

CCNP Data Center

Introduction

Technology advances are generating more data than ever before, by enabling new applications and businesses that connect everything—people, devices, and machines. With intent-based networking, data center teams can take advantage of automation to scale and secure their infrastructure. To capitalize on these opportunities, today's data center professionals need a broader range of skills and a deeper focus in strategic technology areas. The CCNP Data Center certification program gives you exactly that breadth and depth.

CCNP Data Center certification helps you prove your skills in the ever-changing landscape of data center technologies. The certification covers core technologies and a data center focus area of your choice. You choose where you want to focus. You choose where to take your career.

Required Exam

350-601 DCCOR: Implementing and Operating Cisco Data Center Core Technologies

The Implementing and Operating Cisco Data Center Core Technologies (DCCOR) v1.0 course helps you prepare for the Cisco® CCNP® Data Center and CCIE® Data Center certifications for advanced-level data center roles. In this course, you will master the skills and technologies you need to implement data center compute, LAN, and SAN infrastructure. You will also learn the essentials of automation and security in data centers. You will gain hands-on experience deploying, securing, operating, and maintaining Cisco data center infrastructure including Cisco MDS Switches and Cisco Nexus Switches; Cisco Unified Computing System™ (Cisco UCS®) B-Series Blade Servers, and Cisco UCS C-Series Rack Servers. This course also earns you 64 Continuing Education (CE) credits towards recertification.

Duration

5 Days

Course Objectives

- Implement routing and switching protocols in the Data Center environment
- Implement overlay networks in the data center
- Introduce high-level Cisco Application Centric Infrastructure (Cisco ACI™) concepts and Cisco Virtual Machine Manager (VMM) domain integration
- Describe Cisco Cloud Service and deployment models
- Implement Fibre Channel fabric
- Implement Fibre Channel over Ethernet (FCoE) unified fabric
- Implement security features in the data center
- Implement software management and infrastructure monitoring
- Implement Cisco UCS Fabric Interconnect and Server abstraction
- Implement SAN connectivity for Cisco Unified Computing System™ (Cisco UCS®)
- Describe Cisco HyperFlex™ infrastructure concepts and benefits
- Implement Cisco automation and scripting tools in the data center
- Evaluate automation and orchestration technologies

Prerequisites

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

- Familiarity with Ethernet and TCP/IP networking
- Familiarity with SANs
- Familiarity with Fibre Channel protocol
- Identify products in the Cisco Data Center Nexus and Cisco MDS families
- Understanding of Cisco Enterprise Data Center architecture
- Understanding of server system design and architecture
- Familiarity with hypervisor technologies (such as VMware)

Target Audience

- Network designers
- Network administrators
- Network engineers
- Systems engineers
- Datacenter engineers
- Consulting systems engineers
- Technical solutions architects
- Field engineers
- Cisco integrators and partners
- Server administrator
- Network manager

Course Outline

- Implementing Data Center Switching Protocols*
 - Spanning Tree Protocol
 - Port Channels Overview
 - Virtual Port Channels Overview
 - Implementing First-Hop Redundancy Protocols*
 - Hot Standby Router Protocol (HSRP) Overview
 - Virtual Router Redundancy Protocol (VRRP) Overview
 - First Hop Redundancy Protocol (FHRP) for IPv6
- Implementing Routing in Data Center*
 - Open Shortest Path First (OSPF) v2 and Open Shortest Path Protocol (OSPF) v3
 - Border Gateway Protocol
- Implementing Multicast in Data Center*
 - IP Multicast in Data Center Networks
 - Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD)
 - Multicast Distribution Trees and Routing Protocols
 - IP Multicast on Cisco Nexus Switches
- Implementing Data Center Overlay Protocols
 - Cisco Overlay Transport Virtualization
 - Virtual Extensible LAN
- Implementing Network Infrastructure Security*
 - User Accounts and Role-Based Access Control (RBAC)
 - Authentication, Authorization, and Accounting (AAA) and SSH on Cisco NX-OS
 - Keychain Authentication
 - First Hop Security
 - Media Access Control Security
 - Control Plane Policing
- Describing Cisco Application-Centric Infrastructure

