

# Troubleshooting Cisco Data Center Infrastructure (DCIT) v7.0

## What you'll learn in this course

The **Troubleshooting Cisco Data Center Infrastructure (DCIT) v7.0** course shows you how to troubleshoot LAN, SAN, Cisco® Data Center Unified Fabric, Cisco Unified Computing System™ (Cisco UCS®), and Cisco Application-Centric Infrastructure (Cisco ACI®). You will learn methodologies and tools to identify issues that may occur in data center network architecture. You will get extensive hands-on practice troubleshooting installation, configuration and interconnectivity issues on Cisco Multilayer Director Switch (MDS) switches, Cisco Nexus® switches, Cisco Fabric Extenders (FEXs), Cisco UCS, Cisco ACI, and more.

This course helps prepare you to take the exam:

- **300-615 Troubleshooting Cisco Data Center Infrastructure (DCIT)**

## Course duration

- Instructor-led training: 5 days in the classroom with hands-on lab practice
- Virtual instructor-led training: 5 days of web-based classes with hands-on lab practice
- E-learning: Equivalent of 5 days of instruction with hands-on lab practice, videos, and challenges

## How you'll benefit

This course will help you:

- Learn how to deploy and troubleshoot various components of Cisco data center infrastructure to support performance, resiliency, scalability needs
- Gain knowledge and skills through Cisco's unique combination of lessons and hands-on practice using enterprise-grade Cisco learning technologies, data center equipment, and software
- Qualify for professional-level job roles

## What to expect in the exam

The **300-615 DCIT** exam certifies your knowledge of troubleshooting a data center infrastructure including network, compute platforms, storage network, automation, management, and operations.

After you pass **300-615 DCIT**, you earn the **Cisco Certified Specialist - Data Center Operations** certification and you satisfy the concentration exam requirement for the **CCNP Data Center** certification.

## Who should enroll

- Network designers
- Network administrators
- Network engineers
- System engineers
- Data center engineers
- Consulting systems engineers



- Technical solutions architects
- Server administrators
- Network managers
- Cisco integrators and partners

## How to enroll

### E-learning

- To buy a single e-learning license, visit the [Cisco Learning Network Store](#).
- For more than one license, or a learning library subscription, contact us at [learning-bdm@cisco.com](mailto:learning-bdm@cisco.com).

### Instructor-led training

- Find a class at the [Cisco Learning Locator](#).
- Arrange training at your location through [Cisco Private Group Training](#).

## Technology areas

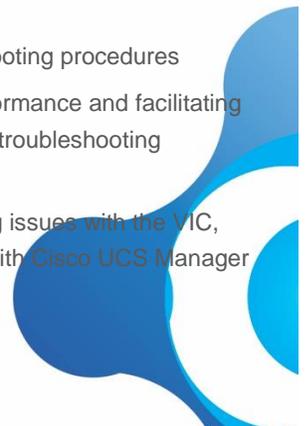
- Data center

## Course details

### Objectives

After taking this course, you should be able to:

- Describe how to troubleshoot the data center network, troubleshooting tools and methodologies available from the Command-Line Interface (CLI) that are used to identify and resolve issues in a Cisco data center network architecture
- Identify and resolve issues that are related to: Virtual LANs (VLANs) and private VLANs (PVLANS); port channels and virtual port channels; Overlay Transport Virtualization (OTV); and Virtual Extensible LAN (VXLAN)
- Describe troubleshooting of routing protocols such as Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Protocol-Independent Multicast (PIM), and LAN security features
- Identify and resolve issues that are related to a single device
- Identify and resolve issues that are related to Fibre Channel interface operation
- Identify and resolve Fibre Channel switching issues when the Cisco NX-OS Software is used in switched mode, and in N-Port Virtualization (NPV) mode
- Identify and resolve issues that are related to Fibre Channel over Ethernet (FCoE) and FCoE Initialization Protocol (FIP), including FCoE performance
- Describe Cisco UCS architecture, initial setup, tools, and service aids that are available for Cisco UCS troubleshooting and interpretation of the output
- Describe Cisco UCS configuration, Cisco UCS B-Series Blade Server operation and troubleshoot related issues
- Describe LAN, SAN, and Fibre Channel operations, including in-depth troubleshooting procedures
- Describe Cisco Integrated Management Controller (IMC) tools for validating performance and facilitating data-gathering activities for Cisco UCS C-Series server troubleshooting, and the troubleshooting approach for hardware and firmware failures
- Define the proper procedures for configuring LAN and SAN connectivity, avoiding issues with the VIC, troubleshooting connectivity issues and Cisco UCS C-Series server integration with Cisco UCS Manager



- Identify the tools, protocols, and methods to effectively troubleshoot Cisco ACI
- Describe how to troubleshoot automation, scripting tools, and programmability

