CCNAX 2.0 Boot Camp

Interconnecting Cisco Networking Devices: Accelerated (CCNAX) v2.0 is a 50-60 hour instructor-led course that provides students with the knowledge and skills necessary to install, operate, and troubleshoot a small to medium-sized network, including connecting to a WAN and implementing network security.

This course is the equivalent of Interconnecting Cisco Network Devices Part 1 v2.0 and Interconnecting Cisco Network Devices Part 2 v2.0 together.

The ideal candidate would be someone who has worked in a data network environment (PC support/helpdesk or network operations/monitoring), and has had hands-on experience, though no formal training, with Cisco IOS devices. This boot camp will serve to review and expand on what the candidate already knows and add to it, the detailed configuration and implementation of Cisco IOS devices.

Prospective CCNAX v2.0 students should prepare themselves for course days consisting of at least 10 hours and as long as 12 hours. Homework will be assigned and reviewed daily.

What the Students Get:

- Cisco Authorized course content
- Authorized Cisco CCSI Instructor

Objectives

Upon completing this course, the learner will be able to meet these overall objectives:

•Describe network fundamentals and build simple LANs
•Establish Internet connectivity
•Manage network device security
•Describe IPv6 basics
•Troubleshoot VLAN issues, explain how STP works, configure EtherChannel, and understand the idea behind Layer 3 redundancy
•Troubleshoot IP connectivity
•Define the characteristics, functions, and components of a WAN
•Configure and troubleshoot EIGRP in an IPv4 environment, and configure EIGRP for IPv6
•Configure, verify, and troubleshoot multi-area OSPF
•Describe SNMP, syslog and NetFlow, and manage Cisco device configurations, IOS images, and licenses

Who Should Attend

Target Candidate: Individuals seeking the Cisco CCNA Routing and Switching certification.

The course is also appropriate for pre-sales and post-sales network engineers involved in the installation and support of enterprise branch office networks.

Key Job Tasks:

•Configure: Implement the identified solution by applying the planned implementation processes using Cisco IOS commands and applications in the correct order to the selected devices and portions of the network.
•Verify: Use the appropriate show and debug commands and applications to ensure that the solution was correctly implemented and is performing as desired.
•Troubleshoot: Use the appropriate show and debug commands and applications to identify the cause of basic level network issues and correctly implement a solution that ensures the network is performing as desired.

•Job roles: Entry Level Network Engineer, Network Administrator, Network Support Technician or Help Desk Technician.

Outline

Module 1: Building a Simple Network

Lesson 1: Exploring the Functions of Networking
What Is a Network?

- Physical Components of a Network
- Interpreting a Network Diagram
- Impact of User Applications on the Network
- Characteristics of a Network
- Physical vs. Logical Topologies

Lesson 2: Understanding the Host-to-Host Communications Model
Introducing Host-to-Host Communications

- OSI Reference Model
- TCP/IP Protocol Suite
- Encapsulation and De-Encapsulation
- Peer-to-Peer Communications

Lesson 3: Introducing LANs
Local Area Networks

- LAN Components
- Need for Switches
- Switches

Lesson 4: Operating Cisco IOS Software
Cisco IOS Software Features and Functions

- Cisco IOS CLI Functions
- User EXEC Mode
- Privileged EXEC Mode
- Help Functions in the CLI
- CLI Error Messages
- Managing Cisco IOS Configurations
- Improving the User Experience in the CLI

Lesson 5: Starting a Switch
Switch Installation

- Switch LED Indicators
- Connecting to a Console Port
- Basic Switch Configuration
- Verifying the Switch Initial Startup Status

Lesson 6: Understanding Ethernet and Switch Operation
Ethernet LAN Connection Media

- Ethernet Frame Structure

Module 2: Establishing Internet Connectivity

Lesson 1: Understanding the TCP/IP Internet Layer
Internet Protocol

- IPv4 Address Representation
- IPv4 Header Address Fields
- Decimal and Binary Systems
- Decimal-to-Binary Conversion
- IP Address Classes
- Reserved IPv4 Addresses
- Domain Name System
- Verifying the IPv4 Address of a Host
- Summary

Lesson 2: Understanding IP Addressing and Subnets

- Subnets
- Subnet Masks
- Octet Values of a Subnet Mask
- Default Gateways
- Computing Usable Subnetworks and Hosts
- Applying Subnet Masks
- Determining the Network Addressing Scheme
- Example: Addressing Scheme
- Variable-Length Subnet Mask
- VLSM Example
- Summary

Lesson 3: Understanding the TCP/IP Transport Layer
TCP/IP Transport Layer Functions

