

Course Name: Cisco Certified Internetwork Expert Data Center (CCIE Data Center – Version2)

Course Time: 100 Hrs.

Course Prerequisites: Professional Routing and Switching

Course Outline:

➤ **CCIE Data Center – Version2**

Course Outline:

➤ **VDCs**

- Virtual Device Contexts (VDCs)
- Implementing VDCs
- Allocating VDC Interfaces
- Limiting VDC Resources
- Moving Between VDCs & VDC Management
- VDC User Rights, High Availability & Verification

➤ **Nexus Fabric Extenders (FEX)**

- Fabric Extenders [FEX]
- Nexus 2000 FEX Overview
- FEX Configuration, FEX and STP
- Cisco Integrated Management Controller
- Using the Cisco Integrated Management Controller [CIMC]
- FEX Configuration
- Configuring Fabric Extenders
- vPC and FEX Design Variations
- Host vPC & Fabric vPC
- Enhanced vPC

➤ **Nexus Virtual Port Channels (vPC)**

- Introduction
- Virtual Port-Channels (vPC) Overview
- Implementing Virtual Port-Channels in NX-OS
- How MLAG Works
- vPC High Level Components
- NX-OS vPC Verifications
- Implementing vPC
- Back-to-Back vPC
- vPC Peer Switch
- vPC Failure Detection & Recovery
- vPC Failure Detection & Recovery Overview
- Correct vPC Failure Order of Operations
- vPC Initialization Order of Operations
- vPC Consistency Check
- vPC Orphan Ports
- vPC Peer Link Failure
- Peer Keepalive & Peer Link Fate Sharing
- Peer Keepalive & Peer Link Path Diversity
- vPC Peer Link Failure & Orphan Isolation

- vPC Peer Link Failure & Northbound Routing
- vPC & FHRPs
- vPC Peer Gateway

➤ **Nexus FabricPath**

- FabricPath Overview
- 3 Tier Design Issues Review
- FabricPath
- Implementing Basic FabricPath
- FabricPath Configuration
- FabricPath Verifications
- FabricPath and STP Interaction
- FabricPath and STP Interaction
- FabricPath and STP Traffic Engineering
- vPC+
- Anycast HSRP
- FabricPath Multi-Topology Routing
- Implementing FabricPath IS-IS MTR
- FabricPath Features
- FabricPath Multidestination Trees
- Modifying & Verifying MDT Election
- FabricPath Authentication
- Implementing FabricPath Authentication
- FabricPath IS-IS Overload Bit
- BFD & over FabricPath

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➤ **Overlay Transport Virtualization (OTV) on NX-OS**

OTV Course Overview

Why Use OTV?

OTV vs Other DCIs

How OTV Works

OTV Terminology

OTV Control Plane

OTV Data Plane & Adjacency Server

Configuring OTV

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OTV Prerequisites

- OTV Order of Operations
- Verifying OTV
- Common OTV Verifications
- OTV with Multicast Transport
- OTV with Unicast Transport
- OTV with Unicast Transport Adjacency Server Topology
- OTV with Unicast Transport Adjacency Server Configuration
- OTV High Availability
- OTV HA Considerations & AED Node High Availability
- Recovering from AED Node Failure
- Tuning AED Node Failure Detection
- Layer 3 Multicast HA for AEDs & Adjacency Server HA
- OTV & First Hop Redundancy Protocols (FHRP) Localization
- Locator/ID Separation Protocol (LISP)
- Locator/ID Separation Protocol (LISP) Overview
- What Is LISP?
- Why LISP?
- LISP Terminology
- Implementing LISP on Cisco NX-OS
- ACI to VXLAN BGP EVPN Over OTV with LISP Mobility

➤ **Implementing Unified Computing System (UCS)**

- UCS Course Overview
- Implementing UCS Introduction
- UCS Blade Server Components
- High Level Components
- Basic Initialization
- UCS Manager Initialization
- Initialization Workflow
- UCS - OS Installation to Remote Storage
- UCS - OS Installation to Remote Storage
- Remote Storage Variations & Virtual Media
- UCS LAN Connectivity
- Blade to 10M Pinning & UCS FI Cluster Links
- Logical View & VN-Link vs. VN-Tag
- LAN Connectivity & LAN Connectivity - EHM
- LAN Connectivity Example
- UCS Disjoint Layer 2 LAN Connectivity
- Disjoint Layer 2 Solutions
- UCS LAN Connectivity - Ethernet Port Channels
- Hardware Topology - UCS B Series
- UCS LAN connectivity fabric Failover
- Logical View - FIs, 10Ms, & Blades
- UCS LAN Connectivity vNIC Templates
- LAN Connectivity vNIC Templates
- UCS Service Profile Templates
- UCS Server Pools & Qualification Policies
- UCS Server Pools
- UCS Address Pools
- UCS Policies