- Cisco ACI Overview, Initialization, and Discovery
 - Cisco ACI Management
 - Cisco ACI Fabric Access Policies
- Describing Cisco ACI Building Blocks and VMM Domain Integration
 - Tenant-Based Components
 - Cisco ACI Endpoints and Endpoint Groups (EPG)
 - Controlling Traffic Flow with Contracts
 - Virtual Switches and Cisco ACI VMM Domains
 - VMM Domain EPG Association
 - Cisco ACI Integration with Hypervisor Solutions
- Describing Packet Flow in Data Center Network*
 - Data Center Traffic Flows
 - Packet Flow in Cisco Nexus Switches
 - Packet Flow in Cisco ACI Fabric
- Describing Cisco Cloud Service and Deployment Models
 - Cloud Architectures
 - Cloud Deployment Models
- Describing Data Center Network Infrastructure Management, Maintenance, and Operations*
 - Time Synchronization
 - Network Configuration Management
 - Software Updates
 - Network Infrastructure Monitoring
- Explaining Cisco Network Assurance Concepts*
 - Need for Network Assurance
 - Cisco Streaming Telemetry Overview
- Implementing Fibre Channel Fabric
 - Fibre Channel Basics
 - Virtual Storage Area Network (VSAN) Overview
 - SAN Port Channels Overview
 - Fibre Channel Domain Configuration Process
- Implementing Storage Infrastructure Services
 - Distributed Device Aliases
 - Zoning
 - N-Port Identifier Virtualization (NPIV) and N-Port Virtualization (NPV)
 - Fibre Channel over IP
 - Network Access Server (NAS) Concepts
 - Storage Area Network (SAN) Design Options
- Implementing FCoE Unified Fabric
 - Fibre Channel over Ethernet
 - Describing FCoE
 - FCoE Topology Options
 - FCoE Implementation
- Implementing Storage Infrastructure Security*
 - User Accounts and RBAC
 - Authentication, Authorization, and Accounting
 - Fibre Channel Port Security and Fabric Binding
- Describing Data Center Storage Infrastructure Maintenance and Operations*
 - Time Synchronization
 - Software Installation and Upgrade
 - Storage Infrastructure Monitoring
- Describing Cisco UCS Server Form Factors*
 - Cisco UCS B-Series Blade Servers
 - Cisco UCS C-Series Rack Servers
- Implementing Cisco Unified Computing Network Connectivity
 - Cisco UCS Fabric Interconnect
 - Cisco UCS B-Series Connectivity
 - Cisco UCS C-Series Integration
- Implementing Cisco Unified Computing Server Abstraction

- Identity Abstraction
 - Service Profile Templates
- Implementing Cisco Unified Computing SAN Connectivity
 - iSCSI Overview
 - Fibre Channel Overview
 - Implement FCoE
- Implementing Unified Computing Security
 - User Accounts and RBAC
 - Options for Authentication
 - Key Management
- Introducing Cisco HyperFlex Systems*
 - Hyperconverged and Integrated Systems Overview
 - Cisco HyperFlex Solution
 - Cisco HyperFlex Scalability and Robustness
- Describing Data Center Unified Computing Management, Maintenance, and Operations*
 - Compute Configuration Management
 - Software Updates
 - Infrastructure Monitoring
 - Cisco Intersight™
- Implementing Cisco Data Center Automation and Scripting Tools*
 - Cisco NX-OS Programmability
 - Scheduler Overview
 - Cisco Embedded Event Manager Overview
 - Bash Shell and Guest Shell for Cisco NX-OS
 - Cisco Nexus API
- Describing Cisco Integration with Automation and Orchestration Software Platforms
 - Cisco and Ansible Integration Overview
 - Cisco and Puppet Integration Overview
 - Python in Cisco NX-OS and Cisco UCS
- Describing Cisco Data Center Automation and Orchestration Technologies*
- Power On Auto Provisioning
 - Cisco Data Center Network Manager Overview
 - Cisco UCS Director Fundamentals
 - Cisco UCS PowerTool

Lab Outline

- Configure Overlay Transport Visualization (OTV)
- Configure Virtual Extensible LAN (VXLAN)
- Explore the Cisco ACI Fabric
- Implement Cisco ACI Access Policies and Out-of-Band Management
- Implement Cisco ACI Tenant Policies
- Integrate Cisco ACI with VMware
- Configure Fibre Channel
- Configure Device Aliases
- Configure Zoning
- Configure NPV
- Configure FCoE
- Provision Cisco UCS Fabric Interconnect Cluster
- Configure Server and Uplink Ports
- Configure VLANs
- Configure a Cisco UCS Server Profile Using Hardware Identities
- Configure Basic Identity Pools
- Configure a Cisco UCS Service Profile Using Pools
- Configure an Internet Small Computer Systems Interface (iSCSI) Service Profile
- Configure Cisco UCS Manager to Authenticate Users with Microsoft Active Directory
- Program a Cisco Nexus Switch with Python

