data Plane Encapsulation
 4. VXLAN Data Plane: Flood and Learn
 5. VXLAN and vPC
 6. Common VXLAN Issues
 7. Unable to Create an NVE Interface
 8. VXLAN License Expiration
 9. Packets Are Not Reaching Remote Sites
 10. VXLAN Troubleshooting Procedure
 11. Step 1: Verify Basic VXLAN Configuration Parameters
 12. Step 2: Verify IP Core Unicast and Multicast Reachability
 13. Step 3: Examine VXLAN VNI and VTEP Status
 14. Step 4: Examine MAC Address Table and ARP Table
 - 15. Lab: Troubleshoot LAN—VXLAN**
 16. Challenge
- H. Troubleshooting Platform-Specific Issues
 1. Cisco Fabric Services Overview
 2. Cisco Fabric Services Distribution
 3. Troubleshooting Cisco Fabric Services
 4. Troubleshooting Merge Failures
 5. Troubleshooting Lock Failures
 6. Troubleshooting Cisco Fabric Services Regions
 7. VDC Overview
 8. Troubleshooting VDC
 9. Unable to Create a VDC
 10. Unable to Log in to a Device
 11. Unable to Delete a VDC
 12. Unable to Allocate an Interface to a VDC
 13. VDC Remains in a Failed State
 14. VDC Does Not Reflect a Resource Template Change
 15. Unable to Save the Configuration in a VDC
 16. Routing Overview on Cisco NX-OS
 17. Initial Routing Troubleshooting Checklist
 18. Troubleshoot Basic Routing Issues
 19. ISSU Overview
 20. ISSU Prerequisites and Limitations
 21. Determining the Upgrade Impact
 22. Monitoring the ISSU Upgrade Status
 23. Cisco NX-OS ISSU Failure Conditions

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Course Outline (cont'd)

- 24. **Lab: Troubleshoot LAN—CFS**
 - 25. **Lab : Troubleshoot LAN—FEX**
 - 26. Challenge
- II. Troubleshooting Data Center SAN**
- A. Troubleshooting Fibre Channel Interfaces
 - 1. Fibre Channel Interfaces
 - 2. Fibre Channel Interface States
 - 3. Device Registration
 - 4. Troubleshooting Fibre Channel Interfaces
 - 5. Troubleshooting Physical Port Issues
 - 6. Troubleshooting Device Registration
 - 7. F Port Troubleshooting
 - 8. E Port Troubleshooting
 - 9. xE Port Isolation
 - 10. Fabric Registration in Cisco DCNM for SAN
 - 11. SAN Port Channels Overview
 - 12. Port Channel Compatibility Parameters
 - 13. SAN Port Channel Troubleshooting Commands
 - 14. SAN Port-Channel Issues
 - 15. SAN Port Channels in Cisco DCNM
 - 16. **Lab: Troubleshoot SAN—FC Interfaces**
 - 17. Challenge
 - B. Troubleshooting Fibre Channel Fabric Service
 - 1. VSAN Overview
 - 2. Troubleshooting VSANs
 - 3. fcdomain Feature Phases
 - 4. Fibre Channel Domain Restart
 - 5. Troubleshooting Fibre Channel Domain Services
 - 6. Troubleshooting Fibre Channel Name Services
 - 7. Zoning Overview
 - 8. Troubleshooting Zoning
 - 9. Troubleshooting Fabric Merges
 - 10. Zone Set Import and Export
 - 11. Cisco Fabric Services Overview
 - 12. Troubleshooting Cisco Fabric Services on Cisco MDS Series Multilayer Fabric
 - 13. **Lab: Troubleshoot SAN—FC VSANs, Zones, and Domain Services**
 - 14. Challenge
 - C. Troubleshooting NPV Mode
 - 1. NPIV Mode
 - 2. NPV Mode
 - 3. NPV Mode Fabric Login Process
 - 4. Troubleshooting NPV Mode
 - 5. Locating the Exact Port to Which Server Is Physically Attached
 - 6. **Lab: Troubleshoot SAN—NPV Mode**
 - 7. Challenge
 - D. Troubleshooting FCoE
 - 1. FCoE Overview
 - 2. FIP Overview
 - 3. Single-Hop FIP Virtual Link Establishment
 - 4. Multihop FCoE
 - 5. Troubleshooting FIP
 - 6. Troubleshooting Multihop FIP
 - 7. FCoE and QoS Policies
 - 8. Troubleshooting FCoE Bandwidth Allocation
 - 9. Troubleshooting Jumbo MTU Issues
 - 10. **Lab: Troubleshoot SAN—FCoE**
 - 11. Challenge
 - E. Troubleshooting DCBX
 - 1. Data Center Bridging Overview
 - 2. Troubleshooting DCBX
 - 3. Priority Flow Control Overview
 - 4. Troubleshooting PFC
 - 5. **Lab: Troubleshoot SAN—DCB**
 - 6. Challenge
- III. Troubleshooting Data Center Unified Computing**
- A. Troubleshooting Cisco UCS B-Series Architecture and Initialization
 - 1. Troubleshooting Cisco UCS B-Series System Initialization
 - 2. Standalone vs. Cluster Fabric Interconnect Mode
 - 3. Cisco UCS Internal Components
 - 4. Cisco UCS Split Brain and Partition in Time Issues
 - 5. Troubleshoot Cisco UCS Cluster Wiring Issues
 - 6. Troubleshoot Cisco UCS Manager IP Connectivity Failure
 - 7. Troubleshoot Cisco UCS Manager Java Issues
 - 8. KVM Issue 1: Inability to Ping KVM IP Address
 - 9. KVM Issue 2: KVM Launching Failure

