Configuring Cisco Nexus 7000 Series Switches
DCNX7K v3.0; 5 Days, Instructor-led

Course Description
The Configuring Cisco Nexus 7000 Switches (DCNX7K) v3.0 course is a 5-day ILT training program that is designed for systems and field engineers who install and implement Cisco Nexus 7000 Series Switches. This course covers the key components and procedures you need to know to configure, manage, and troubleshoot the Cisco Nexus 7000 Series Switch platform.

Configuring Cisco Nexus 7000 Switches (DCNX7K) v3.0 prepares you for implementing a Cisco Nexus 7000 Series Switches in the data center solution.

This update to the course will include coverage of new features introduced in Cisco NX-OS 6.2 and will also include introductory coverage of Cisco Nexus Series Switches.

A certification exam is not associated with this course, and Channel Partner deployment engineers will use this training as augmentation to the DCUFI course material to provide in-depth experience in implementing the Cisco Nexus 7000 Series Switches features.

The course focuses on the product hardware, its architecture, key features, and market differentiators, with extensive feature configuration and hands on labs.

At Course Completion
After completing this course the student should be able to:

- Identify the specific products that make up the Cisco Nexus product families and provide a high level overview of their features and common deployment models.
- You will also be able to recognize the advanced data center class features and functionality of the Cisco Nexus 7000 Series Switch. Common network architectures implemented using the products and features of the Cisco Nexus product family will also be presented.
- Cisco Nexus 7000 Series Switch hardware components, like the chassis, supervisor, and line cards, determine the device features and role in data center architecture. In this module, you will learn to identify the chassis and components of the Cisco Nexus 7000 Switch. You will also describe the Cisco Nexus 7000 and 7700 Series packet flow, and the VOQ operation.
- Provide an overview of the Cisco Nexus 2000 hardware and support of the Cisco Nexus 2000 with Cisco Nexus 7000 Series.
- Describe how to perform hardware installation, verify and troubleshoot system hardware of the Cisco Nexus 7000 Series Switches.
- Understand the architecture, usage, high availability, and licensing features of the Cisco NX-OS Software.
- You will learn how to use the management features that are available on the Cisco Nexus 7000 Series Switch, and how to configure those features to support the management infrastructure requirements. You will also learn these troubleshooting process basics and available tools.
- Describe Cisco Prime DCNM management tool that can be implemented to manage Cisco Nexus 7000 Series Switches in a consolidated network environment.
- Describe the concept of Cisco Cisco Dynamic Fabric and how it is used on Cisco Nexus 7000 Series Switches.
- Describe the purpose, architecture, and use of VDCs on the Cisco Nexus 7000 Series Switch; configure and verify its operation.
- Describe and configure the Layer 2 switching and related features on the Cisco Nexus 7000 Series Switch.
- Describe the port channel configuration, the concept of vPC and how to configure and troubleshoot vPCs on the Cisco Nexus 7000 Series Switch.
- Understand the operation of Cisco FabricPath and how it can be utilized and configured to build scalable and highly available Layer 2 networks on the Cisco Nexus 7000 Series Switch.
- Describe and configure the Layer 3 switching features on the Cisco Nexus 7000 Series Switch, and how to manage the routes and IP traffic through the use of the Route Policy Manager and policy-based routing.
- Describe MPLS features that are available on Cisco Nexus 7000 Series Switches and configure MPLS, MPLS Layer 2 and Layer 3 Virtual Private Networks (VPNs) and MPLS Traffic Engineering (TE).
- Describe basic and advanced Cisco OTV features on the Cisco Nexus 7000 Series Switch. Iso Also describe how to configure the OTV and some of the advanced OTV features that are available on the Cisco Nexus 7000 Series Switches.
- Describe the concept, use, and configuration of the Locator/ID Separation Protocol (LISP) on the Cisco Nexus 7000 Switch.
- Describe FCoE and FCoE features on the Cisco Nexus 7000 Series Switch; configure and verify their operation.
- Describe the security features that are available on the Cisco Nexus 7000 Series Switch; configure and verify their operation.
- Describe the QoS features that are available on the Cisco Nexus 7000 Series Switches; configure and verify their operation.
- Describe the concept of the Intelligent Traffic Director feature and how to configure and verify ITD on Cisco Nexus 7000 Series Switches.

