CCNP Data Center

Implementing Cisco Data Center Unified Computing (DCUCI) v6.2

Course details

Objectives

After taking this course, you should be able to:

- Describe Cisco UCS server form factors
- Describe Cisco UCS connectivity
- Configure identity abstraction
- Configure service profile templates
- Implement SSCI over IP (iSCSI)
- Implement Fibre Channel port channels
- Implement Fibre Channel over Ethernet (FCoE)
- Implement Role-Based Access Control (RBAC)
- Implement external authentication providers
- Implement key management
- Implement Cisco UCS firmware updates
- Implement Cisco UCS backups
- Implement monitoring
- Deploy Cisco UCS Central and use it to add a Cisco UCS Manager domain, manage resources centrally, and create all required pools and templates to deploy a service profile
- Implement Cisco UCS Director and Cisco Integrated Management Controller (IMC) Supervisor
- Compare scripting options for Cisco UCS Manager

Prerequisites

We recommend (but don't require) that you have these skills and knowledge before taking this course:

- Understanding of server system design and architecture
- Familiarity with Ethernet and TCP/IP networking
- Familiarity with SANs
- Familiarity with the Fibre Channel protocol
- Understanding of Cisco enterprise data center architecture
- Familiarity with hypervisor technologies (such as VMware)

Outline

- Cisco Unified Computing System Implementation
    - Describing Cisco UCS Server Form Factors
    - Describing Cisco UCS Connectivity
    - Configuring Identity Abstraction
    - Configuring Service Profile Templates
- SAN Storage Implementation for Cisco Unified Computing System
    - Implementing iSCSI
    - Implementing Fibre Channel
    - Implementing FCoE
- Security Implementation for Cisco Unified Computing System
    - Implementing Role-Based Access Control
    - Implementing External Authentication Providers
    - Implementing Key Management
- Operations and Maintenance for Cisco Unified Computing System
    - Implementing Cisco UCS Firmware Updates
    - Implementing Cisco UCS Backups
    - Implementing Monitoring
- Cisco Unified Computing System Automation
    - Implementing Cisco UCS Central
    - Implementing Cisco UCS Director and Cisco IMC Supervisor
    - Comparing Scripting Options for Cisco UCS Manager

Lab outline

- Provision Cisco UCS Fabric Interconnect Cluster
- Configure Server and Uplink Ports
- Configure VLANs
- Configure a Cisco UCS Service Profile Using Hardware Identities
- Configure Basic Identity Pools
- Configure a Cisco UCS Service Profile Using Pools
- Configure a Service Profile Template
- Configure an iSCSI Service Profile

- Configure Pod-Specific Device Aliases
- Configure Zoning
- Configure VSANs in Cisco UCS Manager
- Configure Unified Ports on Cisco UCS Fabric Interconnects
- Install and Boot VMware ESXi on Cisco UCS C-Series Servers from SAN LUN
- Install and Boot VMware ESXi on Cisco UCS B-Series Servers from SAN LUN
- Configure Organizations and Locales
- Configure Job-Specific Roles
- Configure Cisco UCS Manager to Authenticate Users with Microsoft Active Directory
- Configure a Trusted Point and Key Ring in Cisco UCS Manager
- Perform Backup and Restore Activities
- Implement Syslog
- Deploy and Use Cisco UCS Central
- Deploy and Use Cisco IMC Supervisor
- Configure Cisco UCS Manager with XML API and Cisco UCS PowerTool

Implementing Cisco Data Center Infrastructure (DCII) v6.2

Course details

Objectives

After taking this course, you should be able to:

- Configure Rapid PVST+, Multiple Spanning Tree (MST), and available Spanning Tree Protocol (STP) options
- Configure Fabric Extenders (FEX) in static, dynamic, and enhanced virtual port channel setup
- Configure port channels and virtual port channels
- Implement FabricPath and describe Cisco Dynamic Fabric Automation (DFA)
- Configure Cisco Overlay Transport Virtualization (OTV)
- Configure a Virtual Extensible LAN (VXLAN)
- Describe the Locator/ID Separation Protocol (LISP)
- Configure first-hop redundancy protocols
- Configure routing on a Cisco Nexus switch
- Implement multicast functionality in a Cisco data center network architecture
- Manage user accounts, Secure Shell (SSH), and Authentication, Authorization, and Accounting (AAA) on Cisco NX-OS
- Describe and configure system security features
- Perform basic Fibre Channel configuration
- Manage Fibre Channel domains
- Configure port security and fabric binding
- Describe and configure Fibre Channel over Ethernet (FCoE)
- Describe and configure distributed device aliases
- Describe and configure zoning
- Configure N-Port Identifier Virtualization (NPIV) and N-Port Virtualization (NPV)
- Describe and configure Fibre Channel over IP (FCIP)
- Configure system management and infrastructure monitoring
- Configure infrastructure monitoring and programmability

