

Cisco Certified Network Associate (CCNA) Routing and Switching is a certification program for entry-level network engineers that helps maximize your investment in foundational networking knowledge and increase the value of your employer's network. CCNA Routing and Switching is for Network Specialists, Network Administrators, and Network Support Engineers with 1-3 years of experience. The CCNA Routing and Switching validates the ability to install, configure, operate, and troubleshoot medium-size routed and switched networks.

Outline :**Module One: Operation of IP Data**

- Recognize the purpose and function of version network devices.
- Select the components required to meet a given network specification
- Identify common application and impact on the network.
- Basic operation of the protocols in the OSI and TCP/IP
- Predict the data flow between two hosts across a network
- Identify the appropriate media, cables, ports and connectors to connect devices.

Module Two: LAN Switch Technologies

- Determine the technology and media access control method for Ethernet network
- Identify basic switching concepts
 - Collision domains
 - Broadcast domains
 - Ways to switch
 - Store
 - Forward
 - Cut through
 - CAM Table
- Switch Configuration
 - Hostname
 - Mgmt. IP address
 - IP default -gateway
 - Local user and password
 - Enable secret password
 - Console and VTY logins
 - Exec-timeout
 - Service password encryption
 - Copy run start
- Verify network status and switch operation
 - Ping
 - Telnet
 - SSH
- Creating VLANs logically
- Configuration and verify VLANs
- Configuration and verify trunking
 - DTP
 - Auto-negotiation
- Identify enhanced switching technologies
 - RSTP
 - PVSTP
 - Etherchannels
- Configure and verify PVSTP operation

- o Describe root bridge election
- o Spanning tree mode

Module Three: IP Addressing (IPv4/IPv6)

- ##Operation and necessity of using Private and public IPv4 address .
- ##Identify the appropriate IPv6 addressing .
- ##Identify the appropriate IPv4 addressing using VLSM and summarization.
- ##Describe the technological requirements for running IPv6 in conjunction with IPv4.
 - o Dual stack
- ##Describe IPv6 addresses
 - o Global unicast
 - o Multicast
 - o Link local
 - o Unique local
 - o EUI 64
 - o Auto-configuration

Module Four: IP Routing Technologies

- ##Describe basic routing concepts
 - o Packet forwarding
 - o Router lookup process
 - o Process Switching/Fast Switching/CEF
- ##Router Configuration
 - o Hostname
 - o Local user and password
 - o Enable secret and password
 - o Console & VTY logins
 - o Exec-timeout
 - o Service password encryption
 - o Interface IP address
 - Loopback
 - o Banner
 - o Motd
 - o Copy run start
- ##Configure and verify operation status of an Ethernet interface.
 - o Serial
 - o Ethernet
- ##Verify router configuration and network connectivity using
 - o Ping
 - Extended pings
 - o Traceroute
 - o Telnet
 - o SSH
 - o Show cdp Neighbors
- ##Configure and verify routing configuration for a static or default route
- ##Differentiate methods of routing and routing protocol
 - o Static Vs. Dynamic
 - o Link state Vs. Distance vector
 - o Next hop
 - o IP routing table

- o Passive interfaces
- o Admin Distance
- o Split horizon
- o Metric
- ##Configuration and verify OSPF (single area)
 - o Benefit of single area
 - o Configure OSPFv2 in a single area
 - o Configure OSPFv3 in a single area
 - o Router I D
 - o **Passive interface**
 - o Discuss multi -area OSPF
 - o Understand LSA types and purpose
- ##Configuration and verify interVLAN routing
 - o Sub interfaces
 - o Upstream routing
 - o Encapsulation
- ##Manage Cisco IOS Files
 - o Boot Preferences
 - o Cisco IOS Images (15)
 - o Licensing
 - Show license
 - Change license
- ##Configure and verify EIGRP (single AS)
 - o Feasible Distance/Feasible Successors/Administrative distance
 - o Feasibility condition
 - o Metric composition
 - o Router ID
 - o auto summary
 - o Path Selection
 - o Load Balancing
 - Unequal
 - Equal

Module Five: IP Services

- ##Configuration and Verify DHCP
 - o Configuring router interfaces to use DHCP
 - o DHCP options
 - o Excluded addresses
 - o Lease time
- ##Describe the types, features, and applications of ACLs
 - o **Standard**
 - o Extended
 - o Named
 - o Numbered
 - o Log option
- ##Configure and verify ACLs in a network environment
 - o Named
 - o Numbered
 - o Log option
- ##Identify the basic operation of NAT
 - o Purpose
 - o Pool

- o Static
- o 1 to 1
- o Overloading
- o Source addressing
- o One-way NAT

##Configure and verify NAT

##Configure and verify NTP as a client

Module Six: Network Device Security

##Configure and verify network device security

- o Device password security
- o Enable secret vs. enable
- o Transport
 - Disable telnet
 - SSH
- o VTYS
- o Physical security
- o Service password
- o Describe external authentication methods

##Configure and verify switch port security

- o Sticky mac
- o MAC address limitation
- o Static/dynamic
- o Violation modes
 - Err disable
 - Shutdown
 - Protect restrict
- o Shutdown unused ports
- o Err disable recovery
- o Assign unused ports in unused VLANs
- o Putting Native VLAN to other than VLAN 1

##Configure and verify ACLs to filter network traffic

##Configure and verify ACLs to limit telnet and SSH access to the router

Module Seven : Troubleshooting

##Identify and correct common network problems

##Utilize netflow data

##Troubleshoot and resolve spanning tree operation issues

- o Verify root switch
- o Verify priority
- o **Verify mode is correct**
- o Verify port states

##Troubleshoot and resolve routing issues

- o Verify routing is enabled (sh ip protocols)
- o Verify routing table is correct
- o Verify correct path selection

##Troubleshoot and resolve OSPF problems

- o Verify neighbor adjacencies
- o Verify hello and dDead timers
- o Verify OSPF area
- o Verify interface MTU
- o Verify network types

- Verify neighbor states
- Review OSPF topology table
- ##Verify correct path selection
- ##Troubleshoot and resolve EIGRP problems
 - Verify neighbor adjacencies
 - Verify AS number
 - Verify load balancing
 - split horizon

- ##Troubleshoot and resolve inter VLAN routing problems
 - Verify connectivity
 - Verify encapsulation
 - Verify subnet
 - Verify native VLAN
 - port mode trunk status
- ##Troubleshoot and resolve WAN implementation issues
 - serial interfaces
 - frame relay
 - PPP
- ##Monitor NetFlow statistics
- ##TS Etherchannel problems

Module Eight : 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