Audience
The primary audience for this course is as follows:
- Network engineers and systems engineers

The secondary audience for this course is as follows:
- Network designers, network administrators, and network managers

Prerequisites
- Good understanding of data center technologies, networking protocols, routing, and switching
- Recommended CCNA Data Center Certification
- Recommended attendance at the Implementing Cisco IP Routing (ROUTE) class
- Recommended attendance at the Implementing Cisco IP Switched Networks (SWITCH) class
Course Outline

Module 1: Cisco Nexus 7000 Series Switches

Lesson 1: Describing the Cisco Nexus Product Family
- Cisco Unified Fabric: Trends in the Data Center
- Cisco Nexus Product Family
- Cisco Nexus 7000 Series Switch

Lesson 2: Describing the Cisco Nexus 7000 Series Switch Deployment Models
- Data Center Architecture Design Evolution
- Single-Layer Data Center Models
- Multitier Data Center Model
- Scalable Spine-Leaf Data Center Fabric

Module 2: Cisco Nexus 7000 Series Switch Hardware

Lesson 1: Describing the Cisco Nexus 7000 and 7700 Series Switch Chassis
- Cisco Nexus 7000 and 7700 Series Switch Common Foundation
- Cisco Nexus 7000 Series Switch Chassis Family
- Cisco Nexus 7700 Series Switch Chassis Family
- Key Chassis Components
- Cisco Nexus 7000 Series Switch Power Supplies
- Fan Cooling

Lesson 2: Describing Cisco Nexus 7000 Series Switch Supervisor, I/O, and Fabric Modules
- Supervisor Modules
- Cisco Nexus 7000 Series Switch Product Identification Scheme
- Cisco Nexus 7000 and 7700 Series Switch I/O Module Families
- Cisco Nexus 7000 Series Switch M1 and M2 I/O Modules
- Cisco Nexus 7000 Series Switch F2, F2E, and F3 I/O Modules
- I/O Modules Forwarding Engine
- Cisco Nexus 7000 and 7700 Series Switch I/O Module Scalability
- Crossbar Switch Fabric Modules
- Cisco Nexus 7000 Series Network Analysis Module
- Hardware High-Availability Features

Lesson 3: Describing Cisco Nexus 7000 Series Switch Forwarding and Packet Flow
- Virtual Output Queuing
- Packet Flow and Arbitration
- Layer 2 and Layer 3 Forwarding

Module 3: Cisco Nexus 2000 Series Fabric Extender

Lesson 1: Describing Cisco Nexus 2000 Series Fabric Extender Hardware
- Cisco FEX Technology
- Cisco Nexus 2000 Series Fabric Extender Models

Lesson 2: Describing Cisco Nexus 2000 Series Fabric Extender Support on Cisco
- Nexus 7000 Series Switches
Module 4: Cisco NX-OS Software
Lesson 1: Describing Cisco NX-OS Architecture, Key Features, and Capabilities
- Cisco NX-OS Software Architecture
- Cisco NX-OS High-Availability Infrastructure Components
- Cisco NX-OS Software Key Features
- Cisco IOS to NX-OS Conversion tool
- Verify Hardware Installation using show Commands
- Troubleshoot Common Hardware Issues

Lesson 2: Describing the Cisco Nexus 7000 Series Licensing Model
- Cisco NX-OS Software Licensing for Cisco Nexus 7000 Series
- Obtaining and Installing the License Key File

Module 5: Cisco Nexus 7000 Series Switch Administration, Management, and Troubleshooting
Lesson 1: Using Cisco Nexus 7000 Series Switch Management Interfaces and Setup Utilities
- Cisco Nexus 7000 Series Switch CLI and GUI Management Interfaces
- Cisco NX-OS Setup Utility Power On Auto Provisioning

Lesson 2: Managing Cisco Nexus 7000 Series Switch User Access with Cisco NXOS
- Cisco NX-OS User Management
- User Account and Role Configuration
- Password Recovery Procedure
- AAA Configuration for Integration with RADIUS, TACACS+, and LDAP

Lesson 3: Configuring Cisco Nexus 7000 Series Switch System Management Features
- System Management Features
- Secure Shell
- SNMP
- The XML Interface
- Cisco Fabric Services
- Cisco Smart Call Home
- Scheduler
- NTP and PTP
- Pong Service
- Cisco NX-OS IP SLA
- Configuration Backup and Restore
- In-Service Software Upgrades and Downgrades
- Cisco NX-OS Image Recovery
- EPLD Image Upgrade
Lesson 4: Using Troubleshooting Processes and Tools
- Troubleshooting Process
- Cisco NX-OS Tools
- Embedded Ethanalyzer
- SPAN and ERSPAN
- NetFlow
- System Message Log Configuration
- Configuring Online Diagnostics
- Using the OBFL Feature
- Configuring RMON
- Configuring Cisco EEM
- Embedded Logic Analyzer Module

