

CCNP ENTERPRISE INFRASTRUCTURE v1.1 END-END TRAINING

**Zoom Ahead to Next Level
Networking Career**

**Comprehensive Program to Learn the
New CCNP Enterprise Infrastructure**

Basic Switching

- ❖ Switch administration
 - Managing MAC address table
 - Errdisable recovery
 - L2 MTU
- ❖ Layer 2 protocols
 - CDP, LLDP
 - UDLD
- ❖ VLAN technologies
 - Access ports
 - Trunk ports (802.1Q)
 - Native VLAN
 - Manual VLAN pruning
 - VLAN database
 - Normal range and extended range VLANs
 - Voice VLAN
 - VTP
- ❖ EtherChannel
 - LACP, static
 - Layer 2, Layer 3
 - Load balancing
 - EtherChannel Misconfiguration Guard
- ❖ Spanning Tree Protocol
 - PVST+, Rapid PVST+, MST
 - Switch priority, port priority, path cost, STP timers
 - PortFast, BPDU Guard, BPDU Filter
 - Loop Guard, Root Guard

Routing Concepts

- ❖ Administrative distance
- ❖ VRF-lite
- ❖ Static routing
- ❖ Policy Based Routing
- ❖ VRF-aware routing with any routing protocol
- ❖ Route filtering with any routing protocol
- ❖ Manual summarization with any routing protocol
- ❖ Redistribution between any pair of routing protocols
- ❖ Routing protocol authentication
- ❖ Bidirectional Forwarding Detection

EIGRP

- ❖ Adjacencies
- ❖ Best path selection
 - RD, FD, FC, successor, feasible successor

- Classic Metrics and Wide Metrics
- ❖ Operations
 - General operations
 - Topology table
 - Packet types
 - Stuck In Active
 - Graceful shutdown
- ❖ EIGRP load balancing
 - Equal-cost
 - Unequal-cost
 - Add-path
- ❖ EIGRP Named Mode
- ❖ Optimization, convergence and scalability
 - Fast convergence requirements
 - Query propagation boundaries
 - IP FRR (single hop)
 - Leak-map with summary routes
 - EIGRP stub with leak map

OSPF (v2 and v3)

- ❖ Adjacencies
- ❖ Network types, area types
- ❖ Path preference
- ❖ Operations
 - General operations
 - Graceful shutdown
 - GTSM (Generic TTL Security Mechanism)
- ❖ Optimization, convergence and scalability
 - Metrics
 - LSA throttling, SPF tuning, fast hello
 - LSA propagation control (area types)
 - Stub router
 - Loop-free alternate
 - Prefix suppression

BGP

- ❖ IBGP and EBGP peer relationships
 - Peer-group/update-group, template
 - Active, passive
 - Timers
 - Dynamic neighbors
 - 4-byte AS numbers
 - Private AS

- ❖ Path selection
 - Attributes
 - Best path selection algorithm
 - Load balancing
- ❖ Routing policies
 - Attribute manipulation
 - Conditional advertisement
 - Outbound Route Filtering
 - Standard and extended communities
 - Multi-homing
- ❖ AS path manipulations
 - local-AS, allowas-in, remove-private-as
 - Prepend
 - Regexp
- ❖ Convergence and scalability
 - Route reflector
 - Aggregation, as-set
- ❖ Other BGP features
 - Multipath, add-path
 - Soft reconfiguration, Route Refresh

Multicast

- ❖ Layer 2 multicast
 - IGMPv2, IGMPv3
 - IGMP Snooping, PIM Snooping
 - IGMP Querier
 - IGMP Filter
 - MLD
- ❖ Reverse path forwarding check
- ❖ PIM
 - Sparse Mode
 - Static RP, BSR, AutoRP
 - Group to RP Mapping
 - Bidirectional PIM
 - Source-Specific Multicast
 - Multicast boundary, RP announcement filter
 - PIMv6 Anycast RP
 - IPv4 Anycast RP using MSDP
 - Multicast multipath

Cisco SD Access

- ❖ Design a Cisco SD Access solution
 - Underlay network (IS-IS, manual/PnP)
 - Overlay fabric design (LISP, VXLAN, Cisco TrustSec)
 - Fabric domains (single-site and multi-site using SD-WAN transit)
- ❖ Cisco SD Access deployment
 - Cisco DNA Center device discovery and device management
 - Add fabric node devices to an existing fabric
 - Host onboarding (wired endpoints only)
 - Fabric border handoff
- ❖ Segmentation
 - Macro-level segmentation using VNs
 - Micro-level segmentation using SGTs (using Cisco ISE)
- ❖ Assurance
 - Network and client health (360)
 - Monitoring and troubleshooting

