

# CCNA Routing & Switching

## Course Description

SecureNinja's instructor-led 5-day CCNA Routing & Switching hands-on training and certification boot camp in Washington, DC and San Diego, CA covers the exam objectives for exam 200-125 CCNAX. Packed with updated topics that have been added to the latest version of the CCNA exam, this updated course features expanded coverage of key topic areas plus new material on IP data networks, LAN switching technologies, IP addressing (IPv4/IPv6), IP routing technologies, IP services, network device security, troubleshooting, and WAN technologies.

## Course Objectives

- Describe network fundamentals and build simple LANs
- Establish Internet connectivity
- Manage network device security
- Describe IPv6 basics
- Troubleshoot VLAN issues
- Spanning Tree Protocol (STP)
- Configure EtherChannel
- Discuss and understand layer 3 redundancy
- Troubleshoot IP connectivity
- Define the characteristics, functions, and components of a WAN
- Configure and troubleshoot EIGRP in an IPv4 environment
- Configure EIGRP for IPv6
- Configure, verify, and troubleshoot multi-area OSPF
- Describe SNMP, Syslog, and NetFlow
- Manage Cisco device configurations, IOS images, and licenses

## Who Would Benefit

This course is designed for students who have a basic understanding of IT concepts; especially in relation to computer networking infrastructure. This course is excellent preparation for students who wish not only to be CCNA certified but who desire to move on towards the higher certifications of CCNP, CCVP, CCSP, Security+, MCP, MCSE, MCTS, or MCITP. Job Roles include help desk technicians, pre & post sales network engineers who install and support office networks, entry-level network engineers, network administrators, and network support technicians.

## Required Exams

200-125 CCNA

CCNA Composite Exam: The 200-125 CCNAX is the composite exam associated with the Cisco CCNA Routing and Switching certification. Candidates can prepare for this exam by taking the Interconnecting Cisco Networking Devices: Accelerated (CCNAX) v3.0 course. This exam tests a candidate's knowledge and skills required to install, operate, and troubleshoot a small to medium size enterprise branch network. The topics include all the

areas covered under ICND 1 and ICND2 Exams.

## Courseware

CCNA Routing and Switching Study Guide: Exams 100-105, 200-105, and 200-125

## Follow-on Courses

- CompTIA Security+
- Microsoft MCP / MCTS
- Microsoft MCSE / MCITP
- Cisco CCNP

## Prerequisites

This course assumes basic computer literacy, Internet usage skills, IP address knowledge, networking. CompTIA Network+ or equivalent work experience is recommended.

## Course Length

40 hours

## Course Details

### Operation of IP Data Networks

- Operation of IP Data Networks
- Recognize the purpose and functions of various network devices such as Routers, Switches, Bridges, and Hubs.
- Select the components required to meet a given network specification.
- Identify common applications and their impact on the network
- Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models.
- Predict the data flow between two hosts across a network.
- Identify the appropriate media, cables, ports, and connectors to connect Cisco network devices to other network devices and hosts in a LAN

### LAN Switching Technologies

- Determine the technology and media access control method for Ethernet networks
- Identify basic switching concepts and the operation of Cisco switches.
  - Collision Domains
  - Broadcast Domains
  - Types of switching
  - CAM Table
- Configure and verify initial switch configuration including remote access management.
  - Cisco IOS commands to perform basic switch setup
- Verify network status and switch operation using basic utilities such as ping, telnet,

- and ssh.
- Identify enhanced switching technologies
    - RSTP
    - PVSTP
    - EtherChannel
  - Describe how VLANs create logically separate networks and the need for routing between them.
    - Explain network segmentation and basic traffic management concepts
  - Configure and verify VLANs
  - Configure and verify trunking on Cisco switches
    - DTP
    - Auto-negotiation
  - Configure and verify PVSTP operation
    - describe root bridge election
    - spanning tree mode

### **IP addressing (IPv4 / IPv6)**

- Describe the operation and necessity of using private and public IP addresses for IPv4 addressing
- Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment.
- Identify the appropriate IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment.
- Describe the technological requirements for running IPv6 in conjunction with IPv4 such as dual stack
- Describe IPv6 addresses
  - Global unicast
  - Multicast
  - Link-local
  - Unique local
  - eui 64
  - autoconfiguration

### **IP Routing Technologies**

- Describe basic routing concepts
  - CEF
  - Packet forwarding
  - Router lookup process
- Describe the boot process of Cisco IOS routers
  - POST
  - Router bootup process
- Configure and verify utilizing the CLI to set basic Router configuration
  - Cisco IOS commands to perform basic router setup
- Configure and verify operation status of a device interface, both serial and ethernet
- Verify router configuration and network connectivity
- Cisco IOS commands to review basic router information and network connectivity
- Configure and verify routing configuration for a static or default route given

- specific routing requirements
- Manage Cisco IOS Files
  - Boot preferences
  - Cisco IOS image(s)
  - Licensing
    - Show license
    - Change license
- Differentiate methods of routing and routing protocols
  - Static vs. Dynamic
  - Link state vs. Distance Vector
  - Administrative distance
  - split horizon
  - metric
  - next hop
  - ip routing table
  - Passive Interfaces
- Configure and verify OSPF (single area)
  - The benefit of single area
  - neighbor adjacencies
  - OSPF states
  - Discuss Multi-area
  - Configure OSPF v2
  - Configure OSPF v3
  - Router ID
  - Passive interface
  - LSA types
- Configure and verify EIGRP (single AS)
  - Feasible Distance / Feasible Successors /Administrative distance
  - Feasibility condition
  - Metric composition
  - Router ID
  - Auto-summary
  - Path selection
  - Load balancing
    - Equal
    - Unequal
  - Passive interface
- Configure and verify inter-VLAN routing (Router on a stick)
  - subinterfaces
  - upstream routing
  - encapsulation
- Configure SVI interfaces

