

Cisco Certified Network Professional (CCNP)

Cisco Certified Network Professional (CCNP) Routing and Switching certification validates the ability to plan, implement, verify and troubleshoot local and wide-area enterprise networks and work collaboratively with specialists on advanced security, voice, wireless and video solutions. The CCNP Routing and Switching certification is appropriate for those with at least one year of networking experience who are ready to advance their skills and work independently on complex network solutions. Those who achieve CCNP Routing and Switching have demonstrated the skills required in enterprise roles such as network engineer, support engineer, systems engineer or network technician. The routing and switching protocol knowledge from this certification will provide a lasting foundation as these skills are equally relevant in the physical networks of today and the virtualized network functions of tomorrow.

Outline:

Module One: Network Principles

- # Identify Cisco Express Forwarding Concepts
 - o FIB
 - o Adjacency table
 - o Etherchannels
- # Explain General Network
 - o Unicast
 - o Out-of-order packets
 - o Asymmetric routing
- # Describe IP operation
 - o ICMP Unreachable and Redirects
 - o IPv4 and IPv6 fragmentation
 - o TTL
- # Explain TCP operation
 - o IPv4 and IPv6 (P) MTU
 - o MSS
 - o Latency
 - o Windowing
 - o Bandwidth-delay product
 - o Global synchronization
- # Describe UDP operation
 - o Starvation
 - o Latency
 - o Asymmetric routing
- # Recognize proposed changes to the network
 - o Changes to routing protocol parameters
 - o Migrate parts of the network to IPv6
 - o Routing protocol migration
- # Use Cisco IOS troubleshooting tools
 - o Debug, conditional debug
 - o Ping and trace route with extended options
- # Apply troubleshooting methodologies
 - o Diagnose the root cause of networking issues (analyze symptoms, identify and describe root cause)
 - o Design and implement valid solutions
 - o Verify and monitor resolution

Module Two: Layer 2 Technologies

- # Configuration and verify PPP
 - o Authentication (PPP,CHAP)
 - o PPPoE (client side only)
- # Explain Frame Relay
 - o Operations
 - o Point-to-point
 - o Multipoint
- # Configure, verify and Troubleshoot switch administration
 - o SDM templates
 - o Managing MAC address table
 - o Troubleshooting Err-disable recovery
- # Configure, verify and Troubleshoot Layer 2 protocols
 - o CDP-LLDP
 - o UDLD
- # Configure, verify and Troubleshoot VLANs
 - o Access ports
 - o VLAN database
 - o Normal, Extended VLANs, voice VLAN
- # Configure, verify and Troubleshoot trunking
 - o VTPv1, VTPv2, VTPv3, VTP pruning
 - o Dot1Q
 - o Native VLAN
 - o Manual pruning
- # Configure, verify and Troubleshoot EtherChannels
 - o LACP, PAgP, manual
 - o Layer 2 Layer 3
 - o Load balancing
 - o EtherChannel misconfiguration guard
- # Configure, verify and Troubleshoot spanning tree
 - o PVST+, RPVST+, MST
 - o Switch priority , port priority ,path cost
 - o STP timers
 - o PortFast, BPDUguard, BPDUfilter
 - o Loopguard and Rootguard
- # Configure, verify and Troubleshoot other LAN switching technologies
 - o SPAN, RSPAN

- # Describe and Troubleshoot chassis virtualization and aggregation technologies
 - o Stackwise

