

CISCO CCNA Day

Length: 5 days

Format: Classroom

Time: Day



About This Course

As Enterprises migrate toward controller based architectures, the role and skills required of a core network engineer are evolving and more vital than ever. To prepare for this network transition, the CCNA certification will not only prepare you with the knowledge of foundational technologies, but ensure you stay relevant with skill sets needed for the adoption of next generation technologies.

Required Exams

Interconnecting Cisco Networking Devices exam

Audience Profile

Course Objectives

The CCNA boot camp helps you master the following topics:

- * Ethernet LANs
- * IPv4 routing protocols
- * Wide area networks
- * IPv4 services: ACLs and QoS
- * IPv4 routing and troubleshooting
- * IPv6
- * Network management, SDN, and cloud computing

Outline

Part I Ethernet LANs

Chapter 1 Implementing Ethernet Virtual LANs

Virtual LAN Concepts

- * Creating Multiswitch VLANs Using Trunking
- * Forwarding Data Between VLANs

VLAN and VLAN Trunking Configuration and Verification

- * Creating VLANs and Assigning Access VLANs to an Interface
- * VLAN Trunking Protocol
- * VLAN Trunking Configuration
- * Implementing Interfaces Connected to Phones

Chapter 2 Spanning Tree Protocol Concepts

Spanning Tree Protocol (IEEE 802.1D)

- * The Need for Spanning Tree
- * What IEEE 802.1D Spanning Tree Does
- * How Spanning Tree Works
- * Influencing and Changing the STP Topology

Rapid STP (IEEE 802.1w) Concepts

- * Comparing STP and RSTP
- * RSTP and the Alternate (Root) Port Role
- * RSTP States and Processes
- * RSTP and the Backup (Designated) Port Role
- * RSTP Port Types

Optional STP Features

- * EtherChannel
- * PortFast
- * BPDU Guard

Chapter 3 Spanning Tree Protocol Implementation

Implementing STP

- * Setting the STP Mode
- * Connecting STP Concepts to STP Configuration Options
- * Verifying STP Operation
- * Configuring STP Port Costs
- * Configuring Priority to Influence the Root Election

Implementing Optional STP Features

- * Configuring PortFast and BPDU Guard
- * Configuring EtherChannel

Implementing RSTP

- * Identifying the STP Mode on a Catalyst Switch
- * RSTP Port Roles
- * RSTP Port States
- * RSTP Port Types

Chapter 4 LAN Troubleshooting

Troubleshooting STP

- * Determining the Root Switch
- * Determining the Root Port on Nonroot Switches
- * Determining the Designated Port on Each LAN Segment
- * STP Convergence

Troubleshooting Layer 2 EtherChannel

- * Incorrect Options on the channel-group Command
- * Configuration Checks Before Adding Interfaces to EtherChannels

Analyzing the Switch Data Plane Forwarding

- * Predicting STP Impact on MAC Tables
- * Predicting EtherChannel Impact on MAC Tables
- * Choosing the VLAN of Incoming Frames

Troubleshooting VLANs and VLAN Trunks

- * Access VLAN Configuration Incorrect
- * Access VLANs Undefined or Disabled
- * Mismatched Trunking Operational States
- * Mismatched Supported VLAN List on Trunks
- * Mismatched Native VLAN on a Trunk

Chapter 5 VLAN Trunking Protocol

VLAN Trunking Protocol (VTP) Concepts

- * Basic VTP Operation
- * VTP Version 1 Versus Version 2
- * VTP Pruning
- * Summary of VTP Features

VTP Configuration and Verification

- * Using VTP: Configuring Servers and Clients
- * Verifying Switches Synchronized Databases
- * Storing the VTP and Related Configuration
- * Avoiding Using VTP

VTP Troubleshooting

- * Determining Why VTP Is Not Synchronizing
- * Common Rejections When Configuring VTP
- * Problems When Adding Switches to a Network

Chapter 6 Miscellaneous LAN Topics

Securing Access with IEEE 802.1x

AAA Authentication

- * AAA Login Process
- * TACACS+ and RADIUS Protocols
- * AAA Configuration Examples

DHCP Snooping

- * DHCP Snooping Basics
- * An Example DHCP-based Attack
- * How DHCP Snooping Works
- * Summarizing DHCP Snooping Features