- Reliable vs. Best-Effort Transport
- TCP vs. UDP Analogy
- UDP Characteristics
- TCP Characteristics
- TCP/IP Applications
- Summary

Lesson 4: Exploring the Functions of Routing
Role of a Router

- Router Characteristics
- Router Functions
- Path Determination
- Routing Table
- Types of Routes
- Dynamic Routing Protocols

- MAC Addresses
- Switching Operation
- Duplex Communication
- Configuring Duplex and Speed Options

Lesson 7: Troubleshooting Common Switch Media Issues
Common Troubleshooting Tools

- Media Issues
- Troubleshooting Switch Media Issues
- Port Issues
- Troubleshooting Port Issues

Lesson 8: Module Summary

- References

Lesson 9: Module Self-Check

- Summary

Lesson 5: Configuring a Cisco Router
Initial Router Startup

- Initial Router Setup
- Configuring Router Interfaces
- Configuring the Cisco Router IP Address
- Verifying Interface Configuration and Status
- Exploring Connected Devices
- Cisco Discovery Protocol
- Discovering Neighbors Using Cisco Discovery Protocol
- Summary

Lesson 6: Exploring the Packet Delivery Process
Layer 2 Addressing

- Layer 3 Addressing
- Address Resolution Protocol
- Host-to-Host Packet Delivery
- Role of a Switch in Packet Delivery
- Summary

Lesson 7: Enabling Static Routing

- Routing Operations
- Static and Dynamic Routing Comparison
- When to Use Static Routing
- Static Route Configuration
- Default Routes
- Static Route Configuration Verification
- Summary

Lesson 8: Managing Traffic Using ACLs
Using ACLs

- ACL Operation
- ACL Wildcard Masking
- Wildcard Bit Mask Abbreviations
- Types of ACLs
- Testing an IP Packet Against a Numbered Standard Access List
- Basic Configuration of Numbered Standard IPv4 ACLs
- Summary

Lesson 9: Enabling Internet Connectivity
The Demarcation Point

- Dynamic Host Configuration Protocol
- Options for Configuring a Provider-Assigned IP Address
- Configuring a Static Provider-Assigned IP Address
- Configuring a DHCP Client
- Public vs. Private IPv4 Addresses

- Introducing NAT
- Types of Addresses in NAT
- Types of NAT
- Understanding Static NAT
- Configuring Static NAT
- Verifying Static NAT Configuration
- Understanding Dynamic NAT
- Configuring Dynamic NAT
- Verifying Dynamic NAT Configuration
- Understanding PAT
- Configuring PAT
- Verifying PAT Configuration
- Troubleshooting NAT
- Troubleshooting NAT Case Study
- Summary

Lesson 10: Module Summary

- References

Lesson 11: Module Self-Check

Module 3: Managing Network Device Security

Lesson 1: Securing Administrative Access

- Network Device Security Overview
- Securing Access to Privileged EXEC Mode
- Securing Console Access
- Securing Remote Access
- Enabling Remote Access Connectivity
- Limiting Remote Access with ACLs
- External Authentication Options
- Configuring the Login Banner
- Summary

Lesson 2: Implementing Device Hardening
Securing Unused Ports

- Port Security
- Port Security Configuration
- Port Security Verification
- Disabling Unused Services
- Network Time Protocol
- Configuring NTP
- Verifying NTP
- Summary

Lesson 3: Implementing Traffic Filtering with ACLs
Using ACLs to Filter Network Traffic

- ACL Operation
- Applying ACLs to Interfaces
- The Need for Extended ACLs
- Configuring Numbered, Extended IPv4 ACLs

Module 4: Introducing IPv6

Lesson 1: Introducing Basic IPv6
IPv4 Addressing Exhaustion Workarounds

- IPv6 Features
- IPv6 Addresses
- IPv6 Unicast Addresses
- IPv6 Addresses Allocation
- Basic IPv6 Connectivity
- Summary

Lesson 2: Understanding IPv6
IPv6 Header Changes and Benefits

- ICMPv6
- Neighbor Discovery
- Stateless Autoconfiguration
- Summary

Lesson 3: Configuring IPv6 Routing
Overview

- Routing for IPv6
- Static Routing
- Summary

Lesson 4: Module Summary

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Lesson 5: Module Self-Check

- Configuring Named ACLs
- ACL Configuration Guidelines
- Monitoring ACLs
- Troubleshooting Common ACL Errors
- Summary