Concentration Exams (Choose One)

1. 300-635 DCAUTO: Automating and Programming Cisco Data Center Solutions

The Implementing Automation for Cisco Data Center Solutions (DCAUI) v1.0 course teaches you how to implement Cisco®'s Data Center automated solutions including programming concepts, orchestration, and automation tools. Through a combination of lessons and hands-on practice, you will manage the tools and learn the benefits of programmability and automation in the Cisco-powered Data Center. You will examine Cisco Application Centric Infrastructure (Cisco ACI®), Software-Defined Networking (SDN) for data center and cloud networks, Cisco Nexus® (Cisco NX-OS) platforms for device-centric automation, and Cisco Unified Computing System (Cisco UCS®) for Data Center compute. You will study their current ecosystem of Application Programming Interfaces (APIs), software development toolkits, and relevant workflows along with open industry standards, tools, and APIs, such as Python, Ansible, Git, JavaScript Object Notation (JSON), Yaml Ain't Markup Language (YAML), Network Configuration Protocol (NETCONF), Representational State Transfer Configuration Protocol (RESTCONF), and Yet Another Generation (YANG). This course prepares you for the 300-635 Automating Cisco Data Center Solutions (DCAUTO) certification exam. Introducing Automation for Cisco Solutions (CSAU) is required before enrolling in Implementing Automation for Cisco Data Center Solutions (DCAUI) because it provides crucial foundational knowledge essential to success.

Duration

3 Days

Course Objectives

After taking this course, you should be able to:

- Leverage the tools and APIs to automate Cisco ACI-powered data centers.
- Demonstrate workflows (configuration, verification, health checking, monitoring) using Python, Ansible, and Postman.
- Leverage the various models and APIs of the Cisco Nexus OS platform to perform day 0 operations, improve troubleshooting methodologies with custom tools, augment the CLI using scripts, and integrate various workflows using Ansible and Python.
- Describe the paradigm shift of Model-Driven Telemetry and understand the building blocks of a working solution.
- Describe the Cisco Data Center compute solutions that can be managed and automated using API-centric tooling, by using the Python SDK, PowerTool, and Ansible modules to implement various workflows on Cisco UCS, Cisco IMC, Cisco UCS Manager, Cisco UCS Director, and Cisco Intersight.

Prerequisites

Before taking this course, you should have the following knowledge and skills:

- Basic programming language concepts
- Basic understanding of virtualization and VMware
- Ability to use Linux and Command Line Interface (CLI) tools, such as Secure Shell (SSH) and bash
- CCNP level data center knowledge
- A foundational understanding of Cisco ACI

Target Audience

This course is designed for network and software engineers who hold the following job roles:

- Network engineer
- Systems engineer
- Wireless engineer
- Consulting systems engineer
- Technical solutions architect
- Network administrator
- Wireless design engineer
- Network manager
- Site reliability engineer
- Deployment engineer
- Sales engineer
- Account manager

Course Outline

- Describing the Cisco ACI Policy Model
- Describing the Cisco APIC REST API
- Using Python to Interact with the ACI REST API
- Using Ansible to Automate Cisco ACI
- Describing Cisco ACI Apps Center and Kubernetes Integration
- Introducing Cisco NX-OS Programmability
- Describing Day-Zero Provisioning with Cisco NX-OS
- Implementing On-Box Programmability and Automation with Cisco NX-OS
- Implementing Off-Box Programmability and Automation with Cisco NX-OS
- Understanding Model-Driven Telemetry
- Automating Cisco UCS Using Developer Tools
- Implementing Workflows Using Cisco UCS Director
- Describing Cisco DCNM
- Describing Cisco Intersight

Lab Outline

- Use Cisco APIC Web GUI
- Discover the Cisco APIC REST API
- Use Postman with the APIC REST API
- Use Python with the Cisco APIC REST API
- Configure and Verify Cisco ACI Using Acitoolkit
- Use Cobra and Arya to Recreate a Tenant
- Manage Configuration Using Ansible
- Set Up a New Tenant the NetDevOps Way
- Create an Infrastructure Health Report
- Install an Application from the App Center on the Cisco APIC
- Power on Auto Provisioning on the Cisco Nexus 9000
- Use Bash and Guest-Shell on Cisco NX-OS
- Use Python to Enhance CLI Commands
- Trigger a Python Script Using Cisco Embedded Event Manager (EEM)
- Docker Containers on NX-OS
- Configure and Verify Using NX-API and Python
- Configure and Verify Using NETCONF/YANG
- Use Ansible with NX-OS
- Streaming Telemetry