Switch Stacking and Chassis Aggregation

- * Traditional Access Switching Without Stacking
- * Switch Stacking of Access Layer Switches
- * Switch Stack Operation as a Single Logical Switch
- * Cisco FlexStack and FlexStack-Plus

- * Chassis Aggregation

Part II IPv4 Routing Protocols

Chapter 7 Understanding OSPF Concepts

Comparing Dynamic Routing Protocol Features

- * Routing Protocol Functions
- * Interior and Exterior Routing Protocols
- * Comparing IGPs
- * Administrative Distance

OSPF Concepts and Operation

- * OSPF Overview
- * Becoming OSPF Neighbors
- * Exchanging the LSDB Between Neighbors
- * Calculating the Best Routes with SPF

OSPF Area Design

- * OSPF Areas
- * How Areas Reduce SPF Calculation Time
- * OSPF Area Design Advantages

Chapter 8 Implementing OSPF for IPv4

Implementing Single-Area OSPFv2

- * OSPF Single-Area Configuration
- * Matching with the OSPF network Command
- * Verifying OSPFv2 Single Area
- * Configuring the OSPF Router ID
- * OSPF Passive Interfaces

Implementing Multiarea OSPFv2

- * Single-Area Configurations
- * Multiarea Configuration
- * Verifying the Multiarea Configuration

Additional OSPF Features

- * OSPF Default Routes
- * OSPF Metrics (Cost)
- * OSPF Load Balancing
- * OSPFv2 Interface Configuration

Chapter 9 Understanding EIGRP Concepts

EIGRP and Distance Vector Routing Protocols

- * Introduction to EIGRP
- * Basic Distance Vector Routing Protocol Features
- * EIGRP as an Advanced DV Protocol

EIGRP Concepts and Operation

- * EIGRP Neighbors
- * Exchanging EIGRP Topology Information
- * Calculating the Best Routes for the Routing Table
- * EIGRP Convergence

Chapter 10 Implementing EIGRP for IPv4

Core EIGRP Configuration and Verification

- * EIGRP Configuration
- * Configuring EIGRP Using a Wildcard Mask
- * Verifying EIGRP Core Features

EIGRP Metrics, Successors, and Feasible Successors

- * Viewing the EIGRP Topology Table
- * Examining the Metric Components

Other EIGRP Configuration Settings

- * Load Balancing Across Multiple EIGRP Routes
- * Tuning the EIGRP Metric Calculation
- * Autosummarization and Discontiguous Classful Networks

Chapter 11 Troubleshooting IPv4 Routing Protocols

Perspectives on Troubleshooting Routing Protocol Problems

Interfaces Enabled with a Routing Protocol

- * EIGRP Interface Troubleshooting
- * OSPF Interface Troubleshooting

Neighbor Relationships

- * EIGRP Neighbor Verification Checks
- * EIGRP Neighbor Troubleshooting Example
- * OSPF Neighbor Troubleshooting
- * Other OSPF Issues

Chapter 12 Implementing External BGP

BGP Concepts

- * Advertising Routes with BGP
- * Internal and External BGP
- * Choosing the Best Routes with BGP
- * eBGP and the Internet Edge

eBGP Configuration and Verification

- * BGP Configuration Concepts
- * Configuring eBGP Neighbors Using Link Addresses
- * Injecting BGP Table Entries with the network Command
- * Learning a Default Route from the ISP

Part III Wide-Area Networks

Chapter 13 Implementing Point-to-Point WANs

Leased-Line WANs with HDLC

- * Layer 1 Leased Lines
- * Layer 2 Leased Lines with HDLC
- * Configuring HDLC

Leased-Line WANs with PPP

- * PPP Concepts
- * Implementing PPP
- * Implementing PPP CHAP

- * Implementing PPP PAP
- * Implementing Multilink PPP

Troubleshooting Serial Links

- * Troubleshooting Layer 1 Problems
- * Troubleshooting Layer 2 Problems
- * Troubleshooting Layer 3 Problems

Chapter 14 Private WANs with Ethernet and MPLS

Metro Ethernet

- * Metro Ethernet Physical Design and Topology
- * Ethernet WAN Services and Topologies
- * Layer 3 Design Using Metro Ethernet
- * Ethernet Virtual Circuit Bandwidth Profiles