Prerequisites

Before taking this course, you should be able to:

- Describe data center networking concepts

- Describe data center storage concepts
- Describe data center virtualization
- Describe the Cisco Unified Computing System™ (Cisco UCS®)
- Describe data center automation and orchestration focusing on Cisco ACI and Cisco UCS Director
- Identify products in the Cisco Nexus and MDS families
- Describe network fundamentals and build simple LANs, including switching and routing

To fully benefit from this course, you should have completed the following courses or obtained the equivalent level of knowledge:

- Introducing Cisco Data Center Networking (DCICN) v6.0 or higher
- Introducing Cisco Data Center Technologies (DCICT) v6.0 or higher
- Interconnecting Cisco Networking Devices: Accelerated (CCNAX), or Interconnecting Cisco Networking Devices, Part 1 (ICND1), and Interconnecting Cisco Networking Devices, Part 2 (ICND2)

Outline

- Data Center Protocols
    - Configuring Spanning Tree Protocol
    - Configuring Port Channels
    - Configuring Fabric Extenders
    - Implementing Cisco FabricPath
    - Understanding Overlay Transport Virtualization
    - Implementing VXLAN
    - Implementing LISP
- Layer 3 Switching Features in the Data Center
    - Configuring First-Hop Redundancy
    - Configuring Routing
    - Configuring IP Multicast
- Data Center Infrastructure Security
    - Configuring User Management
    - Configuring System Security Features
- Data Center Infrastructure Storage Fabric
    - Basic Fibre Channel Configuration

    - Managing Domains
    - Implementing Port Security and Fabric Binding
- FCoE Unified Fabric
    - Describing FCoE
    - Implementing FCoE
- Data Center Infrastructure Storage Services
    - Configuring Distributed Device Aliases
    - Implementing Zoning
    - Configuring NPIV and NPV
    - Configuring Fibre Channel over IP
- Data Center Infrastructure Maintenance, Management, and Operations
    - Configuring System Management
    - Configuring Infrastructure Monitoring

Lab outline

- Configure Layer 2 Switching
- Configure Port Channels
- Configure FEX
- Configure Cisco FabricPath
- Configure OTV
- Configure VXLAN
- Configure VRRP
- Configure OSPF
- Configure User Management Security Features
- Configure System Security Features
- Configure Fibre Channel
- Manage Domains and Configure Persistent FCIDs
- Configure Fabric Binding and Port Security
- Configure FCoE
- Configure Device Aliases
- Configure Zoning
- Configure NPV

Implementing Cisco Data Center Virtualization and Automation (DCVAI) v6.2

Course details

Objectives

After taking this course, you should be able to:

- Describe two primary features to logically separate a physical switch
- Describe the Cisco Nexus® 1000V Switch
- Describe the programmability options in Cisco NX-OS
- Describe Command-Line Interface (CLI) features that simplify configuration management
- Use different scripting tools available with Cisco NX-OS
- Describe the high-level concepts and different fabric discovery parameters for Cisco ACI
- Create tenant-based policies for bare-metal hosts
- Describe the integration of VM manager domains with Cisco ACI
- Describe how Cisco ACI supports multitier applications
- List Cisco ACI monitoring capabilities
- Describe Cisco ACI programmability and orchestration
- Describe virtual Port Channel (vPC)-based aggregation and availability
- Describe the Cisco Application Virtual Switch (AVS), distributed firewall, and microsegmentation
- Describe packet flows within Cisco ACI
- Describe integrating Cisco ACI with external Layer 3 networks
- Outline the integration options with external Layer 2 networks
- Describe how Layer 4 through Layer 7 services are inserted into the Cisco ACI fabric, and how traffic is subsequently redirected

Prerequisites

To fully benefit from this course, you should have completed the following courses or obtained the equivalent level of knowledge:

- Introducing Cisco Data Center Networking (DCICN) v6.0 or higher
- Introducing Cisco Data Center Technologies (DCICT) v6.0 or higher
- Configuring Cisco Nexus 9000 Series Switches in ACI Mode (DCAC9K) v2.0 or higher

You should have a good understanding of the VMware environment and should also be able to:

- Describe data center networking concepts
- Describe data center storage concepts

- Describe data center virtualization

Outline

- Infrastructure Virtualization Implementation
    - Configuring Logical Device Separation
    - Configuring Virtual Switching Technology
- Cisco NX-OS Configuration Automation
    - Implementing Configuration Programmability
    - Implementing Configuration Profiles
    - Using Scripting Tools
- Application-Centric Infrastructure Overview
    - Introducing Cisco ACI
- Cisco ACI Building Blocks and Application Policies
    - Building Tenant-Based Policies with Bare-Metal Hosts
    - Describing VMM Domain Integration
    - Multitier Applications in Cisco ACI
- Cisco ACI Manageability and Programmability
    - Monitoring and Managing Cisco ACI
    - Describing Cisco ACI Programmability and Orchestration
- Cisco ACI Enhanced Features
    - Describing vPC
    - Deploying Cisco AVS
- Cisco ACI Networking
    - Describing Packet Flow Internal to the ACI Fabric
    - Describing External Layer 3 Network Integration
    - Describing External Layer 2 Network Integration
    - Configuring Service Insertion and Redirection

Lab outline

- Implement Cisco NX-OS Configuration Automation
- Discover and Initialize Cisco ACI Fabric
- Implement Cisco ACI Fabric Connectivity for Bare-Metal Hosts
- Implement Cisco ACI Fabric Connectivity for VMs

- Implement Application Policies
- Implement Inter-Tenant Connectivity
- Program Cisco APIC Using Python and Arya
- Implement vPC to Hypervisors
- Deploy Cisco AVS and Microsegmentation
- Enable Connectivity to External Layer 3 Networks
- Enable Connectivity to External Layer 2 Networks
- Provision Layer 2 Extension Using Cisco UCS Director
- Deploy Service Graph ASA NGFW

Designing Cisco Data Center Infrastructure (DCID) v6.2

Course details

Objectives

After taking this course, you should be able to:

- 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
- Design a solution that uses Locator/ID Separation Protocol (LISP) for traffic forwarding
- Describe the hardware redundancy options and virtualize the network, compute, and storage
- Discuss virtual networking in the data center
- Describe solutions using Fabric Extenders (FEX) and compare Cisco Adapter FEX with VM-FEX
- Describe the Cisco Nexus® 1000V solution to extend the hypervisor functionality
- Describe security threats and solutions in the data center
- Describe advanced data center security technologies and best practices
- Describe virtual appliances that are deployed in a data center network
- Describe device management and orchestration in the data center
- Design a data center storage network
- Describe the storage options for compute and the different RAID levels from a High Availability (HA) and performance perspective
- Describe Fibre Channel concepts, architecture, topologies, and industry terms
- Describe how Ethernet and Fibre Channel networks converge
- Describe security options in the storage network
- Describe management and automation options for the storage networking infrastructure
- Describe Cisco UCS® servers and use cases for various Cisco UCS platforms (B-Series and C-Series)
- Explain the connectivity options in the fabric interconnects for southbound and northbound connections. Describe port personalities and oversubscription models. Distinguish between the End-Host Virtualizer (EHV) and switching mode, and between the N-Port Virtualization (NPV) and Fibre Channel switching mode. Describe split brain and partition in time issues with the fabric interconnects for HA

- Describe the hyperconvergence solution and how it integrates systems based on different storage vendors. Compare storage vendors and evaluate the advantages for each stacked solution
- Describe design and management options for Cisco UCS. Design the management solution in HA mode and describe integration with the Cisco UCS domain
- Describe the systemwide parameters to set up a Cisco UCS domain, including monitoring, Quality of Service (QoS), and organizations to build up a management hierarchy in the 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 in Cisco UCS Manager. Describe the design of and best practices for naming conventions
- Describe the different policies you may set in the service profile to achieve and fulfill customer or application requirements
- Describe the Ethernet and Fibre Channel interface policies and additional network technologies
- Describe how to use templates to work more efficiently in Cisco UCS Manager

Prerequisites

Before taking this course, you should be able to:

- Describe data center networking concepts
- Describe data center storage concepts
- Describe data center virtualization
- Describe the Cisco Unified Computing System™
- Describe data center automation and orchestration focusing on Cisco Application Centric Infrastructure (Cisco ACI™) and Cisco UCS Director
- Identify products in the Cisco Nexus and MDS families
- Describe network fundamentals and build simple LANs, including switching and routing

To fully benefit from this course, you should have completed the following courses or obtained the equivalent level of knowledge:

- Introducing Cisco Data Center Networking (DCICN)
- Introducing Cisco Data Center Technologies (DCICT)
- Interconnecting Cisco Networking Devices: Accelerated (CCNAX), or Interconnecting Cisco Networking Devices, Part 1 (ICND1), and Interconnecting Cisco Networking Devices, Part 2 (ICND2)

Outline

- Data Center Network Connectivity Designs

- Describing High Availability on Layer 2
- Designing Layer 3 Connectivity
- Designing Data Center Topologies
- Designing Data Center Interconnects with Cisco OTV
- Designing a LISP Solution

- Data Center Infrastructure Design
  - Describing Hardware and Device Virtualization
  - Describing FEX Options
  - Describing Virtual Networking
  - Describing Basic Data Center Security
  - Describing Advanced Data Center Security
  - Describing Virtual Appliances
  - Describing Management and Orchestration
- Data Center Storage Network Design
  - Describing Storage and RAID Options
  - Describing Fibre Channel Concepts
  - Describing Fibre Channel Topologies
  - Describing FCoE
  - Describing Storage Security
  - Describing SAN Management and Orchestration
- Data Center Compute Connectivity Design
  - Describing Cisco UCS Servers and Use Cases
  - Describing Fabric Interconnect Connectivity
  - Describing Hyperconverged and Integrated Systems
  - Describing Management Systems
  - Describing Hadoop, SAP Hana, and IoT on Cisco UCS
- Data Center Compute Resource Parameters Design
  - Describing Cisco UCS Manager Systemwide Parameters
  - Describing Cisco UCS RBAC
  - Describing Pools for Service Profiles
  - Describing Policies for Service Profiles

- Describing Network-Specific Adapters and Policies
- Describing Templates in Cisco UCS Manager

Activity Outline

- Design Virtual Port Channels
- Design FabricPath
- Design FHRP
- Design Routing Protocols
- Design Data Center Topology for a Customer
- Design Data Center Interconnect Using Cisco OTV
- Design Your VXLAN Network
- Design a FEX
- Design a Cisco Nexus 1000V-Based Solution
- Design Management and Orchestration in Cisco UCS Solution
- Design a Fibre Channel Network
- Design and Integrate an FCoE Solution
- Design a Secure SAN
- Design Cisco UCS Director for Storage Networking
- Design Cisco UCS C-Series Servers Implementation
- Design a Cisco UCS Domain and Fabric Interconnect Cabling
- Design Cisco C-Series Integration with a Cisco UCS Domain
- Design a Cisco UCS Mini Solution
- Design Cisco UCS Fabric Interconnect Network and Storage Connectivity
- Design Systemwide Parameters in a Cisco UCS Solution
- Design an LDAP Integration with a Cisco UCS Domain
- Design Pools for Service Profiles in a Cisco UCS Solution
- Design Network-Specific Adapters and Policies in a Cisco UCS Solution

Troubleshooting Cisco Data Center Infrastructure (DCIT) v6.2

Course details

Objectives

After taking this course, you should be able to:

- Outline the troubleshooting process and highlight which questions to ask
- Describe troubleshooting tools and methodologies that are available from the Command-Line Interface (CLI) and are used to identify and resolve issues in a Cisco data center network architecture
- Identify and resolve issues related to VLANs and private VLANs, port channels and virtual port channels, Cisco FabricPath, Overlay Transport Virtualization (OTV), Virtual Extensible LAN (VXLAN), and Locator/ID Separation Protocol (LISP)
- Describe troubleshooting routing protocols such as Open Shortest Path First (OSPF), Intermediate System to Intermediate System (IS-IS), and Protocol Independent Multicast (PIM)
- Describe troubleshooting Authentication, Authorization, and Accounting (AAA) and Role-Based Access Control (RBAC)
- Identify and resolve issues related to a single device
- Identify and resolve issues related to Fibre Channel interface operation
- Identify and resolve issues related to Fibre Channel switching when the Cisco NX-OS software switch is in switched mode
- Identify and resolve issues related to Fibre Channel switching when the Cisco NX-OS software is in N-Port Virtualization (NPV) mode
- Identify and resolve issues related to FCoE Initalization Protocol (FIP) and Fibre Channel over Ethernet (FCoE), including FCoE performance
- Describe the Cisco UCS architecture, initial setup, tools, and service aids that are available for Cisco UCS troubleshooting and output interpretation
- Describe Cisco UCS configuration and troubleshoot related issues
- Describe Cisco UCS B-Series operation and troubleshoot related issues
- Describe LAN, SAN, and Fibre Channel operations, including in-depth troubleshooting procedures
- Describe Cisco Integrated Management Controller (IMC) utilities to validate performance and facilitate data-gathering activities for Cisco UCS C-Series troubleshooting, as well as troubleshooting hardware and firmware failures
- Define proper procedures to configure LAN and SAN connectivity and avoid issues with the P81E Virtual Interface Card (VIC)