## Prerequisites

To fully benefit from this course, you should have the following knowledge and skills:

- Configure, secure, and maintain LAN and SAN based on Cisco Nexus and MDS switches
- Configure, secure, and maintain Cisco Unified Computing System
- Configure, secure, and maintain Cisco ACI

The following Cisco courses may help you meet these prerequisites:

- **Implementing and Administering Cisco Networking Technologies (CCNA®)**
- **Understanding Cisco Data Center Foundations (DCFNDU)**
- **Implementing and Operating Cisco Data Center Core Technologies (DCCOR)**
- **Introducing Cisco NX-OS Switches and Fabrics in the Data Center (DCINX)**
- **Configuring Cisco NX-OS Switches and Fabrics in the Data Center (DCCNX)**
- **Introducing Cisco Unified Computing System (DCIUCS)**
- **Configuring Cisco Unified Computing System (DCCUCS)**

## Outline

- Describing the Troubleshooting Process
  - Troubleshooting Overview
  - Narrow Down the Cause of the Problem
- Understanding CLI Troubleshooting Tools
  - Ping, Pong, and Traceroute
  - Debugging, Event History, and System Monitoring
  - Switched Port Analyzer (SPAN) and Encapsulated Remote SPAN
  - Ethalyzer, Embedded Logic Analyzer Module (ELAM), and Data Plane Sampling Capture
  - Logging
  - Cisco Generic Online Diagnostics
  - Simple Network Management Protocol (SNMP), Cisco Embedded Event Manager (EEM), and Remote Network Monitor (RMON)
- Troubleshooting VLANs and PVLANS
  - Troubleshoot VLAN Trunking Protocol (VTP)
  - Troubleshoot Layer 2 Issues
  - VLANs and Switched Virtual Interfaces (SVIs) on Cisco Nexus Series Switches
  - Troubleshoot VLANs, PVLANS, and SVIs
  - Troubleshoot Rapid Per VLAN Spanning Tree+ (PVST+)
- Troubleshooting Port Channels and Virtual Port Channels
  - Port Channel Overview
  - Virtual Port Channel (vPC) Overview
  - Troubleshoot vPCs
  - Common vPC Issues



- Troubleshooting Cisco Overlay Transport Virtualization (OTV)
  - Cisco OTV Features
  - Common Cisco OTV Issues
  - Cisco OTV Troubleshooting
  - Hot Standby Routing Protocol (HSRP) Isolation Between Data Centers Using Cisco OTV
- Troubleshooting Virtual Extensible LAN (VXLAN)
  - VXLAN Overlay Features
  - VXLAN Multiprotocol Border Gateway Protocol (MP-BGP) Ethernet VPN
  - Common VXLAN Issues
  - VXLAN Troubleshooting
- Troubleshooting Routing and High-Availability Protocols
  - Troubleshoot Basic Routing Issues
  - Troubleshoot OSPFv2 and OSPFv3
  - Troubleshoot EIGRP
  - Troubleshoot PIM
  - Troubleshoot First Hop Redundancy Protocol (FHRP)
- Troubleshoot Data Center LAN Security
  - Troubleshoot Authentication, Authorization, and Accounting (AAA) and Role-Based Access Control (RBAC)
  - Troubleshoot First-Hop Security
  - Troubleshoot Control Plane Policing (CoPP)
  - Troubleshoot Access Control Lists (ACLs)
- Troubleshooting Platform-Specific Issues
  - Cisco Fabric Services Overview
  - Troubleshoot Cisco Fabric Services
  - Configure and Troubleshoot Configuration Profiles
  - Common Virtual Device Contexts (VDC) Issues
  - Troubleshoot VDC
  - Troubleshoot Virtual Routing and Forwarding (VRF)
  - Cisco FEX Troubleshooting
  - Troubleshoot Cisco In-Service Software Upgrade (ISSU)
- Troubleshooting Fibre Channel Interfaces
  - Fibre Channel Overview
  - Troubleshoot Fibre Channel Interfaces and Device Registration
  - Troubleshoot Fibre Channel Port Channels
  - Troubleshoot Port Security and Fabric Binding
- Troubleshooting Fibre Channel Fabric Services
  - Troubleshoot Virtual Storage Area Networks (VSANs)
  - Troubleshoot Fibre Channel Domain and Name Services
  - Troubleshoot Zoning and Fabric Merges