Lesson 5: Troubleshooting Memory and Packet Flow Issues
- Evaluating Memory Using the Built-in Platform Monitoring Tool
- Evaluating Platform Memory Utilization on a High Level
- Evaluating Platform Memory Utilization on a Detailed Level
- Troubleshooting Packet Flow Issues

Lesson 6: Describing the Cisco Nexus 7000 Series NAM-NX1
- Cisco Network Analysis Module
- Lesson 7: Describing Cisco RISE
- Cisco RISE Overview

Module 6: Cisco Prime DCNM
Lesson 1: Describing Cisco Prime DCNM
- Cisco Prime DCNM
- Cisco Prime DCNM Components
- Cisco Prime DCNM Licensing
- Cisco Prime DCNM Features

Module 7: Virtual Device Contexts on Cisco Nexus 7000 Series Switches
Lesson 1: Describing Virtual Device Contexts
- Virtual Device Contexts
- Virtualization Hierarchy
- Communicating Between VDCs
- Virtualization Scalability
- VDC Types
- VDC Resources
- VDC Management

Lesson 2: Configuring VDCs
- VDC Licensing Overview
- VDC Guidelines and Limitations
- Configure VDCs
- Verify VDCs
• Allocate VDC Resources
• Configure Resource Templates

**Lesson 3: Describing Management Settings for VDCs**
• Management Settings for Virtual Device Contexts
• Allocate Interfaces to a VDC
• VDC Navigation
• Manage VDC Configurations
• Nondefault VDC Suspension and Reload
• VDC High-Availability Policies

**Module 8: Layer 2 Switching Features on Cisco Nexus 7000 Series Switches**

**Lesson 1: Describing and Configuring Security Features**
• Configure Basic Interface Parameters
• Dedicated vs. Shared Mode
• UniDirectional Link Detection

**Lesson 2: Configuring Cisco Nexus 2000 Series Fabric Extenders**
• Configure Cisco Nexus 2000 Series Fabric Extenders
• Configure FEX Layer 2 Interfaces
• Configure FEX Layer 3 Interfaces
• Verify Cisco Nexus 2000 Series Fabric Extenders Configuration

**Lesson 3: Configuring VLANs and Advanced VLAN Features**
• Configure Layer 2 Interfaces
• Configure VLANs
• Port Profiles
• Configure VTP
• Configure Private VLANs
• Configure MVRP

**Lesson 4: Configuring STP and STP Extensions**
• STP Overview and Configuration
• Configure STP Extensions
• Lesson 5: Configuring Q-in-Q
• Q-in-Q VLAN Tunnels
• Configure Q-in-Q VLAN Tunnels

**Module 9: Port Channels and Virtual Port Channels on Cisco Nexus 7000 Series Switches**

**Lesson 1: Describing Port Channels**
• Port Channel Operation
• Configure Layer 2 and Layer 3 Port Channels
• Verify Port Channels
• Configure Port Channel Load Balancing

**Lesson 2: Describing vPCs**
vPC Concept and Benefits
vPC Architecture
vPC Control and Data Plane Operation
vPC Peer Link Failure
vPC Peer Switch
Layer 3 and vPC Interactions
Supported Layer 3 and vPC Designs
vPC and FHRPs
Multicast with vPC

Lesson 3: Configuring vPCs
vPC-Supported Hardware
Configure vPCs
Verify the vPC
Optimizing vPCs

Lesson 4: Troubleshooting vPC
Initial Troubleshooting Checklist
Troubleshoot vPC Initialization
Troubleshoot vPC Peer Keepalives
Troubleshoot vPC Cisco Fabric Services
Troubleshoot Common vPC Issues

Module 10: Cisco FabricPath on Cisco Nexus 7000 Series Switches
Lesson 1: Describing Cisco FabricPath Architecture
Cisco FabricPath Architecture
Cisco FabricPath MAC Address Learning
Basic Cisco FabricPath Data Plane Operation
Cisco FabricPath Interaction with Spanning Tree
Cisco FabricPath and IP Multicast Routing
Virtual Port Channel+
vPC+ and HSRP
Anycast HSRP
Cisco Fabric Extenders with Cisco FabricPath

Lesson 2: Configuring Cisco FabricPath
Cisco FabricPath on Cisco Nexus 7000 Series Switches
Configure Cisco FabricPath
Configure vPC+

Lesson 3: Troubleshooting Cisco FabricPath
Troubleshooting Cisco FabricPath
Cisco FabricPath Pong

Module 11: Cisco DFA
Lesson 1: Describing Cisco DFA Architecture
Module 12: Layer 3 Switching Features on Cisco Nexus 7000 Series Switches

