

## Cisco Certified Network Associate (200-125) ROUTING AND SWITCHING

### 1.0 Network Fundamentals

- 1.1 Compare and contrast OSI and TCP/IP models
- 1.2 Compare and contrast TCP and UDP protocols
- 1.3 Describe the impact of infrastructure components in an enterprise network
  - 1.3.a Firewalls
  - 1.3.b Access points
  - 1.3.c Wireless controllers
- 1.4 Describe the effects of cloud resources on enterprise network architecture
  - 1.4.a Traffic path to internal and external cloud services
  - 1.4.b Virtual services
  - 1.4.c Basic virtual network infrastructure
- 1.5 Compare and contrast collapsed core and three-tier architectures
- 1.6 Compare and contrast network topologies
  - 1.6.a Star
  - 1.6.b Mesh
  - 1.6.c Hybrid
- 1.7 Select the appropriate cabling type based on implementation requirements
- 1.8 Apply troubleshooting methodologies to resolve problems
  - 1.8.a Perform and document fault isolation
  - 1.8.b Resolve or escalate
  - 1.8.c Verify and monitor resolution
- 1.9 Configure, verify, and troubleshoot IPv4 addressing and subnetting
- 1.10 Compare and contrast IPv4 address types

- 1.10.a Unicast
- 1.10.b Broadcast
- 1.10.c Multicast
  
- 1.11 Describe the need for private IPv4 addressing
  
- 1.12 Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment
  
- 1.13 Configure, verify, and troubleshoot IPv6 addressing
  
- 1.14 Configure and verify IPv6 Stateless Address Auto Configuration
  
- 1.15 Compare and contrast IPv6 address types
  - 1.15.a Global unicast
  - 1.15.b Unique local
  - 1.15.c Link local
  - 1.15.d Multicast
  - 1.15.e Modified EUI 64
  - 1.15.f Autoconfiguration
  - 1.15.g Anycast

## **2.0 LAN Switching Technologies**

- 2.1 Describe and verify switching concepts
  - 2.1.a MAC learning and aging
  - 2.1.b Frame switching
  - 2.1.c Frame flooding
  - 2.1.d MAC address table
  
- 2.2 Interpret Ethernet frame format
  
- 2.3 Troubleshoot interface and cable issues (collisions, errors, duplex, speed)
  
- 2.4 Configure, verify, and troubleshoot VLANs (normal/extended range) spanning multiple switches
  - 2.4.a Access ports (data and voice)
  - 2.4.b Default VLAN
  
- 2.5 Configure, verify, and troubleshoot interswitch connectivity
  - 2.5.a Trunk ports
  - 2.5.b Add and remove VLANs on a trunk
  - 2.5.c DTP, VTP (v1&v2), and 802.1Q
  - 2.5.d Native VLAN
  
- 2.6 Configure, verify, and troubleshoot STP protocols
  - 2.6.a STP mode (PVST+ and RPVST+)
  - 2.6.b STP root bridge selection

- 2.7 Configure, verify and troubleshoot STP related optional features
  - 2.7.a PortFast
  - 2.7.b BPDU guard
- 2.8 Configure and verify Layer 2 protocols
  - 2.8.a Cisco Discovery Protocol
  - 2.8.b LLDP
- 2.9 Configure, verify, and troubleshoot (Layer 2/Layer 3) EtherChannel
  - 2.9.a Static
  - 2.9.b PAGP
  - 2.9.c LACP
- 2.10 Describe the benefits of switch stacking and chassis aggregation

### **3.0 Routing Technologies**

- 3.1 Describe the routing concepts
  - 3.1.a Packet handling along the path through a network
  - 3.1.b Forwarding decision based on route lookup
  - 3.1.c Frame rewrite
- 3.2 Interpret the components of a routing table
  - 3.2.a Prefix
  - 3.2.b Network mask
  - 3.2.c Next hop
  - 3.2.d Routing protocol code
  - 3.2.e Administrative distance
  - 3.2.f Metric
  - 3.2.g Gateway of last resort
- 3.3 Describe how a routing table is populated by different routing information sources
  - 3.3.a Admin distance
- 3.4 Configure, verify, and troubleshoot inter-VLAN routing
  - 3.4.a Router on a stick
  - 3.4.b SVI
- 3.5 Compare and contrast static routing and dynamic routing
- 3.6 Compare and contrast distance vector and link state routing protocols
- 3.7 Compare and contrast interior and exterior routing protocols
- 3.8 Configure, verify, and troubleshoot IPv4 and IPv6 static routing
  - 3.8.a Default route
  - 3.8.b Network route