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Course Outline (cont'd)

10. Troubleshoot Cisco UCS Initialization Issues with Fabric Interconnect Reboots
11. Troubleshooting Cisco UCS with Embedded Tools
12. Cisco UCS CLI scope Command
13. Cisco UCS CLI connect Command
14. Cisco UCS CLI connect nxos Command
15. Cisco UCS CLI connect iom Command
16. Other Cisco UCS CLI Commands
17. Tech Support File
18. System Event Log
19. Core Dumps
20. Cisco Call Home
21. Finite State Machine
22. Ethalyzer
23. Troubleshooting Cisco UCS Hardware Discovery
24. Cisco UCS B-Series System Main Components
25. Verify the Discovery of Chassis and Blades
26. Chassis Discovery Policy
27. Troubleshoot Chassis Discovery Failure
28. Troubleshoot Blade Server Issues
29. Challenge
- B. Troubleshooting Cisco UCS B-Series Configuration
 1. Troubleshooting UCS Server Deployment
 2. Stateless Computing
 3. Service Profiles
 4. Service Profile Templates
 5. Server Pools
 6. Troubleshoot Service Profile Association Failure Due to a MAC Address Issue
 7. Troubleshoot Service Profile Association Failure Due to a WWPN Issue
 8. Troubleshoot Service Profile Association Failure Due to a WWNN Issue
 9. Troubleshoot Service Profile Association Failure Due to a UUID Issue
 10. Troubleshoot Service Profile Association Failure Due to a QoS Issue
 11. Other Service Profile Association Issues
 12. Verifying Service Profile Association Using FSM
 13. Cisco UCS Management Configuration
 14. User Roles Inside Cisco UCS Manager
 15. Organizational Structure in Cisco UCS Manager
 16. RBAC and Remote Authentication
 17. Troubleshoot Authentication Failure Due to a Connectivity Issue
 18. Troubleshoot Authentication Failure Due to an LDAP Configuration Issue
 19. Testing LDAP Server
 20. Testing LDAP Server Group
 21. **Lab: Troubleshoot Compute—Cisco UCS Management and Service Profile Deployment**
 22. Challenge
- C. Troubleshooting Cisco UCS B-Series Operation
 1. Troubleshooting Cisco UCS B-Series Server Boot
 2. Troubleshoot Server Boot Failure Due to a RAID1 Cluster Migration Issue
 3. Troubleshooting Operating System Drivers
 4. Identify and Download Appropriate Operating System Drivers
 5. Troubleshoot Microsoft Windows 2008 R2 Installation Failure
 6. Troubleshooting Remote Access
 7. Reset Cisco IMC of a Blade Server
 8. Troubleshoot Cisco IMC Connectivity Issue
 9. Challenge
- D. Troubleshooting Cisco UCS B-Series LAN and SAN Connectivity
 1. Troubleshooting Cisco UCS B-Series LAN Connectivity
 2. Troubleshooting Interface Link-Level Issues
 3. Troubleshooting Connectivity Issues for Some Servers
 4. Troubleshooting Intermittent Connectivity
 5. Troubleshooting Disjoint Layer 2 Networks
 6. Troubleshooting Redundant Connectivity

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Course Outline (cont'd)

