

Lab – CCIE Enterprise Infrastructure



Online Course

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Course Modules

1. Network Infrastructure

- Switched campus
 - o Switch administration
 - ☒ Managing MAC address table
 - ☒ Errdisable recovery
 - ☒ L2 MTU
 - o Layer 2 protocols
 - ☒ CDP, LLDP
 - ☒ UDLD
 - o VLAN technologies
 - ☒ Access ports
 - ☒ Trunk ports (802.1Q)
 - ☒ Native VLAN
 - ☒ Manual VLAN pruning
 - ☒ Normal range and extended range VLANs
 - ☒ Voice VLAN
 - o EtherChannel
 - ☒ LACP, static
 - ☒ Layer 2, Layer 3
 - ☒ Load balancing
 - ☒ EtherChannel misconfiguration guard
 - ☒ Identify multichassis EtherChannel use cases

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- o Operations
 - ☒ General operations
 - ☒ Topology table
 - ☒ Packet types
 - ☒ Stuck-in-active
 - ☒ Graceful shutdown
- o EIGRP named mode
- o Optimization, convergence, and scalability
 - ☒ Query propagation boundaries
 - ☒ Leak-map with summary routes
 - ☒ EIGRP stub with leak map
- OSPF (v2 and v3)
 - o Adjacencies
 - o OSPFv3 address family support
 - o Network types, area types
 - o Path preference
 - o Operations
 - ☒ General operations
 - ☒ Graceful shutdown
 - ☒ GTSM (Generic TTL Security Mechanism)
 - o Optimization, convergence, and scalability
 - ☒ Metrics
 - ☒ LSA throttling, SPF tuning
 - ☒ Stub router
 - ☒ Prefix suppression



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- BGP
 - o IBGP and EBGP peer relations
 - ☒ Peer groups, templates
 - ☒ Active, passive
 - ☒ Timers
 - ☒ Dynamic Neighbours
 - ☒ 4-byte AS numbers
 - ☒ Private AS numbers
 - o Path selection
 - ☒ Attributes
 - ☒ Best path selection algorithm
 - ☒ Load balancing
 - o Routing policies
 - ☒ Attribute manipulation
 - ☒ Conditional advertisement
 - ☒ Outbound route filtering
 - ☒ Standard and extended communities
 - ☒ Multihoming
 - o AS path manipulations
 - ☒ local-as, allowas-in, remove-private-as
 - ☒ AS path prepending
 - ☒ Regular expressions
 - o Convergence and scalability
 - ☒ Route reflectors
 - ☒ Aggregation, as-set



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- o Other BGP features such as soft reconfiguration & route refresh
- Multicast
 - o Layer 2 multicast
 - ☒ IGMPv2, IGMPv3
 - ☒ IGMP snooping, PIM snooping
 - ☒ IGMP querier
 - ☒ IGMP filter
 - ☒ MLD
 - o Reverse path forwarding check
 - o PIM
 - ☒ Sparse mode
 - ☒ Static RP, BSR, Auto-RP
 - ☒ Group-to-RP mapping
 - ☒ Source Specific Multicast
 - ☒ Multicast boundary, RP announcement filter
 - ☒ PIMv6 anycast RP
 - ☒ IPv4 anycast RP using MSDP
 - ☒ Multicast multipath



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- o Fabric border handoff
- ☒ SDA, SDWAN, IP transits
- ☒ Peer device (Fusion router)
- ☒ Layer 2 border handoff
- o Segmentation
- ☒ Macro segmentation using virtual networks
- ☒ Micro-level segmentation using SGTs and SGACLs
 - Cisco SD-WAN
- o Controller architecture
- ☒ Management plane (vManage)
- ☒ Orchestration plane (vBond)
- ☒ Control plane (vSmart)
- o SD-WAN underlay
- ☒ WAN Cloud Edge deployment (AWS, Azure, Google Cloud)
- ☒ WAN Edge deployment (hardware)
- ☒ Greenfield, brownfield, and hybrid deployments
- ☒ System configuration (system IP, site ID, org name, etc)
- ☒ Transport configuration (underlay and tunnel interfaces, etc)
- o Overlay Management Protocol (OMP)
- ☒ OMP attributes
- ☒ IPsec key management
- ☒ Route aggregation
- ☒ Redistribution
- ☒ Additional features (BGP AS path propagation, SDA integration)



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- o Configuration templates
 - ☒ CLI templates
 - ☒ Feature templates
 - ☒ Device templates
- o Centralized policies
 - ☒ Data policies
 - ☒ Application-aware routing policies
 - ☒ Control policies
- o Localized policies
 - ☒ Access lists
 - ☒ Route policies

3. Transport Technologies and Solutions

- Static point-to-point GRE tunnels
- MPLS
 - o Operations
 - ☒ Label stack, LSR, LSP
 - ☒ LDP
 - ☒ MPLS ping, MPLS traceroute
 - o L3VPN
 - ☒ PE-CE routing using BGP
 - ☒ Basic MP-BGP VPNv4/VPNv6



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- DMVPN
 - o Troubleshoot DMVPN Phase 3 with dual hub
- ☒ NHRP
- ☒ IPsec/IKEv2 using preshared key

4. Infrastructure Security and services

- Device security on Cisco IOS XE
 - o Control plane policing and protection
 - o AAA
- Network security
 - o Switch security features
 - ☒ VACL, PACL
 - ☒ Storm control
 - ☒ DHCP snooping, DHCP option 82
 - ☒ IP Source Guard
 - ☒ Dynamic ARP Inspection
 - ☒ Port security
 - o Router security features
 - ☒ IPv6 traffic filters
 - ☒ IPv4 access control lists
 - ☒ Unicast Reverse Path Forwarding
 - o IPv6 infrastructure security features
 - ☒ RA Guard
 - ☒ DHCP Guard



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- Network services
 - First-Hop Redundancy Protocols
 - ☒ HSRP, VRRP
 - ☒ Redundancy using IPv6 RS/RA
 - Time synchronization protocols
 - ☒ NTP as a client
 - ☒ PTP design considerations
 - DHCP on Cisco devices
 - ☒ Client, server, relay
 - ☒ Options
 - ☒ SLAAC/DHCPv6 integration
 - ☒ Stateful, stateless DHCPv6
 - ☒ DHCPv6 Prefix Delegation
 - IPv4 Network Address Translation
 - ☒ Static NAT, PAT
 - ☒ Dynamic NAT, PAT
 - ☒ Policy-based NAT, PAT
 - ☒ VRF-aware NAT, PAT
 - ☒ VRF-aware Software Infrastructure (VASI) NAT
- Network optimization
 - IP SLA (ICMP, UDP, TCP probes)
 - Tracking objects and lists
 - Flexible NetFlow



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- Network operations
 - o Traffic capture
 - ☒ SPAN, RSPAN, ERSPAN
 - ☒ Embedded packet capture
 - o Troubleshooting tools
 - ☒ Data path packet trace
 - ☒ Conditional debugger (debug platform condition)

5. Infrastructures Automation and programmability

- Data encoding formats
 - o JSON
 - o XML
 - o YAML
 - o Jinja
- Automation and scripting
 - o EEM applets
 - o Guest shell
 - ☒ Linux environment
 - ☒ CLI Python module
 - ☒ EEM Python module
- Programmability
 - o Interaction with vManage API
 - ☒ Python requests library and Postman
 - ☒ Monitoring endpoints

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