Lesson 1: Describing the Cisco NX-OS Forwarding Architecture
- Cisco NX-OS Routing and Forwarding
- Unicast and Multicast RIB and FIB

Lesson 2: Configuring Routing Protocols
- Routing Protocol Configuration Overview
- Configure Static Route
- Configure OSPF
- Configure EIGRP Configuration
- Configure IS-IS
- Configure BGP

Lesson 3: Describing and Configuring Route Policy Manager and PBR
- Configure Route Policy Manager
- Configure PBR

Lesson 4: Configuring Layer 3 Virtualization
- Layer 3 Virtualization Overview
- Lesson 5: Configuring FHRP Protocols
- Configure HSRP
- Configure VRRP
- Configure GLBP

Lesson 6: Describing and Configuring BFD
- BFD Overview
- BFD on Cisco Nexus 7000 Series Switches
- Configure BFD

Lesson 7: Configuring Multicast
- Configure Multicast

Module 13: MPLS on Cisco Nexus 7000 Series Switches

Lesson 1: Describing MPLS
- Multiprotocol Label Switching Overview
- Layer 3 Unicast VPN
- Layer 2 VPN
• MPLS Traffic Engineering

Lesson 2: Configuring MPLS on Cisco Nexus 7000 Switches
• MPLS on Cisco Nexus 7000 Series Switches
• Configure the MPLS Feature Set
• Configure MPLS LDP

Lesson 3: Configuring MPLS Layer 3 VPNs
• MPLS Layer 3 VPNs General Configuration Steps
• Configure MPLS in the Core
• Configure MPLS Layer 3 VPN Customers

Lesson 4: Configuring MPLS Layer 2 VPNs
• MPLS Layer 2 VPN Features on Cisco Nexus 7000 Series Switches
• MPLS Layer 2 VPNs General Configuration Steps
• Configure the MPLS Layer 2 VPN Feature
• Configuration Example: EoMPLS
• Configuration Example: VPLS

Lesson 5: Configuring MPLS TE
• Configure MPLS TE

Module 14: Cisco OTV on Cisco Nexus 7000 Series Switches
Lesson 1: Describing Cisco OTV
• Cisco OTV Overview
• Cisco OTV Terminology
• Cisco OTV Control Plane
• Cisco OTV Data Plane
• Cisco OTV Unicast-Only Transport Infrastructure
• Cisco OTV Data Plane Encapsulation
• Spanning Tree and Cisco OTV
• Unknown Unicast and Cisco OTV
• ARP Traffic Control
• Multihoming
• FHRP Isolation
• Cisco OTV and QoS
• Cisco OTV Fast Convergence

Lesson 2: Configuring Basic Cisco OTV
• Cisco OTV Guidelines
• Configure Basic Cisco OTV
• Verify Cisco OTV

Lesson 3: Configuring Cisco OTV Advanced Features
• Configure Cisco OTV Authentication
• Configure FHRP Isolation
• Configure a Dedicated Broadcast Group
• Configure OTV VLAN Translation
• Configure OTV Fast Convergence and Fast Failure Detection
• Configure OTV Tunnel Depolarization with Secondary IP

Module 15: LISP on Cisco Nexus 7000 Series Switches
Lesson 1: Describing LISP
• Locator/ID Separation Protocol
• LISP VM Mobility
• LISP ESM Multihop Mobility
• LISP VPN Virtualization
• Lesson 2: Configuring LISP on Cisco Nexus 7000 Series Switches
• LISP on Cisco Nexus 7000 Series Switches
• General LISP Configuration Steps
• Configure LISP Infrastructure
• Configure LISP Site Devices
• Configure LISP Internetworking Devices
• Configure LISP VM Mobility

Module 16: FCoE on Cisco Nexus 7000 Series Switches
Lesson 1: Describing FCoE
• Fiber Channel over Ethernet
• FCoE Requirements
• Data Center Bridging
• Fibre Channel Forwarder and Fibre Channel Bridge
• FCoE Addressing Scheme
• FCoE Initialization Protocol
• FCoE Port Types
• FCoE Design
• Multihop FCoE Design
• Lesson 2: Describing FCoE Support on Cisco Nexus 7000 Series Switches
• FCoE Requirements
• Storage VDC
• Supported FCoE Ports

Lesson 3: Configuring FCoE on Cisco Nexus 7000 Series Switches
• FCoE Configuration Steps
• Licensing an FCoE Module
• Enable FCoE
• Create a Dedicated Storage VDC
• Allocate Shared Interfaces
• VSAN-to-VLAN Mapping
• Create a Virtual Fibre Channel Interface
• Verify a Virtual Interface
• Configure Multihop FCoE
• Configure a Virtual Fibre Channel Port Channel Interface
• Configure the FC-MAP