Multiprotocol Label Switching (MPLS)

- * MPLS VPN Physical Design and Topology
- * MPLS and Quality of Service
- * Layer 3 with MPLS VPN

Chapter 15 Private WANs with Internet VPN

Internet Access and Internet VPN Fundamentals

- * Internet Access
- * Internet VPN Fundamentals

GRE Tunnels and DMVPN

- * GRE Tunnel Concepts
- * Configuring GRE Tunnels
- * Verifying a GRE Tunnel
- * Troubleshooting GRE Tunnels
- * Multipoint Internet VPNs Using DMVPN

PPP over Ethernet

- * PPPoE Concepts
- * PPPoE Configuration

- * PPPoE Verification
- * PPPoE Troubleshooting

Part IV IPv4 Services: ACLs and QoS

Chapter 16 Basic IPv4 Access Control Lists

IPv4 Access Control List Basics

- * ACL Location and Direction
- * Matching Packets
- * Taking Action When a Match Occurs
- * Types of IP ACLs

Standard Numbered IPv4 ACLs

- * List Logic with IP ACLs
- * Matching Logic and Command Syntax
- * Implementing Standard IP ACLs
- * Troubleshooting and Verification Tips

Practice Applying Standard IP ACLs

- * Practice Building access-list Commands
- * Reverse Engineering from ACL to Address Range

Chapter 17 Advanced IPv4 Access Control Lists

Extended Numbered IP Access Control Lists

- * Matching the Protocol, Source IP, and Destination IP
- * Matching TCP and UDP Port Numbers
- * Extended IP ACL Configuration
- * Practice Building access-list Commands

Named ACLs and ACL Editing

- * Named IP Access Lists
- * Editing ACLs Using Sequence Numbers
- * Numbered ACL Configuration Versus Named ACL Configuration
- * ACL Implementation Considerations

Troubleshooting with IPv4 ACLs

- * Analyzing ACL Behavior in a Network
- * ACL Interactions with Router-Generated Packets

Chapter 18 Quality of Service (QoS)

Introduction to QoS

- * QoS: Managing Bandwidth, Delay, Jitter, and Loss
- * Types of Traffic
- * QoS as Mentioned in This Book
- * QoS on Switches and Routers

Classification and Marking

- * Classification Basics
- * Matching (Classification) Basics
- * Classification on Routers with ACLs and NBAR
- * Marking IP DSCP and Ethernet CoS
- * Defining Trust Boundaries
- * DiffServ Suggested Marking Values

Congestion Management (Queuing)

- * Round Robin Scheduling (Prioritization)
- * Low Latency Queuing
- * A Prioritization Strategy for Data, Voice, and Video

Shaping and Policing

- * Policing
- * Shaping

Congestion Avoidance

- * TCP Windowing Basics
- * Congestion Avoidance Tools

Part V IPv4 Routing and Troubleshooting

Chapter 19 IPv4 Routing in the LAN

VLAN Routing with Router 802.1Q Trunks

- * Configuring ROAS
- * Verifying ROAS
- * Troubleshooting ROAS

VLAN Routing with Layer 3 Switch SVIs

- * Configuring Routing Using Switch SVIs
- * Verifying Routing with SVIs
- * Troubleshooting Routing with SVIs

VLAN Routing with Layer 3 Switch Routed Ports

- * Implementing Routed Interfaces on Switches
- * Implementing Layer 3 EtherChannels
- * Troubleshooting Layer 3 EtherChannels

Chapter 20 Implementing HSRP for First-Hop Routing

FHRP and HSRP Concepts

- * The Need for Redundancy in Networks
- * The Need for a First Hop Redundancy Protocol
- * The Three Solutions for First-Hop Redundancy
- * HSRP Concepts

Implementing HSRP

- * Configuring and Verifying Basic HSRP
- * HSRP Active Role with Priority and Preemption
- * HSRP Versions

Troubleshooting HSRP

- * Checking HSRP Configuration
- * Symptoms of HSRP Misconfiguration

Chapter 21 Troubleshooting IPv4 Routing

Problems Between the Host and the Default Router

- * Root Causes Based on a Host's IPv4 Settings
- * Root Causes Based on the Default Router's Configuration

