DCAC9K - Cisco Data Center Application Centric Infrastructure v1.0

Learn to manage and Implement the Cisco Nexus 9000K Switches in ACI mode.

This course is a five-day training program designed for systems and field engineers who manage and implement the Cisco Nexus 9000 Switches in ACI mode. In this course, you will learn the key components and procedures that you need to know to configure and manage Cisco Nexus 9000 Switches in ACI mode, and how to connect the ACI Fabric to external networks and services.

What You'll Learn

- Cisco Nexus 9000 Series Switch ACI
- ACI fabric
- Cisco Nexus 9000 Series Switch hardware
- Configure the ACI controller (APIC)
- Configure ACI L4-L7 service integration
- Integrate the APIC hypervisor
- Programmability and orchestration of the ACI network
- ACI connectivity to outside networks
- Implement ACI management
- Migration options with ACI

Who Needs to Attend

- Network and data center cloud systems architects, as well as server administrators
- Application developers and security engineers as well as virtualization administrators

Prerequisites

- Good understanding of the VMware environment
- Good understanding of networking protocols (CCNA Certification or equivalent knowledge is recommended)

Course Outline

1. Cisco Application Infrastructure Overview

- Describing the Cisco Nexus 9000 Series Switch in ACI Mode
  - Review ACI concepts and principles
  - Describe policy and the ACI policy model in particular
  - Differentiate between the policy and the network
  - Define application logic through policy
  - Describe provider and consumer relationships
  - Understand how to automate infrastructure through policy
  - Review policy instantiation
  - List the advantages of policy-driven data center design
- Describing the ACI Fabric
  - Describe spine/leaf single-site topology
  - Describe ACI management networks
  - Describe fabric initialization and discovery using LLDP
  - Describe extended VXLAN
  - Describe integrated overlay with host/32 routing
  - Describe unicast forwarding
  - Describe multicast forwarding
  - Describe distributed Layer 3 gateway
  - Describe ACI as a gateway
  - Describe flowlet dynamic load-balancing
- Describing the Cisco Nexus 9000 Series Switch Hardware
  - Describe Cisco Nexus 9000 Series Switches
  - Describe Cisco Nexus 9500 Series chassis
  - Describe Cisco Nexus 9500 Series supervisor modules
  - Describe Cisco Nexus 9500 Series system controllers
  - Describe Cisco Nexus 9500 Series fabric modules
  - Describe Cisco Nexus 9500 Series line card modules
  - Describe Cisco Nexus 9500 Series fans and power supplies
  - Describe Cisco Nexus 9500 Series packet forwarding
  - Describe Cisco Nexus 9300 Series Switches
  - Describe Cisco Nexus 9000 Series FEX support in the ACI
  - Describe 40 Gigabit Ethernet and 100 Gigabit Ethernet networking in the data center
  - Describe the optics supported by the Cisco Nexus 9000 Series Switches in ACI mode
  - Describe Cisco Nexus 9000 Series performance for ACI
- Configuring the APIC
  - Explain the APIC
  - Configure endpoint groups
  - Configure application profiles
  - Configure contracts
  - Configure subjects and filters
  - Configure taboos
  - Configure contexts

- o Configure bridge domains
- o Configure tenants

2. Cisco Application Centric Infrastructure Configuration and Orchestration

- Configuring Layer 4 through Layer 7 Services
    - o Describe service insertion and redirection
    - o Implement service graphs
    - o Configure application profiles specific to Layer 4 to Layer 7 services
    - o Configure ACI programmability of Layer 4 to Layer 7 services
    - o Describe device packages
    - o Describe OpFlex
- Configuring APIC Hypervisor Integration
    - o Describe policy coordination with VM managers
    - o Describe management networks
    - o Configure ACI integration with VMware
    - o Configure ACI integration with Microsoft SCVMM
    - o Describe ACI integration with Red Hat
- Demonstrating ACI Network Programmability and Orchestration
    - o Describe the need for Programming
    - o Describe the JSON and XML encoding formats
    - o Configure ACI programmability using the REST API
    - o Implement the API Inspector
    - o Configure ACI programmability using Python
    - o Describe OpFlex
    - o Describe OpenStack orchestration
    - o Describe OpenDaylight, an open-source SDN controller