Module Three: Layer 3 Technologies

- # Identify, configure, verify and Troubleshoot IPv4 addressing and subnetting
 - o Address types
 - o ARP
 - o DHCP relay and server
 - o DHCP protocol operations
- # Identify and Troubleshoot IPv6 addressing and subnetting
 - o Unicast
 - o EUI-64
 - o ND,RS/RA
 - o Autoconfig (SLAAC)
 - o DHCP relay and sever
 - o DHCP protocol operations
- # Configure, verify and troubleshoot static routing
- # Configure, verify and Troubleshoot default routing
- # Evaluate routing protocol types
 - o Distance vector
 - o Link state
 - o Path vector
- # Describe and Troubleshoot administrative distance
- # Troubleshooting passive interface
- # Configure, verify and Troubleshoot VRF lite
- # Configure, verify and Troubleshoot filtering with any protocol
- # Configure, verify and Troubleshoot redistribution between any routing protocols or routing source
- # Configure, verify and Troubleshoot manual and auto-summarization with any routing protocol
- # Configure, verify and Troubleshoot policy-based routing
- # Explain ROUTE maps
- # Configure, verify and Troubleshoot loop prevention mechanisms
 - o Route tagging and filtering
 - o Split-horizon
 - o Route poisoning
- # Configure, verify and Troubleshoot RIPv2
- # Describe and Troubleshoot RIPv2
- # Describe and Troubleshoot EIGRP packer types
- # Configure, verify and Troubleshoot EIGRP neighbor relationship and authentication
- # Configure, verify and Troubleshoot EIGRP stubs
- # Configure, verify and Troubleshoot EIGRP load balancing
 - o Equal cost
 - o Unequal cost

- # Describe and Troubleshoot OSPF packet types
- # Configure, verify and Troubleshoot OSPF neighbor relationship and authentication
- # Configure, verify and Troubleshoot network types, area types and router types
 - o Point-to-point, Multipoint, Broadcast and Non-broadcast
 - o LSA types, area type: backbone, normal, transit, stub, NSSA, totally stub
 - o Internal router, backbone router, ABR, ASBR
 - o Virtual link
- # Configure, verify and Troubleshoot OSPF path preference
- # Configure, verify and Troubleshoot OSPF operations
- # Configure, verify and Troubleshoot OSPF for IPv6
- # Describe, configure and verify BGP peer relationship and authentication
 - o Peer group
 - o Active, passive
 - o States and timers
- # Configure, verify and Troubleshoot eBGP (IPv4 and IPv6 address families)
 - o eBGP
 - o 4-byte AS number
 - o Private AS
- # Explain BGP attributes and best-path selection

Module Four: VPN Technologies

- # Configure, verify and Troubleshoot GRE
- # Describe DMVPN (single hub)
- # Describe Easy Virtual Networking (EVN)

Module Five: Infrastructure Security

- # Describe and Troubleshoot IOS AAA using local database
- # Describe device security using IOS AAA with TACACS+ and RADIUS
 - o AAA with TACACS+ and RADIUS
 - o Local privilege authorization fallback
- # Configure, verify and Troubleshoot device access control
 - o Lines (VTY, AUX, Console)
 - o Management plane protection
 - o Password encryption
- # Configure, verify and Troubleshoot router security features
 - o Ipv4 access control lists (Standard, Extended, time-based)
 - o IPv6 traffic filter

- Unicast reverse path forwarding
- ⌘ Configuration and verify switch security features
 - DHCP snooping
 - IP Source Guard
 - Dynamic ARP inspection
 - Port security
 - Private VLAN
 - Storm Control
- ⌘ Describe device security Cisco IOS AAA with TACACS+ and RADIUS
 - AAA with TACACS+ RADIUS
 - Local privilege authorization fallback

Module Six: Infrastructure Services

- ⌘ Configure, verify and Troubleshoot device management
 - Console and VTY
 - Telnet, HTTP, HTTPS, SSH, SCP
 - TFTP
- ⌘ Configure and verify SNMP
 - V2
 - V3
- ⌘ Configure and verify logging
 - Local logging, syslog, debugs, conditional debugs

- Timestamps
- ⌘ Configure and verify Network Time protocol (NTP)
 - NTP master, client, version 3, version 4
 - NTP authentication
- ⌘ Configure, verify and Troubleshoot IPv4 and IPv6 DHCP
 - DHCP client, IOS DHCP server, DHCP relay
 - DHCP option (Describe)
- ⌘ Configure, verify and Troubleshoot IPv4 Network Address Translation (NAT)
 - Static NAT, dynamic NAT, PAT
- ⌘ Describe and Troubleshoot SLA architecture
- ⌘ Configure, verify and Troubleshoot IP SLA
 - ICMP
- ⌘ Configure, verify and Troubleshoot tracking objects
 - Tracking objects
 - Tracking different entities
- ⌘ Configure and verify Cisco NetFlow
 - NetFlow v5 ,v9
 - Local retrieval
 - Export
- ⌘ Configure and verify first-hop redundancy protocols
 - HSRP
 - VRRP
 - GLBP