- Connect, Query, and Modify Cisco UCS Manager Objects Using Cisco UCS PowerTool
- Discovery 21: Connect, Query, and Modify Cisco UCS Integrated Management Controller (IMC) Objects Using Cisco IMC PowerTool
- Utilize Cisco UCS Python Software Development Kit (SDK)
- Utilize Cisco IMC Python SDK
- Implement Ansible Playbooks to Modify and Verify the Configuration of Cisco UCS Manager

2. 300-610 DCID: Designing Cisco Data Center Infrastructure

The Designing Cisco Data Center Infrastructure (DCID) v7.0 course helps you master design and deployment options focused on Cisco®'s data center solutions and technologies across the network, compute, virtualization, storage area networks, automation, and security. You will learn design practices for the Cisco Unified Computing System™ (Cisco UCS®) solution based on Cisco UCS B-Series and C-Series servers, Cisco UCS Manager, and Cisco Unified Fabric. You will also gain design experience with network management technologies including Cisco UCS Manager, Cisco Data Center Network Manager (DCNM), and Cisco UCS Director.

Duration

5 Days

Course Objectives

- Describe the Layer 2 and Layer 3 forwarding options and protocols used in a data center
- Describe the rack design options, traffic patterns, and data center switching layer access, aggregation, and core
- Describe the Cisco Overlay Transport Virtualization (OTV) technology that is used to interconnect data centers
- Describe Locator/ID separation protocol
- Design a solution that uses Virtual Extensible LAN (VXLAN) for traffic forwarding
- Describe hardware redundancy options; how to virtualize the network, compute, and storage functions; and virtual networking in the data center
- Describe solutions that use fabric extenders and compare Cisco Adapter Fabric Extender (FEX) with single root input/output virtualization (SR-IOV)
- Describe security threats and solutions in the data center
- Describe advanced data center security technologies and best practices
- Describe device management and orchestration in the data center
- Describe the storage options for compute function and different Redundant Array of Independent Disks (RAID) levels from a high-availability and performance perspective
- Describe Fibre Channel concepts, topologies, architecture, and industry terms
- Describe Fibre Channel over Ethernet (FCoE)
- Describe security options in the storage network
- Describe management and automation options for storage networking infrastructure
- Describe Cisco UCS servers and use cases for various Cisco UCS platforms
- Explain the connectivity options for fabric interconnects for southbound and northbound connections
- Describe the hyper-converged solution and integrated systems
- Describe the system-wide parameters for setting up a Cisco UCS domain
- Describe role-based access control (RBAC) and integration with directory servers to control access rights on Cisco UCS Manager
- Describe the pools that may be used in service profiles or service profile templates on Cisco UCS Manager
- Describe the different policies in the service profile
- Describe the Ethernet and Fibre Channel interface policies and additional network technologies
- Describe the advantages of templates and the difference between initial and updated templates
- Describe data center automation tools

Prerequisites

Before taking this course, you should be able to:

- Implement data center networking [Local Area Network (LAN) and Storage Area Network (SAN)]
- Describe data center storage
- Implement data center virtualization
- Implement Cisco Unified Computing System (Cisco UCS)
- Implement data center automation and orchestration with the focus on Cisco Application Centric Infrastructure (ACI) and Cisco UCS Director
- Describe products in the Cisco Data Center Nexus and Multilayer Director Switch (MDS) families

Target Audience

IT professionals with five to eight years of experience in these roles:

- Datacenter engineers
- Network designers
- Network administrators
- Network engineers
- Systems engineers
- Consulting systems engineers
- Technical solutions architects
- Server administrators
- Network managers
- Cisco integrators or partners

Course Outline

- Describing High Availability on Layer 2
 - Overview of Layer 2 High-Availability Mechanisms
 - Virtual Port Channels
 - Cisco Fabric Path
 - Virtual Port Channel+
- Designing Layer 3 Connectivity
 - First Hop Redundancy Protocols
 - Improve Routing Protocol Performance and Security
 - Enhance Layer 3 Scalability and Robustness
- Designing Data Center Topologies
 - Data Center Traffic Flows
 - Cabling Challenges
 - Access Layer
 - Aggregation Layer
 - Core Layer
 - Spine-and-Leaf Topology
 - Redundancy Options
- Designing Data Center Interconnects with Cisco OTV
 - Cisco OTV Overview
 - Cisco OTV Control and Data Planes
 - Failure Isolation
 - Cisco OTV Features
 - Optimize Cisco OTV
 - Evaluate Cisco OTV
- Describing Locator/ID Separation Protocol
 - Locator/ID Separation Protocol