Lesson 4: Module Summary

- References

Lesson 5: Module Self-Check

Module 5: Building a Medium-Sized Network

Lesson 1: Implementing VLANs and Trunks Overview

- Issues in a Poorly Designed Network
- VLAN Introduction
- Trunking with 802.1Q
- Creating a VLAN
- Assigning a Port to a VLAN
- ConfigurinKg an 802.1Q Trunk
- VLAN Design Considerations
- Summary

Lesson 2: Routing Between VLANs
Purpose of Inter-VLAN Routing

- Options for Inter-VLAN Routing
- Configuring a Router with a Trunk Link
- Summary
  Lesson 3: Using a Cisco Network Device as a DHCP Server?Need for a DHCP Server
- Understanding DHCP
- Configuring a DHCP Server
- Monitoring DHCP Server Functions
- DHCP Relay Agent
- Summary

Lesson 4: Troubleshooting VLAN Connectivity Overview

- Dynamic Trunking Protocol
- VLAN Troubleshooting
- Trunk Troubleshooting
- Summary

Lesson 5: Building Redundant Switched Topologies
Issues in Redundant Topologies

- Spanning-Tree Operation
- Types of Spanning-Tree Protocols
- Per VLAN Spanning Tree Plus
- Modifying the Bridge ID

Module 6: Troubleshooting Basic Connectivity

Lesson 1: Troubleshooting IPv4 Network Connectivity
Components of Troubleshooting End-to-End Connectivity

- Verification of End-to-End Connectivity
- Verification of Physical Connectivity Issue
- Identification of Current and Desired Path
- Default Gateway Issues
- Name Resolution Issues
- ACL Issues
- Summary

Lesson 2: Troubleshooting IPv6 Network Connectivity
Troubleshooting End-to-End IPv6 Connectivity

- Verification of End-to-End IPv6 Connectivity
- Identification of Current and Desired IPv6 Path
- Default Gateway Issues in IPv6
- Name Resolution Issues in IPv6
- ACL Issues in IPv6
- Summary

Lesson 3: Module Summary

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Lesson 4: Module Self-Check

Analyzing the STP Topology
- Spanning-Tree Failure Consequences
- PortFast and BPDU Guard
- Summary

Lesson 6: Improving Redundant Switched Topologies with EtherChannel
The Need for EtherChannel

- Advantages of EtherChannel
- EtherChannel Protocols
- Configuring EtherChannel
- Verifying EtherChannel
- Summary

Lesson 7: Understanding Layer 3 Redundancy
The Need for Default Gateway Redundancy

- Default Gateway Redundancy
- HSRP
- HSRP Interface Tracking
- HSRP Load Balancing
- Gateway Load Balancing Protocol
- Summary

Lesson 8: Module Summary

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Lesson 9: Module Self-Check

Module 7: Wide Area Networks

Lesson 1: Understanding WAN Technologies
Introducing WANs

- WANs vs. LANs
- WAN Devices
- Role of Routers in WANs
- Serial WAN Cabling
- WAN Layer 2 Protocols
- WAN Link Options
- Summary

Lesson 2: Configuring Serial Encapsulation
Point-to-Point Connectivity

- Configuring a Point-to-Point Link
- Serial Communication Links
- Configuration of a Serial Interface
- HDLC Protocol
- Point-to-Point Protocol
- PPP Configuration
- PPP Authentication: PAP
- PPP Authentication: CHAP
- Configuring CHAP for PPP Authentication

Module 8: Implementing an EIGRP-Based Solution

Lesson 1: Implementing EIGRP
Purpose of Dynamic Routing Protocols

- Interior and Exterior Routing Protocols
- Distance Vector and Link-State Routing Protocols
- Administrative Distance
- EIGRP Features
- EIGRP Path Selection
- EIGRP Metric
- EIGRP Configuration
- Verification of EIGRP Configuration
- Load Balancing with EIGRP
- Summary

Lesson 2: Troubleshooting EIGRP
Components of Troubleshooting EIGRP

- Troubleshooting EIGRP Neighbor Issues
- Troubleshooting EIGRP Routing Table Issues
- Summary

Lesson 3: Implementing EIGRP for IPv6

Verifying CHAP Configuration
- Troubleshooting Serial Connections
- Summary

Lesson 3: Establishing a WAN Connection Using Frame Relay
Understanding Frame Relay

- Frame Relay Topologies
- Frame Relay Reachability Issues
- Frame Relay Signaling
- Frame Relay Address Mappings
- Configuring Frame Relay
- Point-to-Point vs. Multipoint
- Configuring Point-to-Point Frame Relay
- Configuring Multipoint Frame Relay
- Verifying Frame Relay Configuration
- Summary

