

CCIE ROUTING AND SWITCHING TRACK

Written Exam Topics

1. General Networking Theory

1. General Routing Concepts
 1. Link State and Distance Vector Protocols
 2. Split Horizon
 3. Summarization
 4. Classful and a Classless routing protocol
 5. Routing decision criteria
2. Routing Information Base (RIB) and Routing Protocols Interaction
 1. Administrative Distance
 2. Routing Table
 3. RIB and Forwarding Information Base interaction
3. Redistribution
 1. Redistribution between routing
 2. Troubleshooting routing loop

2. Bridging and LAN Switching

1. Spanning Tree Protocol (STP)
 1. 802.1d
 2. 802.1w
 3. 802.1s
 4. Loopguard
 5. Rootguard
 6. Bridge Protocol Data Unit (BPDU) Guard
 7. Storm Control
 8. Rapid Spanning Tree Protocol (RSTP)
 9. Unicast flooding
 10. STP port roles, failure propagation and loopguard operation

1. LAN Switching
 1. Trunks
 2. VLAN Trunking Protocol (VTP) administrative functions
 3. Ethernet
 4. Speed
 5. Duplex
 6. Ethernet
 7. Fast Ethernet
 8. Gigabit Ethernet

3. IP

1. Addressing
 1. Subnetting
 2. Hot Standby Routing Protocol (HSRP)
 3. Gateway Load Balancing Protocol (GLBP)
 4. Virtual Router Redundancy Protocol (VRRP)
 5. Network Address Translation (NAT)
2. Services
 1. Network Time Protocol (NTP)
 2. Dynamic Host Control Protocol (DHCP)
 3. Web Cache Communication Protocol (WCCP)
3. Network Management
 1. Logging and Syslog

4. IP Routing

1. OSPF
 1. Standard OSPF area
 2. Stub area
 3. Totally stub area
 4. Not-so-stubby-area (NSSA)
 5. Totally NSSA
 6. Link State Advertisement (LSA) types
 7. Adjacency on a point-to-point and on a multi-access (broadcast)
 8. OSPF graceful restart
 9. Troubleshooting failing adjacency formation to fail
 10. Troubleshooting of external route installation in the RIB

2. **BGP**
 1. Protocol on which BGP peers communicate
 2. Next Hop
 3. Peering
 4. Troubleshooting of BGP route that will not install in the routing table

3. **EIGRP**
 1. Best path
 2. Loop free paths
 3. EIGRP operations when alternate loop free paths are available and when it is not available
 4. EIGRP queries
 5. Manual summarization
 6. Auto-summarization
 7. EIGRP Stubs
 8. Troubleshooting of EIGRP neighbor adjacencies

4. **Policy Routing**
 1. Concept of policy routing

5. **QoS**
 1. Modular QoS command-line (MQC) applied to:
 1. Network-Based Application Recognition (NBAR)
 2. Class-based weighted fair queueing (CBWFQ) / Modified Deficit Round Robin (MDRR)
 3. Policing
 4. Shaping
 5. Marking
 6. Random Early Detection (RED)

6. **WAN**
 1. Frame Relay
 1. Local Management Interface (LMI)
 2. Traffic Shaping
 3. HUB and Spoke routers
 4. Dynamic Multipoint VPN (DMVPN)
 5. DE

7. **IP Multicast**
 1. Internet Group Management Protocol (IGMP) v2
 2. Group addresses
 3. Shared Trees
 4. Source Trees
 5. Protocol Independent Multicast (PIM) Mechanic
 6. PIM Sparse Mode

7. Auto-RP
8. Anycast RP

8. Security

1. Extended IP access lists
2. Unicast Reverse Path Forwarding (uRPF)
3. IP Source Guard
4. Context Based Access Control (CBAC)

9. MPLS (New)

1. Label Switching Router (LSR)
2. Label Switched Path (LSP)
3. Route Descriptor
4. Label Format
5. Label imposition/disposition
6. Label Distribution

10. IPv6 (New)

1. IPv6 Addressing and types
2. IPv6 Neighbor Discovery
3. Basic IPv6 functionality protocols
4. IPv6 Multicast and related Multicast protocols
5. Tunneling Techniques
6. OSPFv3
7. EIGRPv6

Lab Exam Topics

1. Bridging and Switching

1. Frame relay
2. Catalyst configuration: VLANs, VTP, STP, MSTP, RSTP, Trunk, Etherchannel, management, features, advanced configuration, Layer 3
3. Tunneling

2. IP IGP Routing

1. OSPF
2. EIGRP
3. RIPv2
4. IPv6: Addressing, RIPng, OSPFv3
5. GRE
6. ODR
7. Filtering, redistribution, summarization and other advanced features

3. BGP

1. IBGP
2. EBGp
3. Filtering, redistribution, summarization, synchronization, attributes and other advanced features

4. IP and IOS Features

1. IP addressing
2. DHCP
3. HSRP
4. IP services
5. IOS user interfaces
6. System management
7. NAT
8. NTP
9. SNMP
10. RMON
11. Accounting
12. SLA

5. IP Multicast

1. PIM-SM, bi-directional PIM
2. MSDP
3. Multicast tools, source specific multicast
4. DVMRP
5. Anycast

6. QoS

1. Quality of service solutions
2. Classification
3. Congestion management, congestion avoidance
4. Policing and shaping
5. Signaling
6. Link efficiency mechanisms
7. Modular QoS command line

7. Security

1. AAA
2. Security server protocols
3. Traffic filtering and firewalls
4. Access lists
5. Routing protocols security, catalyst security
6. CBAC
7. Other security features