- Location Identifier Separation Protocol (LISP) Virtual Machine (VM) Mobility
 - LISP Extended Subnet Mode (ESM) Multihop Mobility
 - LISP VPN Virtualization
- Describing VXLAN Overlay Networks
 - Describe VXLAN Benefits over VLAN
 - Layer 2 and Layer 3 VXLAN Overlay
 - Multiprotocol Border Gateway Protocol (MP-BGP) Ethernet VPN (EVPN) Control Plane Overview
 - VXLAN Data Plane
- Describing Hardware and Device Virtualization
 - Hardware-Based High Availability
 - Device Virtualization
 - Cisco UCS Hardware Virtualization
 - Server Virtualization
 - SAN Virtualization
 - N-Port ID Virtualization
- Describing Cisco FEX Options
 - Cisco Adapter FEX
 - Access Layer with Cisco FEX
 - Cisco FEX Topologies
 - Virtualization-Aware Networking
 - Single Root I/O Virtualization
 - Cisco FEX Evaluation
- Describing Basic Data Center Security
 - Threat Mitigation
 - Attack and Countermeasure Examples
 - Secure the Management Plane
 - Protect the Control Plane
 - RBAC and Authentication, Authorization, and Accounting (AAA)
- Describing Advanced Data Center Security
 - Cisco TrustSec in Cisco Secure Enclaves Architecture
 - Cisco TrustSec Operation
 - Firewalling
 - Positioning the Firewall Within Data Center Networks
 - Cisco Firepower® Portfolio
 - Firewall Virtualization
 - Design for Threat Mitigation
- Describing Management and Orchestration
 - Network and License Management
 - Cisco UCS Manager
 - Cisco UCS Director
 - Cisco Intersight
 - Cisco DCNM Overview
- Describing Storage and RAID Options
 - Position DAS in Storage Technologies
 - Network-Attached Storage
 - Fibre Channel, FCoE, and Internet Small Computer System Interface (iSCSI)
 - Evaluate Storage Technologies
- Describing Fibre Channel Concepts
 - Fibre Channel Connections, Layers, and Addresses
 - Fibre Channel Communication
 - Virtualization in Fibre Channel SAN
- Describing Fibre Channel Topologies
 - SAN Parameterization
 - SAN Design Options
 - Choosing a Fibre Channel Design Solution
- Describing FCoE
 - FCoE Protocol Characteristics

- FCoE Communication
 - Data Center Bridging
 - FCoE Initialization Protocol
 - FCoE Design Options
- Describing Storage Security
 - Common SAN Security Features
 - Zones
 - SAN Security Enhancements
 - Cryptography in SAN
- Describing SAN Management and Orchestration
 - Cisco DCNM for SAN
 - Cisco DCNM Analytics and Streaming Telemetry
 - Cisco UCS Director in the SAN
 - Cisco UCS Director Workflows
- Describing Cisco UCS Servers and Use Cases
 - Cisco UCS C-Series Servers
 - Fabric Interconnects and Blade Chassis
 - Cisco UCS B-Series Server Adapter Cards
 - Stateless Computing
 - Cisco UCS Mini
- Describing Fabric Interconnect Connectivity
 - Use of Fabric Interconnect Interfaces
 - VLANs and VSANs in a Cisco UCS Domain
 - Southbound Connections
 - Northbound Connections
 - Disjoint Layer 2 Networks
 - Fabric Interconnect High Availability and Redundancy
- Describing Hyperconverged and Integrated Systems
 - Hyperconverged and Integrated Systems Overview
 - Cisco HyperFlex™ Solution
 - Cisco HyperFlex Scalability and Robustness
 - Cisco HyperFlex Clusters
 - Cluster Capacity and Multiple Clusters on One Cisco UCS Domain
 - External Storage and Graphical Processing Units on Cisco HyperFlex
 - Cisco HyperFlex Positioning
- Describing Cisco UCS Manager Systemwide Parameters
 - Cisco UCS Setup and Management
 - Cisco UCS Traffic Management
- Describing Cisco UCS RBAC
 - Roles and Privileges
 - Organizations in Cisco UCS Manager
 - Locales and Effective Rights
 - Authentication, Authorization, and Accounting
 - Two-Factor Authentication
- Describing Pools for Service Profiles
 - Global and Local Pools
 - Universally Unique Identifier (UUID) Suffix and Media Access Control (MAC) Address Pools
 - World Wide Name (WWN) Pools
 - Server and iSCSI Initiator IP Pools
- Describing Policies for Service Profiles
 - Global vs. Local Policies
 - Storage and Basic Input/Output System (BIOS) Policies
 - Boot and Scrub Policies
 - Intelligent Platform Management Interface (IPMI) and Maintenance Policies
- Describing Network-Specific Adapters and Policies
 - LAN Connectivity Controls
 - SAN Connectivity Controls
 - Virtual Access Layer