7. Fabric Interconnect Cluster ID Mismatch
8. vNIC Failover Does Not Work When Uplink Fails
9. Uplink Port Channel Does Not Become Active
10. Troubleshooting Cisco UCS B-Series SAN Connectivity
11. SAN Connectivity: Verify Fabric Interconnect Mode
12. SAN Connectivity: Verify VSANs in Cisco UCS Manager
13. SAN Connectivity: Verify Fibre Channel Uplinks
14. SAN Connectivity: Verify Service Profile Association
15. SAN Connectivity: Fibre Channel Databases on the Core SAN Switch
16. SAN Connectivity: SAN Fabric Connectivity Verification
17. SAN Connectivity: VSANs and Zones on the Core SAN Switch
18. SAN Connectivity: Problem Resolution
19. SAN Connectivity: Directly Attached Storage
20. Troubleshooting Cisco UCS B-Series SAN Boot
21. Troubleshooting SAN Boot on the Server Adapter
22. Troubleshooting Boot from iSCSI Target
23. Using SPAN for Troubleshooting
24. Using SPAN for Ethernet Traffic
25. Using SPAN for Fibre Channel Traffic
26. Verifying Packet Flow
27. Verify Packet Flow: Step 1
28. Verify Packet Flow: Step 2
29. Verify Packet Flow: Step 3
30. Verify Packet Flow: Step 4
31. Verify Packet Flow: Step 5
32. Verify Packet Flow: Step 7
33. **Lab: Troubleshoot Compute—Cisco UCS B-Series Server Boot from SAN**
34. **Lab: Troubleshoot Compute—LAN Connectivity, Part 1**
35. **Lab: Troubleshoot Compute—LAN Connectivity, Part 2**
36. **Lab: Troubleshoot Compute—Failover Connectivity, Part 1**
37. **Lab: Troubleshoot Compute—Failover Connectivity, Part 2**
38. Challenge
- E. Troubleshooting Cisco UCS B-Series Hardware
 1. Sources of Information on Cisco UCS
 2. Troubleshooting Server Performance Issues
 3. Troubleshooting Memory
 4. Challenge
 5. Lesson 6: Troubleshooting Cisco UCS C-Series Architecture and Configuration
 6. Troubleshooting Cisco UCS C-Series Initialization
 7. Standalone Mode vs. Integration with Cisco UCS Manager
 8. Cisco IMC in Cisco UCS C-Series Servers
 9. Cisco IMC GUI
 10. Cisco IMC CLI
 11. Troubleshooting Guidelines
 12. Troubleshoot Cisco IMC Issues
 13. Export a Tech-Support File
 14. Cisco UCS C-Series Password Recovery
 15. Challenge
- F. Troubleshooting Cisco UCS C-Series Hardware and Firmware
 1. Troubleshooting Cisco UCS C-Series Boot Process
 2. How to Break Into Server BIOS
 3. How to Break Into RAID Controller BIOS
 4. Troubleshoot Operating System Bootup Issue
 5. Troubleshooting Memory
 6. Troubleshoot DIMM Issues
 7. Challenge
- G. Troubleshooting Cisco UCS C-Series LAN and SAN Connectivity
 1. Cisco UCS C-Series VIC 1225 Overview
 2. Troubleshooting Cisco IMC Link
 3. Troubleshooting Cisco UCS C-Series LAN Connectivity
 4. Server Does Not Have Network Connectivity
 5. Operating System Cannot Communicate with the Network
 6. Troubleshooting UCS C-Series SAN Connectivity

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Course Outline (cont'd)

7. Server Is Unable to Connect to SAN
8. Using SPAN to Capture Cisco UCS C-Series Server Traffic
9. Troubleshooting Cisco UCS C-Series SAN Boot
10. Cisco UCS C-Series Server Boots from Local Disk
11. **Lab: Troubleshoot Compute—Cisco UCS C-Series Server Boot from SAN**
12. Challenge
- H. Troubleshooting Cisco UCS C-Series and Cisco UCS
 1. Troubleshooting Connectivity Configuration
 2. Benefits of Integrating Cisco UCS C-Series Servers with Cisco UCS Manager
 3. Hardware Requirements for the Integration
 4. Architectures for Integrating Cisco UCS C-Series Servers with Cisco UCS Manager
 5. 36 Troubleshooting Cisco Data Center Infrastructure (DCIT)
 6. Configure the Fabric Interconnects
 7. Troubleshoot a FEX Discovery Issue
 8. Verify Cisco UCS C-Series Server Integration with Cisco UCS Manager
 9. Troubleshoot Server Integration Failure Due to a Discovery Issue
 10. Troubleshoot Server Integration Failure Due to a VIC or mLOM Issue
 11. **Lab: Troubleshoot Compute—Network Connectivity**
 12. Challenge
- IV. **Troubleshooting Data Center ACI**
 - A. Exploring the Tools and Methodology of Troubleshooting
 1. Cisco APIC Access Methods: GUI, API, CLI
 2. Using Syslog
 3. Using Atomic Counters
 4. Faults and Health Scores
 5. Using SNMP
 6. Using SPAN
 7. Using Embedded Logic Analyzer Module
 8. Packet Flow Through Cisco ACI Fabric
 9. **Lab: Troubleshoot ACI—Bare Metal Hosts**
 10. **Lab: Troubleshoot ACI—VMM**
 11. **Lab: Troubleshoot ACI—Contracts**
 12. **Lab: Troubleshoot ACI—External Layer 3**