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- UCS Firmware Management
- UCS Backup & Restore

➤ **Storage Area Networking (SAN) Switching on NX-OS**

- Storage Area Networking
- Storage Area Networking Overview
- Storage Area Networking Hardware Components
- Storage Area Networking Hardware Components
- Cisco Storage Platforms
- Host bus Adapters (HBAs)
- Fibre Channel Protocol
- Fibre Channel Overview
- Fibre Channel Port Types
- Fibre Channel Addressing, FC World Wide Names, and FC Identifiers
- Fibre Channel Domain IDs and Routing
- Fibre Channel Logins, FLOGI, PLOGI, & PLRI
- Zoning
- Virtual SANs (VSANs)
- SAN Port Channeling
- UCS C Series and B Series SAN Connectivity
- UCS C Series and B Series SAN Connectivity
- Unified Ports on Nexus 5000 and UCS B Series Fabric Interconnects FCoE over Enhanced vPC Overview
- FCoE over EvPC Configuration
- SAN Port-Channels
- FCoE on UCS B Series
- Unified Port-Channels
- Multihop FCoE
- Zoning & Device Aliases

➤ **Virtual Extensible LAN (VXLAN) on Nexus NX-OS**

- Course Overview
- VXLAN Overview
- VXLAN Terminology
- VXLAN Encapsulation
- Basic VXLAN Workflow
- VXLAN Configuration
- VXLAN Configuration Prerequisites
- VXLAN Flood & Learn on NX-OS
- Implementing VXLAN BGP EVPN on NX-OS
- VXLAN BGP EVPN Prerequisites
- VXLAN BGP EVPN Configuration Steps
- VXLAN BGP EVPN Verification
- VXLAN Configuration & Verification Review
- VXLAN BGP EVPN Configuration & Verification Review
- Inter-VXLAN Routing
- Asymmetric vs. Symmetric IRB
- How Symmetric IRB Works
- vPC & VXLAN BGP EVPN vPC & VXLAN BGP Traffic Flow Problems
- vPC Anycast VTEP Configuring NVE Peer-Link-VXLAN

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- VXLAN Underlay Fabric Unicast High Availability
- Bidirectional Forwarding Detection (BFD)
- Bidirectional Forwarding Detection (BFD) Overview
- Configuring BFD on NX-OS
- VXLAN Underlay Fabric Multicast High Availability
- VXLAN Underlay Fabric Convergence & Tuning PIM Convergence
- PIM RP Redundancy
- Anycast RP
- Phantom RP
- VXLAN BGP EVPN External Layer 3 Connectivity
- External Routing for VXLAN BGP EVPN, Border Leafs & Considerations
- External Routing for VXLAN BGP EVPN Configuration

➤ **Application Centric Infrastructure (ACI)- Network Centric Mode**

- Course Overview
- ACI Introduction
- What is ACI?
- Nexus 9000 ACI Switches
- APIC Controllers
- ACI Network Topology
- Class ACI Topology
- Managing the ACI Fabric & ACI Behind the Scenes
- ACI Fabric Initialization
- Initializing Fabric & Connecting to APIC via CIMC SOL
- Navigating the APIC GUI
- Discovering The Fabric & Viewing the Topology from the GUI
- Connecting to Nodes & Verifying Underlay Routing from CLI
- ACI Virtual Port Channels (vPC)
- Configuring Fabric Access Policies
- Creating and Verifying a vPC
- ACI Tenants
- Tenant Overview and Hierarchy
- Tenant Components
- Tenant Hierarchy
- Layer 2 Access Ports on ACI
- ACI Object Workflow
- Inter EPG Communication in ACI
- Inter End Point Group (EPG)
- Layer 2 Trunk Ports on ACI (L2Out)
- Extending Bridge Domain Outside ACI
- Extending Bridge Domain Outside ACI (L2Out)
 - STP and L2out
 - STP and L2out in ACI
- Connecting ACI to External Layer3 Networks (L3out)
 - ACI External Layer 3 Routing with OSPF
 - ACI External Layer 3 Routing with EIGRP
 - ACI External Layer 3 Routing with BGP