3. Cisco Application Centric Infrastructure External Connectivity, Management and Migration

- Configuring ACI Connectivity to Outside Networks
    - o Review inside and outside network policies
    - o Configure a Layer 3 connection outside the network
    - o Configure a Layer 2 connection outside the network
- Implementing ACI Management
    - o Configure security domains, and local and remote users
    - o Describe how to repurpose standalone to ACI
    - o Describe managing ACI software
    - o Demonstrate health scores
    - o View faults and events
    - o Configure log retention policy, diagnostics, and forensic abilities
- Describing Migration Options with the ACI
    - o Discuss methods of interconnecting existing data center network pods to the ACI fabric for migration

- o Discuss options for migrating Cisco Nexus 5500 Series Switches and fabric extenders to Cisco Nexus 9300 Series Switches
- o Discuss options for migrating fabric extenders to Cisco Nexus 9300 Series Switches
- o Discuss connecting an existing Layer 2 vPC from networks to the ACI border leaf
- o Discuss connecting existing Layer 3 networks to the ACI border leaf

Labs

Lab 1: Initiate ACI Fabric Discovery (Instructor Demo)

- Login to the APIC Controller (Instructor Demo)
- Register the Cisco Nexus 9000 Switches to APIC-1 (Instructor Demo)
- Navigate Through the APIC GUI to Familiarize Yourself with the Fabric

Lab 2: Configure Basic Network Constructs

- Create a Tenant
- Create a Context
- Create a Bridge Domain

Lab 3: Configure Policy Filters and Contracts

- Create Filters
- Create Contracts

Lab 4: Deploy a 3-Tier Application Profile

- Create Application Profile

Lab 5: Register a VMM Domain with ACI

- Register VMware vCenter to APIC by creating a vCenter Domain
- Create vCenter Credentials and Server Object
- Verifying APIC Connection to vCenter Server

Lab 6: Configure VMware ESXi Hosts to use the APIC DVS

- Add ESXi Hosts to APIC DVS

Lab 7: Associate an EPG to a VMware vCenter Domain

- Associate vCenter Domain to App_EPG
- Associate vCenter Domain to DB_EPG

- Associate vCenter Domain to Web_EPG

Lab 8: Associate a VM to an EPG Port Group

- Connect to your vCenter Server using the vSphere Client
- Edit Web-Server Settings
- Edit App-Server Settings
- Edit DB-Server Settings

Lab 9: Deploy a Service Graph with Application Profile

- Import Device Packages (Instructor Demo)
- Create Device Cluster for the ASA
- Create Service Graph
- Create a Bridge Domain for the ASA
- Create Logical Device Context for ASA

Lab 10: Configure APIC using the REST API

- Open the Postman Plugin for Google Chrome
- Create an Application Profile using the REST API

Lab 11: Configure APIC to Communicate to an External Layer 3 Network

- Configure MP-BGP Route Reflectors (Instructor Demo)
- Configure External L3 network
- Create Application Profile to Propagate Internal Public Routes
- Associate an L3 Outside Connection to a Bridge Domain
- Verify the Leaf is Learning OSPF Routes
- Configure Contract Between the External EPG and Internal EPG

Lab 12: Configure APIC to Communicate to an External Layer 2 Network

- Create an External Bridged Network
- Configure an Attachable Entity Profile to Selectively Allow VLAN Traffic

Lab 13: Configure APIC RBAC for Local and Remote Users

- Create a Security Domain and Map to your Tenant
- Configure Local Users and Roles for your Tenant Security Domain
- Create a RADIUS Security Domain and Map to your Tenant
- Create a AAA Login Domain for RADIUS Authentication
- Test RADIUS Authentication and Authorization

Lab 14: Monitor and Troubleshoot ACI

- View Faults Using the APIC GUI
- View Events using the APIC GUI
- Using the API Inspector
- Using the Managed Object Browser (Visore)
- Configuring Syslog Monitoring

Lab 15: Configure APIC for Bare Metal to Bare Metal Communications

- Configure APIC Fabric for bare metal communications
- Configure Tenant for bare metal communications
- Verify bare metal communications