

CCNA VOICE



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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
 - 1.3.1. Firewalls
 - 1.3.2. Access points
 - 1.3.3. Wireless controllers
- 1.4. Describe the effects of cloud resources on enterprise network architecture
 - 1.4.1. Traffic path to internal and external cloud services
 - 1.4.2. Virtual services
 - 1.4.3. Basic virtual network infrastructure
- 1.5. Compare and contrast collapsed core and three-tier architectures
- 1.6. Compare and contrast network topologies
 - 1.6.1. Star
 - 1.6.2. Mesh
 - 1.6.3. Hybrid
- 1.7. Select the appropriate cabling type based on implementation requirements
- 1.8. Apply troubleshooting methodologies to resolve problems
 - 1.8.1. Perform and document fault isolation
 - 1.8.2. Resolve or escalate
 - 1.8.3. Verify and monitor resolution



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- 1.9. Configure, verify, and troubleshoot IPv4 addressing and subnetting
- 1.10. Compare and contrast IPv4 address types
 - 1.10.1. Unicast
 - 1.10.2. Broadcast
 - 1.10.3. 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
 - 1.15.1. Global unicast
 - 1.15.2. Unique local
 - 1.15.3. Link local
 - 1.15.4. Multicast
 - 1.15.5. Modified EUI 64
 - 1.15.6. Autoconfiguration
 - 1.15.7. Anycast



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2.0 LAN Switching Technologies

- 2.1. Describe and verify switching concepts
 - 2.1.1. MAC learning and aging
 - 2.1.2. Frame switching
 - 2.1.3. Frame flooding
 - 2.1.4. 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
 - 2.4.1. Access ports (data and voice)
 - 2.4.2. Default VLAN
- 2.5. Configure, verify, and troubleshoot interswitch connectivity
 - 2.5.1. Trunk ports
 - 2.5.2. Add and remove VLANs on a trunk
 - 2.5.3. DTP, VTP (v1&v2), and 802.1Q
 - 2.5.4. Native VLAN
- 2.6. Configure, verify, and troubleshoot STP protocols
 - 2.6.1. STP mode (PVST+ and RPVST+)
 - 2.6.2. STP root bridge selection
- 2.7. Configure, verify and troubleshoot STP related optional features
 - 2.7.1. PortFast
 - 2.7.2. BPDU guard
- 2.8. Configure and verify Layer 2 protocols
 - 2.8.1. Cisco Discovery Protocol
 - 2.8.2. LLDP



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- 2.9. Configure, verify, and troubleshoot (Layer 2/Layer 3) EtherChannel
 - 2.9.1. Static
 - 2.9.2. PAGP
 - 2.9.3. LACP
- 2.10. Describe the benefits of switch stacking and chassis aggregation

3.0 Routing Technologies

- 3.1. Describe the routing concepts
 - 3.1.1. Packet handling along the path through a network
 - 3.1.2. Forwarding decision based on route lookup
 - 3.1.3. Frame rewrite
- 3.2. Interpret the components of a routing table
 - 3.2.1. Prefix
 - 3.2.2. Network mask
 - 3.2.3. Next hop
 - 3.2.4. Routing protocol code
 - 3.2.5. Administrative distance
 - 3.2.6. Metric
 - 3.2.7. Gateway of last resort
- 3.3. Describe how a routing table is populated by different routing information sources
 - 3.3.1. Admin distance
- 3.4. Configure, verify, and troubleshoot inter-VLAN routing
 - 3.4.1. Router on a stick
 - 3.4.2. SVI
- 3.5. Compare and contrast static routing & dynamic routing



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- 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
 - 3.8.1. Default route
 - 3.8.2. Network route
 - 3.8.3. Host route
 - 3.8.4. 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



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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
 - 4.4.1. Point-to-point
 - 4.4.2. Hub and spoke
 - 4.4.3. Full mesh
 - 4.4.4. Single vs dual-homed
- 4.5. Describe WAN access connectivity options
 - 4.5.1. MPLS
 - 4.5.2. Metro Ethernet
 - 4.5.3. Broadband PPPoE
 - 4.5.4. 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
 - 4.7.1. Marking
 - 4.7.2. Device trust
 - 4.7.3. Prioritization
 - A. Voice
 - B. Video
 - C. Data
 - 4.7.4. Shaping
 - 4.7.5. Policing
 - 4.7.6. Congestion management



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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)
 - 5.3.1. Server
 - 5.3.2. Relay
 - 5.3.3. Client
 - 5.3.4. TFTP, DNS, and gateway options
- 5.4. Troubleshoot client- and router-based DHCP connectivity issues
- 5.5. Configure, verify, and troubleshoot basic HSRP
 - 5.5.1. Priority
 - 5.5.2. Preemption
 - 5.5.3. Version
- 5.6. Configure, verify, and troubleshoot inside source NAT
 - 5.6.1. Static
 - 5.6.2. Pool
 - 5.6.3. PAT
- 5.7. Configure and verify NTP operating in a client/server mode



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6.0 Infrastructure Security

- 6.1. Configure, verify, and troubleshoot port security
 - 6.1.1. Static
 - 6.1.2. Dynamic
 - 6.1.3. Sticky
 - 6.1.4. Max MAC addresses
 - 6.1.5. Violation actions
 - 6.1.6. Err-disable recovery
- 6.2. Describe common access layer threat mitigation techniques
 - 6.2.1. 802.1x
 - 6.2.2. DHCP snooping
 - 6.2.3. Nondefault native VLAN
- 6.3. Configure, verify, and troubleshoot IPv4 and IPv6 access list for traffic filtering
 - 6.3.1. Standard
 - 6.3.2. Extended
 - 6.3.3. Named
- 6.4. Verify ACLs using the APIC-EM Path Trace ACL Analysis tool
- 6.5. Configure, verify, and troubleshoot basic device hardening
 - 6.5.1. Local authentication
 - 6.5.2. Secure password
 - 6.5.3. Access to device
 - A. Source address
 - B. Telnet/SSH
 - 6.5.4. Login banner
- 6.5.5. Describe device security using AAA with TACACS+ and RADIUS



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7.0 Infrastructure Management

- 7.1. Configure and verify device-monitoring protocols
 - 7.1.1. SNMPv2
 - 7.1.2. SNMPv3
 - 7.1.3. Syslog
- 7.2. Troubleshoot network connectivity issues using ICMP echo-based IP SLA
- 7.3. Configure and verify device management
 - 7.3.1. Backup and restore device configuration
 - 7.3.2. Using Cisco Discovery Protocol or LLDP for device discovery
 - 7.3.3. Licensing
 - 7.3.4. Logging
 - 7.3.5. Timezone
 - 7.3.6. Loopback
- 7.4. Configure and verify initial device configuration
- 7.5. Perform device maintenance
 - 7.5.1. Cisco IOS upgrades and recovery (SCP, FTP, TFTP, and MD5 verify)
 - 7.5.2. Password recovery and configuration register
 - 7.5.3. File system management
- 7.6. Use Cisco IOS tools to troubleshoot and resolve problems
 - 7.6.1. Ping and traceroute with extended option
 - 7.6.2. Terminal monitor
 - 7.6.3. Log events
 - 7.6.4. Local SPAN
- 7.7. Describe network programmability in enterprise network architecture
 - 7.7.1. Function of a controller
 - 7.7.2. Separation of control plane and data plane
 - 7.7.3. Northbound and southbound APIs



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