- Connectivity Enhancements
- Describing Templates in Cisco UCS Manager
 - Cisco UCS Templates
 - Service Profile Templates
 - Network Templates
- Designing Data Center Automation
 - Model-Driven Programmability
 - Cisco NX-API Overview
 - Programmability Using Python
 - Cisco Ansible Module
 - Use the Puppet Agent

3. 300-630 DCACIA: Implementing Cisco Application Centric Infrastructure - Advanced

The Implementing Cisco Application Centric Infrastructure–Advanced (DCACIA) v1.0 course shows you how to integrate the capabilities of the Cisco® Nexus® 9000 Series Switches in Cisco Application Centric Infrastructure (Cisco ACI®) mode. You will learn how to configure and manage Cisco Nexus 9000 Series Switches in ACI mode providing enhanced management and policy framework, along with the protocols used in the underlying fabric. The course also covers how to use Cisco ACI as a policy-driven solution that integrates software and hardware, and how to implement Cisco ACI Multi-Pod and Multi-Site deployments. You will gain hands-on practice implementing advanced ACI capabilities such as Rogue Endpoint Feature, Transit Routing, VRF Route Leaking, Contracts, and Zoning Rules, Policy-Based Redirect to Layer 4–7 Service Node, Multi-Pod Fabric, and Cisco ACI® Multi-Site Orchestrator.

Duration

5 Days

Course Objectives

After taking this course, you should be able to:

- Explain Cisco ACI advanced fabric packet forwarding
- Explain advanced ACI policy and tenant configuration
- Describe Cisco ACI Multi-Pod deployment
- Explain the details and consideration of implementing and integrating the traditional network with Cisco ACI
- Describe Cisco ACI Service Graph Policy-Based Redirect (PBR)
- Describe Cisco ACI Multi-Site deployment

Prerequisites

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

- Basic understanding of Cisco ACI
- Understanding of Cisco data center architecture
- Familiarity with virtualization fundamentals

Target Audience

- Network designers
- Network administrators
- Network engineers
- Systems engineers
- Datacenter engineers
- Consulting systems engineers
- Technical solutions architects
- Field engineers
- Server administrators
- Network managers
- Storage administrators
- Cisco integrators and partners

Course Outline

- Cisco ACI Advanced Packet Forwarding
 - Packet Forwarding Between Leaf Switches
 - Endpoint Learning
 - Network Interface Card (NIC) Teaming to ACI Fabric
 - Endpoint Learning Optimizations
 - Endpoint Loop Protection
 - Rogue Endpoint Control
- Using Advanced Cisco ACI Policy and Tenant Configuration
 - Layer 3 Outside Transit Routing
 - Using Tenant Common for Shared Services
 - Using Virtual Routing and Forwarding (VRF) Route Leaking for Shared Services
 - Using Layer 3 Outside configuration policy (L3Out) VRF Route Leaking for Shared Services
 - Detailed Contract Architecture with pcTag
 - Contract with vzAny
 - Contract Preferred Group
 - Implementing Traditional Network in Cisco ACI
 - Integrating Switched Network with Cisco ACI
 - Migrating Existing Switched Network to Cisco ACI
 - Network- vs. Application-Centric Deployment Models
- Cisco ACI Service Graph PBR
 - Service Graph PBR Overview
 - PBR End-to-End Packet Flow
 - Service Graph PBR Requirements and Topologies
 - Service Graph PBR Tracking Options
- Cisco ACI Multi-Pod Deployment
 - Cisco ACI Multi-Pod Overview
 - Inter-Pod Network Overview
 - Multi-Pod Provisioning and Packet Flow Between Pods
 - Connectivity to External L3 Networks
 - Service Node Integration Considerations
 - Service Graph Considerations
- Cisco ACI Multi-Site Deployment
 - Cisco ACI Multi-Site Overview
 - Cisco ACI Multi-Site Orchestrator
 - Inter-Site Network Overview
 - Tenant Configuration Deployment from Multi-Site Orchestrator (MSO)
 - Packet Flow Between Sites
 - Multi-Site Stretched Components
 - Multi-Site vs Multi-Pod Comparison