- Troubleshoot integration of Cisco UCS C-Series servers with Cisco UCS Manager
- Identify tools, protocols, and methods to troubleshoot Cisco ACI

Prerequisites

Before taking this course, you should be able to:

- Configure, secure, and maintain LAN and SAN based on Cisco Nexus and MDS switches
- Configure, secure, and maintain Cisco UCS
- Configure, secure, and maintain Cisco ACI

To fully benefit from this course, you should have completed the following courses or obtained the equivalent level of knowledge:

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

Outline

- Troubleshooting the Data Center LAN Network
    - Overview of the Troubleshooting Process
    - Understanding CLI Troubleshooting Tools
    - Troubleshooting VLANs and Private VLANs
    - Troubleshooting Port Channels and Virtual Port Channels
    - Troubleshooting Cisco FabricPath
    - Troubleshooting Cisco OTV
    - Troubleshooting VXLAN
    - Troubleshooting LISP
    - Troubleshooting Routing Protocols
    - Troubleshooting Data Center LAN Security
    - Troubleshooting Platform-Specific Issues
- Troubleshooting Data Center SAN
    - Troubleshooting Fibre Channel Interfaces
    - Troubleshooting Fibre Channel Fabric Services
    - Troubleshooting NPV Mode

    - Troubleshooting FCoE
- Troubleshooting Data Center Unified Computing
    - Troubleshooting Cisco UCS Architecture and Initialization
    - Troubleshooting Cisco UCS Configuration
    - Troubleshooting Cisco UCS B-Series Servers
    - Troubleshooting Cisco UCS B-Series LAN and SAN Connectivity
    - Troubleshooting Cisco UCS C-Series Servers
    - Troubleshooting Cisco UCS C-Series LAN and SAN Connectivity
    - Troubleshooting Cisco UCS C-Series and Cisco UCS Manager Integration
- Troubleshooting Data Center ACI
    - Exploring the Tools and Methodology of Troubleshooting Cisco ACI

Lab outline

- Document the Network Baseline
- Troubleshoot LAN—RSTP
- Troubleshoot LAN—LACP
- Troubleshoot LAN—vPC
- Troubleshoot LAN—FabricPath
- Troubleshoot LAN—OTV
- Troubleshoot LAN—VXLAN
- Troubleshoot LAN—OSPF
- Troubleshoot LAN—FHRP
- Troubleshoot LAN—CFS
- Troubleshoot LAN—VRF
- Troubleshoot LAN—FEX
- Troubleshoot SAN—Fibre Channel Interfaces
- Troubleshoot SAN—Fibre Channel VSANs, Zones, and Domain Services
- Troubleshoot SAN—NPV Mode
- Troubleshoot SAN—FCoE
- Troubleshoot SAN—DCB
- Troubleshoot Compute—Cisco UCS Management and Service Profile Deployment
- Troubleshoot Compute—Cisco UCS Integrated C-Series Server Boot from SAN

- Troubleshoot Compute—LAN Connectivity, Part 1
- Troubleshoot Compute—LAN Connectivity, Part 2
- Troubleshoot Compute—Cisco UCS C-Series Server Boot from SAN
- Troubleshoot Compute—Network Connectivity
- Troubleshoot Cisco ACI—Bare-Metal Hosts
- Troubleshoot Cisco ACI—VMM
- Troubleshoot Cisco ACI—Contracts
- Troubleshoot Cisco ACI—External Layer 3
- Troubleshoot Cisco ACI—External Layer 2