## IP Services

- Configure and verify DHCP (IOS Router)
  - configuring router interfaces to use DHCP
  - DHCP options
  - excluded addresses
  - lease time

- Describe the types, features, and applications of ACLs
  - Standard
  - Sequence numbers
  - Editing
  - Extended
  - Named
  - Numbered
  - Log option
- Configure and verify ACLs in a network environment
  - Named
  - Numbered
  - Log option
- Identify the basic operation of NAT
  - Purpose
  - Pool
  - Static
  - 1 to 1
  - Overloading
  - Source addressing
  - One way NAT
- Configure and verify NAT for given network requirements
- Configure and verify NTP as a client
- Recognize High availability (FHRP)
  - VRRP
  - HSRP
  - GLBP
- Configure and verify Syslog
  - Utilize Syslog Output
- Describe SNMP v2 & v3

## **Network Device Security**

- Configure and verify network device security features such as
  - Device password security
  - Enable secret vs to enable
  - Transport
  - Disable telnet
  - SSH
  - VTYs
  - Physical security
  - Service password
  - Describe external authentication methods
- Configure and verify Switch Port Security features such as
  - Sticky MAC
  - MAC address limitation
  - Static/dynamic
  - Violation modes
    - Err disable
    - Shutdown
  - Protect restrict

- Shutdown unused ports
- Err disable recovery
- Assign unused ports to an unused VLAN
- Setting native VLAN to other than VLAN 1
- Configure and verify ACLs to filter network traffic
- Configure and verify an ACLs to limit telnet and SSH access to the router

## Troubleshooting

- Identify and correct common network problems
- Utilize NetFlow data
- Troubleshoot and correct common problems associated with IP addressing and host configurations.
- Troubleshoot and Resolve VLAN problems
  - identify that VLANs are configured
  - port membership correct
  - IP address configured
- Troubleshoot and Resolve trunking problems on Cisco switches
  - correct trunk states
  - correct encapsulation configured
  - correct VLANs allowed
- Troubleshoot and Resolve Spanning Tree operation issues
  - root switch
  - priority
  - mode is correct
  - port states
- Troubleshoot and Resolve routing issues
  - routing is enabled
  - routing table is correct
  - correct path selection
- Troubleshoot and Resolve OSPF problems
  - neighbor adjacencies
  - Hello and Dead timers
  - OSPF area
  - Interface MTU
  - Network types
  - Neighbor states
  - OSPF topology database
- Troubleshoot and Resolve EIGRP problems
  - neighbor adjacencies
  - AS number
  - Load balancing
  - Split horizon
- Troubleshoot and Resolve interVLAN routing problems
  - Connectivity
  - Encapsulation
  - Subnet
  - Native VLAN
  - Port mode trunk status
- Troubleshoot and Resolve ACL issues

- Statistics
- Permitted networks
- Direction
- Interface
- Troubleshoot and Resolve WAN implementation issues
  - Serial interfaces
  - PPP
  - Frame relay
- Troubleshoot and Resolve Layer 1 problems
  - Framing
  - CRC
  - Runts
  - Giants
  - Dropped packets
  - Late collision
  - Input / Output errors
  - Monitor NetFlow statistics
- Troubleshoot EtherChannel problems

## WAN Technologies

- Identify different WAN Technologies
  - Metro Ethernet
  - VSAT
  - Cellular 3G / 4G
  - MPLS
  - T1 / E1
  - ISDN
  - DSL
  - Frame relay
  - Cable
  - VPN
- Configure and verify a basic WAN serial connection
- Configure and verify a PPP connection between Cisco routers
- Configure and verify Frame Relay on Cisco routers
- Implement and troubleshoot PPPoE

## Career Track & Roles

- Network Administrator
- Systems Administrator
- Systems Engineer
- Systems Architect
- Network Security Specialist
- Information Security Specialist

## About SecureNinja

SecureNinja Training is the DC's Area's #1 Expert IT Training Center. We are conveniently located in beautiful Historic Old Town Alexandria, VA enhancing your training experience

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- Closest Expert IT & IT Security Training Center to Fort Belvoir, Boiling AFB, Fort Myer, Department of Homeland Security, US Department of Navy, US Coast Guard, Fort McNair, Washington Navy Yard and the Pentagon

## **Why Choose SecureNinja for your Washington DC Expert IT Training?**

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- Meet Your DoD 8570-1 Certification Needs. Get Compliant!
- SecureNinja is the ONLY Testing Center that offers ALL 5 industry standard test vendors in the DC / Baltimore Metropolitan Area. ( VUE, Kryterion-Online, Certiport, and Impact-Testing)
- Lowest Prices! We are locally based keeping our overhead low so we can pass the savings along to you
- Washington, DC is our Home. Most training centers set up shop in hotels or rented centers. When you have a need, request or encounter a problem they are not there to answer. Our physical location in Alexandria is open 7 days a week and our staff always there to help.