- Troubleshoot Cisco Fabric Services
- Troubleshooting NPV Mode
  - N-Port ID Virtualization (NPV) and NPV Overview
  - Troubleshoot NPV Mode
- Troubleshooting FCoE
  - FCoE and FIP Overview
  - Troubleshoot FIP
  - Troubleshoot FCoE- and QoS-Related Issues
  - Troubleshoot Data Center Bridging (DCB)
- Troubleshooting Cisco UCS Architecture and Initialization
  - Troubleshoot Fabric Interconnect in Standalone and Cluster Mode
  - Troubleshoot Cisco UCS Management Access
  - Troubleshoot Cisco UCS Manager CLI
  - Troubleshoot Cisco UCS with Embedded Tools
  - Troubleshoot Cisco UCS Hardware Discovery
- Troubleshooting Cisco UCS Configuration
  - Stateless Computing
  - Troubleshoot Service Profile Association Issues Due to Unavailable Addresses
  - Other Service Profile Association Issues
  - Cisco UCS Manageability
  - Troubleshoot Authentication Failures
- Troubleshooting Cisco UCS B-Series Servers
  - Troubleshoot Cisco UCS B-Series Blade Server
  - Troubleshoot Firmware Upgrade and Operating System Drivers
  - Troubleshoot Remote Access
  - Troubleshoot Server Hardware
- Troubleshooting Cisco UCS B-Series LAN and SAN Connectivity
  - Troubleshoot Link-Level Issues
  - Troubleshoot Connectivity Issues for Specific Servers
  - Troubleshoot Intermittent Connectivity
  - Troubleshoot Disjoint Layer 2 Networks
  - Troubleshoot Redundant Connectivity
  - Troubleshoot Cisco UCS B-Series SAN Connectivity
  - Troubleshoot Directly Attached Storage
  - Troubleshoot Server Boot from SAN and iSCSI
  - Use SPAN for Troubleshooting
  - Analyze Packet Flow
- Troubleshooting Cisco UCS C-Series Servers
  - Troubleshoot Cisco UCS C-Series Initialization and Cisco IMC
  - Troubleshoot Cisco UCS C-Series Hardware and Firmware



- Troubleshooting Cisco UCS C-Series LAN and SAN Connectivity
  - Troubleshoot the Cisco UCS C-Series VIC Module and Connectivity to Cisco IMC
  - Troubleshoot Cisco UCS C-Series LAN Connectivity
  - Troubleshoot Cisco UCS C-Series SAN Connectivity
  - Use SPAN to Capture Cisco UCS C-Series Server Traffic
  - Troubleshoot Cisco UCS C-Series Boot from the Fibre Channel Logical Unit Number LUN
  - Troubleshoot Cisco UCS C-Series iSCSI Boot
- Troubleshooting Cisco UCS C-Series and Cisco UCS Manager Integration
  - Integrate Cisco UCS C-Series Servers with Cisco UCS Manager
  - Troubleshoot FEX Discovery and VIC Issues
- Exploring the Tools and Methodologies for Troubleshooting Cisco ACI
  - Troubleshoot the Fabric Discovery Process
  - Traditional Troubleshooting Methods in Cisco ACI
  - Atomic Counters, Faults, and Health Scores
  - Troubleshoot Tenant-Based Policies
  - Packet Flow Through Cisco ACI Fabric
  - Troubleshoot AAA and RBAC
- Troubleshoot Automation and Scripting Tools
  - Troubleshoot Cisco Internetwork Operating System (IOS) EEM
  - Troubleshoot the Cisco NX-OS Scheduler
- Troubleshooting Programmability
  - Troubleshoot Bash Shell and Guest Shell for NX-OS
  - Troubleshoot Representational State Transfer (REST) API, JavaScript Object Notation (JSON), and Extensible Markup Language (XML) Encodings

### Lab outline

- Document the Network Baseline
- Troubleshoot Rapid PVST+
- Troubleshoot Link Aggregation Control Protocol (LACP)
- Troubleshoot vPC
- Troubleshoot OTV
- Troubleshoot VXLAN
- Troubleshoot OSPF
- Troubleshoot FHRP
- Troubleshoot Cisco Fabric Services
- Troubleshoot VRF
- Troubleshoot Cisco FEX
- Troubleshoot Fibre Channel Interfaces
- Troubleshoot Fibre Channel VSANs, Zones, and Domain Services
- Troubleshoot NPV Mode
- Troubleshoot FCoE



- Troubleshoot DCB
- Troubleshoot Cisco UCS Management and Service Profile Deployment
- Troubleshoot Cisco UCS C-Series Server LAN Connectivity
- Troubleshoot Cisco UCS C-Series Server Boot from the Fibre Channel LUN
- Troubleshoot Cisco UCS C-Series Server Management Connectivity
- Troubleshoot Cisco ACI Integration with VMware vCenter
- Troubleshoot Contracts in Cisco ACI
- Troubleshoot Cisco ACI External Layer 3 Connectivity
- Troubleshoot Cisco ACI External Layer 2 Connectivity