Lab Outline

- Examine Local and Remote Endpoint Learning
- Verify Bounce Entries
- Validate IP Learning
- Mitigate IP and MAC Flapping with the Rogue Endpoint Feature
- Enable Transit Routing
- Implement VRF Route Leaking
- Configure VRF Route Leaking with L3Out
- Examine Contracts and Zoning Rules
- Configure Policy-Based Redirect to Layer 4–7 Service Node
- Deploy Multi-Pod Fabric
- Provision Policies with Cisco ACI Multi-Site Orchestrator

4. 300-625 DCSAN: Implementing Cisco Storage Area Networking

The Configuring Cisco MDS 9000 Series Switches (DCMDS) v3.5 course shows you how to implement, manage, and troubleshoot Cisco® MDS 9000 Series Switches, to build highly available scalable storage networks. Through expert instruction and extensive hands-on practice, you will learn how to deploy and use capabilities such as Virtual Storage Area Networks (VSANs), Role-Based Access Control (RBAC), N-Port Virtualization (NPV) fabric security, zoning, automation with NX-API, Slow Drain Analysis, SAN analytics, Fibre Channel over TCP/IP (FCIP) tunnels, and more. You will learn how to configure and implement platform features and learn troubleshooting techniques pertaining to Fibre Channel (FC) domains, firmware upgrades, zones, and zone mergers.

This course helps you prepare to take the exam, 300-625 Implementing Cisco Storage Area Networking (DCSAN), which leads to CCNP Data Center and the Certified Specialist - Data Center SAN Implementation certifications.

Duration

4 Days

Course Objectives

- Discover and describe the Cisco Multilayer Director Switch (MDS) platform of multilayer switches and directors.
- Provisioning Cisco MDS Switches
- Describe key product features of the MDS platform
- Describe and implement automation and Cisco MDS Switches
- Configure and implement the Cisco MDS switches and platform features
- Resolve issues and troubleshoot FC domains, zones and zone merges, and switch boot and firmware upgrades

Prerequisites

- Basic understanding of data storage hardware components and protocols, including Small Computer System Interface (SCSI) and Fibre Channel
- Basic understanding of network protocols, including Ethernet and IP
- Basic routing and switching knowledge

Target Audience

- Technical decision-makers
- Network architects

Course Outline

- Describing Cisco MDS Platform
 - Cisco MDS 9700/9300/9200/9100 Hardware
 - 32-Gb Fibre Channel
 - Cisco NX-OS
 - Cisco DCNM
 - Fibre Channel Architecture
 - FCoE Architecture
- Provisioning Cisco MDS Switches
 - Power-On Auto-Provisioning
 - Cisco DCNM
 - Using Cisco DCNM 11.x
 - RBAC and Authentication, Authorization, and Accounting (AAA)
- Building the Fibre Channel Fabric with Cisco MDS Switches
 - Virtual SANs
 - Port Channels and VSAN Trunking
 - Zoning and Smart Zoning
 - Device Aliases
 - Inter-VSAN Routing
 - Fibre Channel Fabric Security
 - Building SAN Extensions
 - Inter-VSAN Routing
 - Slow Drain Analysis
 - SAN Analytics and Telemetry Streaming
 - Cisco Secure Boot
 - NPV and NPIV
- Automating Cisco MDS Fabric
 - Cisco MDS NX_API Python API
 - Ansible
- Monitoring and Reporting Cisco MDS Features
 - Cisco DCNM SAN Reports and Alarms
 - SAN Analytics and SAN Telemetry Streaming
- Troubleshooting Common Cisco MDS Issues
 - Troubleshooting Fibre Channel Domains, Zones, and Zone Merges
 - Boot and Upgrade Issues

Lab Outline

- Set Up DCNM
- Explore DCNM-SAN Client and DCNM Device Manager
- Configure and Use RBAC
- Configure and Use RBAC with DCNM-SAN Client and Device Manager
- Manage VSANs and Fibre Channel Domain
- Configure NPV and N-Port Identification Virtualization (NPIV)
- Configure Interfaces
- Configure Device Aliases and Zoning
- Explore and Automate with NX-API
- Perform Slow Drain Analysis with Cisco DCNM
- Configure SAN Analysis and SAN Telemetry Streaming

- Configure FCIP Tunnels and FCIP High Availability
- Configure IVR for SAN Extension
- Troubleshoot Zoning and Zone Merges