- 3.8.c Host route
- 3.8.d Floating static
- 3.9 Configure, verify, and troubleshoot single area and multi-area OSPFv2 for IPv4 (excluding authentication, filtering, manual summarization, redistribution, stub, virtual-link, and LSAs)
- 3.10 Configure, verify, and troubleshoot single area and multi-area OSPFv3 for IPv6 (excluding authentication, filtering, manual summarization, redistribution, stub, virtual-link, and LSAs)
- 3.11 Configure, verify, and troubleshoot EIGRP for IPv4 (excluding authentication, filtering, manual summarization, redistribution, stub)
- 3.12 Configure, verify, and troubleshoot EIGRP for IPv6 (excluding authentication, filtering, manual summarization, redistribution, stub)
- 3.13 Configure, verify, and troubleshoot RIPv2 for IPv4 (excluding authentication, filtering, manual summarization, redistribution)
- 3.14 Troubleshoot basic Layer 3 end-to-end connectivity issues
- 4.0 WAN Technologies**
- 4.1 Configure and verify PPP and MLPPP on WAN interfaces using local authentication
- 4.2 Configure, verify, and troubleshoot PPPoE client-side interfaces using local authentication
- 4.3 Configure, verify, and troubleshoot GRE tunnel connectivity
- 4.4 Describe WAN topology options
  - 4.4.a Point-to-point
  - 4.4.b Hub and spoke
  - 4.4.c Full mesh
  - 4.4.d Single vs dual-homed
- 4.5 Describe WAN access connectivity options
  - 4.5.a MPLS
  - 4.5.b Metro Ethernet
  - 4.5.c Broadband PPPoE
  - 4.5.d Internet VPN (DMVPN, site-to-site VPN, client VPN)
- 4.6 Configure and verify single-homed branch connectivity using eBGP IPv4 (limited to peering and route advertisement using Network command only)
- 4.7 Describe basic QoS concepts
  - 4.7.a Marking

- 4.7.b Device trust
- 4.7.c Prioritization
  - 4.7.c. (i) Voice
  - 4.7.c. (ii) Video
  - 4.7.c. (iii) Data
- 4.7.d Shaping
- 4.7.e Policing
- 4.7.f Congestion management

## **5.0 Infrastructure Services**

- 5.1 Describe DNS lookup operation
- 5.2 Troubleshoot client connectivity issues involving DNS
- 5.3 Configure and verify DHCP on a router (excluding static reservations)
  - 5.3.a Server
  - 5.3.b Relay
  - 5.3.c Client
  - 5.3.d TFTP, DNS, and gateway options
- 5.4 Troubleshoot client- and router-based DHCP connectivity issues
- 5.5 Configure, verify, and troubleshoot basic HSRP
  - 5.5.a Priority
  - 5.5.b Preemption
  - 5.5.c Version
- 5.6 Configure, verify, and troubleshoot inside source NAT
  - 5.6.a Static
  - 5.6.b Pool
  - 5.6.c PAT
- 5.7 Configure and verify NTP operating in a client/server mode

## **6.0 Infrastructure Security**

- 6.1 Configure, verify, and troubleshoot port security
  - 6.1.a Static
  - 6.1.b Dynamic
  - 6.1.c Sticky
  - 6.1.d Max MAC addresses
  - 6.1.e Violation actions
  - 6.1.f Err-disable recovery
- 6.2 Describe common access layer threat mitigation techniques
  - 6.2.a 802.1x
  - 6.2.b DHCP snooping

- 6.2.c Nondefault native VLAN
- 6.3 Configure, verify, and troubleshoot IPv4 and IPv6 access list for traffic filtering
  - 6.3.a Standard
  - 6.3.b Extended
  - 6.3.c Named
- 6.4 Verify ACLs using the APIC-EM Path Trace ACL Analysis tool
- 6.5 Configure, verify, and troubleshoot basic device hardening
  - 6.5.a Local authentication
  - 6.5.b Secure password
  - 6.5.c Access to device
    - 6.5.c. (i) Source address
    - 6.5.c. (ii) Telnet/SSH
  - 6.5.d Login banner
- 6.6 Describe device security using AAA with TACACS+ and RADIUS
- 7.0 Infrastructure Management**
- 7.1 Configure and verify device-monitoring protocols
  - 7.1.a SNMPv2
  - 7.1.b SNMPv3
  - 7.1.c Syslog
- 7.2 Troubleshoot network connectivity issues using ICMP echo-based IP SLA
- 7.3 Configure and verify device management
  - 7.3.a Backup and restore device configuration
  - 7.3.b Using Cisco Discovery Protocol or LLDP for device discovery
  - 7.3.c Licensing
  - 7.3.d Logging
  - 7.3.e Timezone
  - 7.3.f Loopback
- 7.4 Configure and verify initial device configuration
- 7.5 Perform device maintenance
  - 7.5.a Cisco IOS upgrades and recovery (SCP, FTP, TFTP, and MD5 verify)
  - 7.5.b Password recovery and configuration register
  - 7.5.c File system management
- 7.6 Use Cisco IOS tools to troubleshoot and resolve problems
  - 7.6.a Ping and traceroute with extended option
  - 7.6.b Terminal monitor
  - 7.6.c Log events
  - 7.6.d Local SPAN

- 7.7 Describe network programmability in enterprise network architecture
  - 7.7.a Function of a controller
  - 7.7.b Separation of control plane and data plane
  - 7.7.c Northbound and southbound APIs