Lesson 4: Introducing VPN Solutions
VPNs and Their Benefits

- Cisco SSL VPN Solutions
- Introducing IPsec
- Summary

Lesson 5: Configuring GRE Tunnels
GRE Tunnel Overview

- GRE Tunnel Configuration
- GRE Tunnel Verification
- Summary

Lesson 6: Module Summary

- References

Lesson 7: Module Self-Check

Module 9: Implementing a Scalable OSPF-Based Solution

Lesson 1: Implementing OSPF
Link-State Routing Protocol Overview

- Link-State Routing Protocol Data Structures
- Introducing OSPF
- Establishing OSPF Neighbor Adjacencies
- SPF Algorithm
- Building a Link-State Database
- OSPF Area Structure
- Router ID
- Configuring Single-Area OSPF
- Verifying OSPF Configuration
- Summary

Lesson 2: Multiarea OSPF IPv4 Implementation
EIGRP for IPv6

- EIGRP for IPv6 Commands
- EIGRP for IPv6 Configuration Example
- Summary

Lesson 4: Module Summary

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Lesson 5: Module Self-Check

Module 10: Network Device Management

Lesson 1: Configuring Network Devices to Support Network Management Protocols
SNMP Overview

- SNMP Versions
- Obtaining Data from an SNMP Agent
- SNMP Configuration
- Syslog Overview
- Syslog Message Format
- Syslog Configuration
- NetFlow Overview
- NetFlow Architecture
- Netflow Configuration
- Summary

Single-Area vs. Multiarea OSPF

- Planning for the Implementation of OSPF
- Multiarea OSPF Configuration
- Multiarea OSPF Verification
- Summary

Lesson 3: Troubleshooting Multiarea OSPF
OSPF Neighbor States

- Components of Troubleshooting OSPF
- Troubleshooting OSPF Neighbor Issues
- Troubleshooting OSPF Routing Table Issues
- Troubleshooting OSPF Path Selection
- Summary

Lesson 4: Examining OSPFv3
OSPFv3 Key Characteristics

- OSPFv3 Configuration
- OSPFv3 Configuration Verification
- Summary

Lesson 5: Module Summary

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Lesson 6: Module Self-Check

Lesson 2: Managing Cisco Devices
Router Internal Components Overview

- ROM Functions
- Stages of the Router Power-On Boot Sequence
- Configuration Register
- Changing the Configuration Register
- Locating Cisco IOS Image Files
- Loading Cisco IOS Image Files
- Loading Cisco IOS Configuration Files
- Cisco IOS Integrated File System and Devices
- Managing Cisco IOS Images
- Deciphering Cisco IOS Image Filenames
- Creating the Cisco IOS Image Backup
- Upgrading Cisco IOS Images
- Managing Device Configuration Files
- Password Recovery
- Summary

Lesson 3: Licensing
Licensing Overview

- Licensing Verification
- Permanent License Installation
- Evaluation License Installation
- Backing up the License
- Uninstalling the License
- Summary

Lesson 4: Module Summary

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Lesson 5: Module Self-Check

Lab Outline

Lab 1-1: Performing Switch Startup and Initial Configuration
Lab 1-2: Troubleshooting Switch Media Issues
Lab 2-1: Performing Initial Router Setup and Configuration
Lab 2-2: Connecting to the Internet
Lab 3-1: Enhancing the Security of the Initial Configuration
Lab 3-2: Device Hardening
Lab 3-3: Filtering Traffic with ACLs
Lab 4-1: Configure and Verify Basic IPv6
Lab 4-2: Configure and Verify Stateless Autoconfiguration
Lab 4-3: Configure and Verify IPv6 Routing
Lab 5-1: Configuring Expanded Switched Networks
Lab 5-2: Configuring DHCP Server
Lab 5-3: Troubleshooting VLANs and Trunks
Lab 5-4: Optimizing STP
Lab 5-5: Configuring EtherChannel
Lab 6-1: Troubleshooting IP Connectivity
Lab 7-1: Configuring and Troubleshooting a Serial Connection

Lab 7-2: Establishing a Frame Relay WAN
Lab 7-3: Establishing a GRE Tunnel
Lab 8-1: Implementing EIGRP
Lab 8-2: Troubleshooting EIGRP
Lab 8-3: Implementing EIGRP for IPv6
Lab 9-1: Implementing OSPF
Lab 9-2: Configuring Multiarea OSPF
Lab 9-3: Troubleshooting Multiarea OSPF
Lab 9-4: Configuring OSPF for IPv6
Lab 10-1: SNMP and Syslog Basic Configuration
Lab 10-2: Analyzing NetFlow Data
Lab 10-3: Managing Cisco Devices and Licensing