Module 17: Security Features on Cisco Nexus 7000 Series Switches
Lesson 1: Describing and Configuring Security Features
• Security Features
• Integrated Intrusion Detection Security
• Configure ACLs
• Configure Port Security
• Configure DHCP Snooping
• Configure DAI
• Configure IP Source Guard
• Configure uRPF
• Configure Traffic Storm Control
• Configure CoPP

Lesson 2: Describing and Configuring Cisco TrustSec on Cisco Nexus 7000 Series Switches
• Cisco TrustSec Overview
• Cisco TrustSec on Cisco Nexus 7000 Series Switches
• Configure Cisco TrustSec

Module 18: QoS on Cisco Nexus 7000 Series Switches
Lesson 1: Describing QoS in the Data Center
• QoS in the Data Center
• Diversity of Data Center Application Flows
• Data Center QoS Requirements
• Priority Flow Control
• Priority-Based Bandwidth Management
• DCBX Protocol

Lesson 2: Configuring QoS on the Cisco Nexus 7000 Series Switches
• QoS on the Cisco Nexus 7000 Switch
• Configure Queuing and Scheduling on M Series I/O Modules
• Configure Network QoS, Queuing and Scheduling, and Priority Flow
• Control on F Series Modules
• Monitoring QoS Statistics

Module 19: Cisco ITD on Cisco Nexus 7000 Series Switches
Lesson 1: Describing Cisco ITD
• Cisco ITD: Multiterabit Load Balancing with Cisco Nexus 7000 Series Switches
• Cisco ITD Deployment Models

Lesson 2: Configuring Cisco ITD
• Configure Cisco ITD
• Cisco ITD Verification

Lab Outline
Challenge 1: Cisco Nexus 7000 Platform Discovery
Management Connectivity
Validation
Interface Configuration
Layer 3 Connectivity
Checkpoints and Rollback
Challenge 2: Configuring User Management
Management Connectivity
AAA Server
AAA
Users and Roles
Challenge 3: Configuring System Management
Management Connectivity and Preparation
Cisco Fabric Services
Scheduler
Cisco Smart Call Home
Cisco DCNM
Challenge 4: Configuring Troubleshooting Features
Management Connectivity
RMON
EEM
SPAN
Challenge 5: Configuring Layer 2 Switching
Management Connectivity
Configure the Cisco Nexus 5000 Switch Interfaces
Configuring Layer 2 Interfaces and Rapid PVST+
Using STP Enhancements
Implementing and Verifying MST
Implementing and Verifying Q-in-Q Tunnels
Challenge 6: Configuring vPC
Management Connectivity and Preparation
vPC Domain
vPC Keepalive Link
vPC Peer Link
vPC Configuration and Optimization
FEX Configuration
Challenge 7: Configuring Cisco FabricPath
Management Connectivity and Preparation
Configure Cisco FabricPath and FabricPath Interfaces and VLANs
Configure the vPC+
Challenge 8: Troubleshooting vPCs and Cisco FabricPath
Troubleshooting Ticket TT1-vPC
Identify the Problem
Resolve the Problem
Troubleshooting Ticket TT2-FP
Identify the Problem
Resolve the Problem
Challenge 9: Configuring Layer 3 Switching
Management Connectivity and Preparation
Configuring VRF with Static Routing
Configuring VRFs with OSPFv2
Configuring VRFs and EIGRP
Configuring BGP
Challenge 10: Configuring FHRP (Optional)
Management Connectivity and Preparation
Configure HSRP
Virtual Router Redundancy Protocol
Gateway Load Balancing Protocol
Challenge 11: Configuring MPLS
Management Connectivity and Preparation
Configure Basic MPLS
Configure MPLS Layer 3 VPNs
Configure MPLS Traffic Engineering
Challenge 12: Configuring Cisco OTV
Management Connectivity and Preparation
Configuring Basic Cisco OTV
Configuring Advanced OTV
Challenge 13: Configuring LISP
Management Connectivity and Preparation
Configure LISP
Configure LISP VM Mobility
Challenge 14: Configuring FCoE
Management Connectivity and Preparation
Basic Configuration on the Cisco MDS Switch
Configuring FCoE on the Cisco Nexus 5000 Switch
Challenge 15: Configuring Security Features (Optional)
Management Connectivity and Preparation
Configuring ACLs
Configuring Port Security
Configuring Traffic Storm Control
Configuring 802.1ae Data Encryption
Challenge 16: Configuring QoS (Optional)
Management Connectivity and Preparation
Configuring Class Maps
Configuring Policy Maps
Configuring Service Policies