Problems with Routing Packets Between Routers

- * IP Forwarding by Matching the Most Specific Route
- * Routing Problems Caused by Incorrect Addressing Plans
- * Pointers to Related Troubleshooting Topics

Part VI IPv6

Chapter 22 IPv6 Routing Operation and Troubleshooting

Normal IPv6 Operation

- * Unicast IPv6 Addresses and IPv6 Subnetting
- * Assigning Addresses to Hosts
- * Router Address and Static Route Configuration
- * Verifying IPv6 Connectivity

Troubleshooting IPv6

- * Pings from the Host Work Only in Some Cases
- * Pings Fail from a Host to Its Default Router
- * Problems Using Any Function That Requires DNS
- * Host Is Missing IPv6 Settings: Stateful DHCP Issues
- * Host Is Missing IPv6 Settings: SLAAC Issues
- * Traceroute Shows Some Hops, But Fails
- * Routing Looks Good, But Traceroute Still Fails

Chapter 23 Implementing OSPF for IPv6

OSPFv3 for IPv6 Concepts

- * IPv6 Routing Protocol Versions and Protocols
- * Two Options for Implementing Dual Stack with OSPF
- * OSPFv2 and OSPFv3 Internals

OSPFv3 Configuration

- * Basic OSPFv3 Configuration
- * Other OSPFv3 Configuration Settings

OSPFv3 Verification and Troubleshooting

- * OSPFv3 Interfaces
- * OSPFv3 Neighbors
- * OSPFv3 LSDB and LSAs
- * The Issue of IPv6 MTU
- * OSPFv3 Metrics and IPv6 Routes

Chapter 24 Implementing EIGRP for IPv6

EIGRP for IPv6 Configuration

- * EIGRP for IPv6 Configuration Basics
- * EIGRP for IPv6 Configuration Example
- * Other EIGRP for IPv6 Configuration Settings

EIGRP for IPv6 Verification and Troubleshooting

- * EIGRP for IPv6 Interfaces
- * EIGRP for IPv6 Neighbors
- * EIGRP for IPv6 Topology Database
- * EIGRP for IPv6 Routes

Chapter 25 IPv6 Access Control Lists

IPv6 Access Control List Basics

- * Similarities and Differences Between IPv4 and IPv6 ACLs
- * ACL Location and Direction
- * IPv6 Filtering Policies
- * ICMPv6 Filtering Caution
- * Capabilities of IPv6 ACLs
- * Limitations of IPv6 ACLs

Configuring Standard IPv6 ACLs

Configuring Extended IPv6 ACLs

- * Examples of Extended IPv6 ACLs
- * Practice Building ipv6 access-list Commands

Other IPv6 ACL Topics

- * Implicit IPv6 ACL Rules
- * IPv6 Management Control ACLs

Part VII Miscellaneous

Chapter 26 Network Management

Simple Network Management Protocol

- * SNMP Concepts
- * Implementing SNMP Version 2c
- * Implementing SNMP Version 3

IP Service Level Agreement

- * An Overview of IP SLA
- * Basic IP SLA ICMP-Echo Configuration
- * Troubleshooting Using IP SLA Counters
- * Troubleshooting Using IP SLA History

SPAN

- * SPAN Concepts
- * Configuring Local SPAN
- * SPAN Session Parameters for Troubleshooting

Chapter 27 Cloud Computing

Cloud Computing Concepts

- * Server Virtualization
- * Cloud Computing Services
- * Cloud and the Service Model

WAN Traffic Paths to Reach Cloud Services

- * Enterprise WAN Connections to Public Cloud
- * A Scenario: Branch Offices and the Public Cloud

Virtual Network Functions and Services

- * Virtual Network Functions: Firewalls and Routers
- * DNS Services
- * Address Assignment Services and DHCP
- * NTP

Chapter 28 SDN and Network Programmability

SDN and Network Programmability Basics

- * The Data, Control, and Management Planes
- * Controllers and Network Architecture
- * SDN Architecture Summary

Examples of Network Programmability and SDN

- * Open SDN and OpenFlow
- * The Cisco Application Centric Infrastructure
- * The Cisco APIC Enterprise Module
- * Comparing the Three Examples

Cisco APIC-EM Path Trace ACL Analysis Application

- * APIC-EM Path Trace App
- * APIC-EM Path Trace ACL Analysis Tool Timing