

# Designing Cisco Data Center Infrastructure

DURATION: 5 DAYS

COURSE CODE: DCID

FORMAT: LIVE/VIRTUAL

## COURSE DESCRIPTION

The Designing Cisco Data Center Infrastructure (DCID) v7.0 course helps you master design and deployment options focused on Cisco® data center solutions and technologies across 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. You can expect theoretical content as well as design-oriented case studies in the form of activities.

This course helps you prepare to take the exam, Designing Cisco Data Center Infrastructure (300-610 DCID), which leads to the new CCNP® Data Center and the Cisco Certified Specialist - Data Center Design certifications.

This exam certifies your knowledge of data center infrastructure design including network, compute, storage network, and automation.

After you pass 300-610 DCID:

- You earn the Cisco Certified Specialist - Data Center Design certification
- You will have satisfied the concentration exam requirement for the new CCNP Data Center. To complete your CCNP Data Center certification, pass the Implementing and Operating Cisco Data Center Core Technologies (300-601 DCCOR) exam or its equivalent

This course will help you:

- Make design choices for optimal data center infrastructure performance, virtualization, security, and automation
- Master the practical and theoretical knowledge necessary to design a scalable, reliable, and intelligent data center based on Cisco technologies
- Qualify for professional-level job roles in the high-demand area of enterprise-class data center environments

## PREREQUISITES

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

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

- Understanding Cisco Data Center Foundations (DCFNDU)
- Implementing and Administering Cisco Networking Technologies (CCNA®)
- Implementing Cisco Data Center Core Technologies (DCCOR)

## WHO SHOULD ATTEND

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

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

## LEARNING 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 hyperconverged 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

## COURSE OUTLINE

### 1. Describing High Availability on Layer 2

- Overview of Layer 2 High-Availability Mechanisms
- Virtual Port Channels
- Cisco Fabric Path
- Virtual Port Channel+

### 2. Designing Layer 3 Connectivity

- First Hop Redundancy Protocols
- Improve Routing Protocol Performance and Security
- Enhance Layer 3 Scalability and Robustness

### 3. Designing Data Center Topologies

- Data Center Traffic Flows
- Cabling Challenges
- Access Layer
- Aggregation Layer
- Core Layer
- Spine-and-Leaf Topology
- Redundancy Options

### 4. 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

### 5. 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

### 6. 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

### 7. Describing Hardware and Device Virtualization

- Hardware-Based High Availability
- Device Virtualization
- Cisco UCS Hardware Virtualization
- Server Virtualization
- SAN Virtualization
- N-Port ID Virtualization

### 8. 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

### 9. 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)

### 10. 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

### 11. Describing Management and Orchestra

- Network and License Management
- Cisco UCS Manager
- Cisco UCS Director
- Cisco Intersight
- Cisco DCNM Overview

### 12. 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

### 13. Describing Fibre Channel Concepts

- Fibre Channel Connections, Layers, and Addresses
- Fibre Channel Communication
- Virtualization in Fibre Channel SAN

### 14. Describing Fibre Channel Topologies

- SAN Parameterization
- SAN Design Options
- Choosing a Fibre Channel Design Solution

## COURSE OUTLINE

### 15. Describing FCoE

- FCoE Protocol Characteristics
- FCoE Communication
- Data Center Bridging
- FCoE Initialization Protocol
- FCoE Design Options

### 16. Describing Storage Security

- Common SAN Security Features
- Zones
- SAN Security Enhancements
- Cryptography in SAN

### 17. 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

### 18. 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

### 19. 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

### 20. 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

### 21. Describing Cisco UCS Manager System-wide Parameters

- Cisco UCS Setup and Management
- Cisco UCS Traffic Management

### 22. Describing Cisco UCS RBAC

- Roles and Privileges
- Organizations in Cisco UCS Manager
- Locales and Effective Rights
- Authentication, Authorization, and Accounting
- Two-Factor Authentication

### 23. 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

### 24. 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

### 25. Describing Network-Specific Adapters and Policies

- LAN Connectivity Controls
- SAN Connectivity Controls
- Virtual Access Layer
- Connectivity Enhancements

### 26. Describing Templates in Cisco UCS Manager

- Cisco UCS Templates
- Service Profile Templates
- Network Templates

### 27. Designing Data Center Automation

- Model-Driven Programmability
- Cisco NX-API Overview
- Programmability Using Python
- Cisco Ansible Module
- Use the Puppet Agent

## DISCOVERY LABS

- 1: Design Virtual Port Channels
- 2: Design First Hop Redundancy Protocol (FHRP)
- 3: Design Routing Protocols
- 4: Design Data Center Topology for a Customer
- 5: Design Data Center Interconnect Using Cisco OTV
- 6: Design Your VXLAN Network
- 7: Create a Cisco FEX Design
- 8: Design Management and Orchestration in a Cisco UCS Solution
- 9: Design a Fibre Channel Network
- 10: Design and Integrate an FCoE Solution
- 11: Design a Secure SAN
- 12: Design Cisco UCS Director for Storage Networking
- 13: Design a Cisco UCS Domain and Fabric Interconnect Cabling
- 14: Design a Cisco UCS C-Series Server Implementation
- 15: Design Cisco UCS Fabric Interconnect Network and Storage Connectivity
- 16: Design System-wide Parameters in a Cisco UCS Solution
- 17: Design an LDAP Integration with a Cisco UCS Domain
- 18: Design Pools for Service Profiles in a Cisco UCS Solution
- 19: Design Network-Specific Adapters and Policies in a Cisco UCS Solution