CCNP-IP Routing[300-101]

Duration - 2   Months

e-Biz™
Technologies

◇ **Network Principles**
- Identify Cisco Express Forwarding concepts
  - I. FIB
  - II. Adjacency table
- Explain general network challenges
  - I. Unicast
  - II. Out-of-order packets
  - III. Asymmetric routing
- Describe IP operations
  - I. ICMP Unreachable and Redirects
  - II. IPv4 and IPv6 fragmentation
  - III. TTL
- Explain TCP operations
  - I. IPv4 and IPv6 (P)MTU
  - II. MSS
  - III. Latency
  - IV. Windowing
  - V. Bandwidth-delay product
  - VI. Global synchronization
- Describe UDP operations
  - I. Starvation
  - II. Latency
- Recognize proposed changes to the network
  - I. Changes to routing protocol parameters
  - II. Migrate parts of the network to IPv6
  - III. Routing protocol migration

◇ **Layer 2 Technologies**
- Configure and verify PPP
  - I. Authentication (PAP, CHAP)
  - II. PPPoE (client side only)
- Explain Frame Relay
  - I. Operations
  - II. Point-to-point
  - III. Multipoint

◇ **Layer 3 Technologies**
- Identify, configure, and verify IPv4 addressing and subnetting
  - I. Address types (Unicast, broadcast, multicast, and VLSM)
  - II. ARP
  - III. DHCP relay and server
  - IV. DHCP protocol operations
- Identify IPv6 addressing and subnetting
  - I. Unicast
  - II. EUI-64
  - III. ND, RS/RA
  - IV. Autoconfig (SLAAC)
  - V. DHCP relay and server
  - VI. DHCP protocol operations
- Configure and verify static routing
- Configure and verify default routing
- Evaluate routing protocol types
  - I. Distance vector
  - II. Link state
  - III. Path vector
- Describe administrative distance
- Troubleshoot passive interfaces
- Configure and verify VRF lite
- Configure and verify filtering with any protocol
- Configure and verify redistribution between any routing protocols or routing sources

- Configure and verify manual and autosummarization with any routing protocol
- Configure and verify policy-based routing
- Identify suboptimal routing
- Explain ROUTE maps
- Configure and verify loop prevention mechanisms
  - I. Route tagging and filtering
  - II. Split-horizon
  - III. Route poisoning
- Configure and verify RIPv2
- Describe RIPng
- Describe EIGRP packet types
- Configure and verify EIGRP neighbor relationship and authentication
- Configure and verify EIGRP stubs
- Configure and verify EIGRP load balancing
  - I. Equal cost
  - II. Unequal cost
- Describe and optimize EIGRP metrics
- Configure and verify EIGRP for IPv6
- Describe OSPF packet types
- Configure and verify OSPF neighbor relationship and authentication
- Configure and verify network types, area types, and router types
  - I. Point-to-point, multipoint, broadcast, nonbroadcast
  - II. LSA types, area type: backbone, normal, transit, stub, NSSA, totally stub
  - III. Internal router, backbone router, ABR, ASBR
  - IV. Virtual link
- Configure and verify OSPF path preference
- Configure and verify OSPF operations
- Configure and verify OSPF for IPv6

- Describe, configure, and verify BGP peer relationships and authentication
  - I. Peer group
  - II. Active, passive
  - III. States and timers
- Configure and verify eBGP (IPv4 and IPv6 address families)
  - I. eBGP
  - II. 4-byte AS number
  - III. Private AS
  - IV. Explain BGP attributes and best-path selection

✧ **VPN Technologies**
- Configure and verify GRE
- Describe DMVPN (single hub)
- Describe Easy Virtual Networking (EVN)

✧ **Infrastructure Security**
- Describe IOS AAA using local database
- Describe device security using IOS AAA with TACACS+ and RADIUS
  - I. AAA with TACACS+ and RADIUS
  - II. Local privilege authorization fallback
- Configure and verify device access control
  - I. Lines (VTY, AUX, console)
  - II. Management plane protection
  - III. Password encryption
- Configure and verify router security features
- IPv4 access control lists (standard, extended, time-based)
- IPv6 traffic filter
- Unicast reverse path forwarding

✧ **Infrastructure Services**
- Configure and verify device management
    - I. Console and VTY
    - II. Telnet, HTTP, HTTPS, SSH, SCP
    - III. (T)FTP
- Configure and verify SNMP
    - I. v2
    - II. v3
- Configure and verify logging
    - I. Local logging, syslog, debugs, conditional debugs
    - II. Timestamps
- Configure and verify Network Time Protocol (NTP)
    - I. NTP master, client, version 3, version 4
    - II. NTP authentication
- Configure and verify IPv4 and IPv6 DHCP
    - I. DHCP client, IOS DHCP server, DHCP relay
    - II. DHCP options (describe)
- Configure and verify IPv4 Network Address Translation (NAT)
    - I. Static NAT, dynamic NAT, PAT
- Describe IPv6 NAT
    - I. NAT64
    - II. NPTv6
- Describe SLA architecture
- Configure and verify IP SLA
    - I. ICMP
- Configure and verify tracking objects
    - I. Tracking objects
    - II. Tracking different entities (for example, interfaces, IPSLA results)
- Configure and verify Cisco NetFlow
    - I. NetFlow v5, v9
    - II. Local retrieval
    - III. Export (configuration only)

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