5. 300-620 DCACI: Implementing Cisco Application Centric Infrastructure

The Implementing Cisco Application Centric Infrastructure (DCACI) v1.0 course shows you how to deploy and manage the Cisco® Nexus® 9000 Series Switches in Cisco Application Centric Infrastructure (Cisco ACI®) mode. You will learn how to configure and manage Cisco Nexus 9000 Series Switches in ACI mode, how to connect the Cisco ACI fabric to external networks and services, and the fundamentals of Virtual Machine Manager (VMM) integration. You will gain hands-on practice implementing key capabilities such as fabric discovery, policies, connectivity, VMM integration, and more. This course earns you 40 Continuing Education (CE) credits towards recertification.

Duration

5 Days

Course Objectives

- Describe Cisco ACI Fabric Infrastructure and basic Cisco ACI concepts
- Describe Cisco ACI policy model logical constructs
- Describe Cisco ACI basic packet forwarding
- Describe external network connectivity
- Describe VMM Integration
- Describe Layer 4 to Layer 7 integrations
- Explain Cisco ACI management features

Prerequisites

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

- Understanding of networking protocols, routing, and switching
- Familiarity with Cisco Ethernet switching products
- Understanding of Cisco data center architecture
- Familiarity with virtualization fundamentals

Target Audience

- Network Designers
- Network Administrators
- Network Engineers
- Systems Engineers
- Data Center Engineers
- Consulting Systems Engineers
- Technical Solutions Architects
- Cisco Integrators/Partners
- Field Engineers
- Server Administrators
- Network Managers
- Storage Administrators
- Cisco integrators and partners

Course Outline

- Introducing Cisco ACI Fabric Infrastructure and Basic Concepts
 - What Is Cisco ACI?
 - Cisco ACI Topology and Hardware
 - Cisco ACI Object Model
 - Faults, Event Record, and Audit Log
 - Cisco ACI Fabric Discovery
 - Cisco ACI Access Policies
- Describing Cisco ACI Policy Model Logical Constructs
 - Cisco ACI Logical Constructs
 - Tenant
 - Virtual Routing and Forwarding
 - Bridge Domain
 - Endpoint Group
 - Application Profile
 - Tenant Components Review
 - Adding Bare-Metal Servers to Endpoint Groups
 - Contracts
- Describing Cisco ACI Basic Packet Forwarding
 - Endpoint Learning
 - Basic Bridge Domain Configuration Knob
 - Introducing External Network Connectivity
 - Cisco ACI External Connectivity Options
 - External Layer 2 Network Connectivity
 - External Layer 3 Network Connectivity
- Introducing VMM Integration
 - VMware vCenter VDS Integration
 - Resolution Immediacy in VMM
 - Alternative VMM Integrations
- Describing Layer 4 to Layer 7 Integrations
 - Service Appliance Insertion Without ACI L4-L7 Service Graph
 - Service Appliance Insertion via ACI L4-L7 Service Graph
 - Service Graph Configuration Workflow
 - Service Graph PBR Introduction
- Explaining Cisco ACI Management
 - Out-of-Band Management
 - In-Band Management
 - Syslog
 - Simple Network Management Protocol
 - Configuration Backup
 - Authentication, Authorization, and Accounting
 - Role-Based Access Control
 - Cisco ACI Upgrade
 - Collect Tech Support

Lab Outline

- Validate Fabric Discovery
- Configure Network Time Protocol (NTP)
- Create Access Policies and Virtual Port Channel (vPC)
- Enable Layer 2 Connectivity in the Same Endpoint Group (EPG)
- Enable Inter-EPG Layer 2 Connectivity
- Enable Inter-EPG Layer 3 Connectivity
- Compare Traffic Forwarding Methods in a Bridge Domain
- Configure External Layer 2 (L2Out) Connection
- Configure External Layer 3 (L3Out) Connection

- Integrate Application Policy Infrastructure Controller (APIC) With VMware vCenter Using VMware Distributed Virtual Switch (DVS)

6. 300-615 DCIT: Troubleshooting Cisco Data Center Infrastructure

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.

Duration

5 Days

Course Objectives

- 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

Target Audience

- 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

Course 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 (NPIV) 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

- Designing Enterprise Connectivity
- Designing an Enterprise Network with BGP Internet Connectivity
- Designing an Enterprise Campus LAN
- Designing Resilient Enterprise WAN
- Designing QoS in an Enterprise Network
- Designing an Enterprise IPv6 Network