Cisco SD-WAN

- ❖ Design a Cisco SD-WAN solution
 - Orchestration plane (vBond, NAT)
 - Management plane (vManage)
 - Control plane (vSmart, OMP)
 - Data plane (vEdge/cEdge)
- ❖ WAN edge deployment
 - Onboarding new edge routers
 - Orchestration with zero-touch provisioning/Plug-And-Play
 - OMP
 - TLOC
- ❖ Configuration templates
- ❖ Localized policies (only QoS)
- ❖ Centralized policies
 - Application Aware Routing
 - Topologies

MPLS

- ❖ Operations
 - Label stack, LSR, LSP
 - LDP
 - MPLS ping, MPLS traceroute
- ❖ L3VPN
 - PE-CE routing
 - MP-BGP VPNv4/VPNv6
 - Extranet (route leaking)

DMVPN

- ❖ Troubleshoot DMVPN Phase 3 with dual-hub
 - NHRP
 - IPsec/IKEv2 using pre-shared key
 - Per-Tunnel QoS
- ❖ Identify use cases for FlexVPN
 - Site-to-site, Server, Client, Spoke-to-Spoke
 - IPsec/IKEv2 using pre-shared key
 - MPLS over FlexVPN

Security and Services

- ❖ Device Security on Cisco IOS XE
 - Control plane policing and protection
 - AAA
- ❖ Network Security
 - Switch security features
 - ✓ VACL, PACL
 - ✓ Storm control
 - ✓ DHCP Snooping, DHCP option 82
 - ✓ IP Source Guard
 - ✓ Dynamic ARP Inspection
 - ✓ Port Security
 - ✓ Private VLAN
 - Router security features
 - ✓ IPv6 Traffic Filters
 - ✓ IPv4 Access Control Lists
 - ✓ Unicast Reverse Path Forwarding

- IPv6 infrastructure security features
 - ✓ RA Guard
 - ✓ DHCP Guard
 - ✓ Binding table
 - ✓ Device tracking
 - ✓ ND Inspection/Snooping
 - ✓ Source Guard
- IEEE 802.1X Port-Based Authentication
 - ✓ Device roles, port states
 - ✓ Authentication process
 - ✓ Host modes
- ❖ System Management
 - Device management
 - ✓ Console and VTY
 - ✓ SSH, SCP
 - ✓ RESTCONF, NETCONF
 - SNMP
 - ✓ v2c
 - ✓ v3
 - Logging
 - ✓ Local logging, syslog, debugs, conditional debugs
 - ✓ Timestamps
- ❖ Quality of Service
 - End to end L3 QoS using MQC
 - ✓ DiffServ
 - ✓ CoS and DSCP Mapping
 - ✓ Classification
 - ✓ Network Based Application Recognition (NBAR)
 - ✓ Marking using IP Precedence, DSCP, CoS
 - ✓ Policing, shaping
 - ✓ Congestion management and avoidance
 - ✓ HQoS, Sub-rate Ethernet Link
- ❖ Network Services
 - First Hop Redundancy Protocols
 - ✓ HSRP, GLBP, VRRP
 - ✓ Redundancy using IPv6 RS/RA
 - Network Time Protocol
 - ✓ Master, client
 - ✓ Authentication

- DHCP on Cisco IOS
 - ✓ Client, server, relay
 - ✓ Options
 - ✓ SLAAC/DHCPv6 interaction
 - ✓ Stateful, stateless DHCPv6
 - ✓ DHCPv6 Prefix Delegation
- IPv4 Network Address Translation
 - ✓ Static NAT, PAT
 - ✓ Dynamic NAT, PAT
 - ✓ Policy-based NAT, PAT
 - ✓ VRF-aware NAT, PAT
 - ✓ IOS-XE VRF-Aware Software Infrastructure (VASI) NAT
- ❖ Network optimization
 - IP SLA
 - ✓ ICMP probes
 - ✓ UDP probes
 - ✓ TCP probes
 - Tracking object
 - Flexible NetFlow
- ❖ Network operations
 - Traffic capture
 - ✓ SPAN
 - ✓ RSPAN
 - ✓ ERSPAN
 - ✓ Embedded Packet Capture
 - Cisco IOS-XE troubleshooting tools
 - ✓ Packet Trace
 - ✓ Conditional debugger (debug platform condition)

Automation and Programmability

- ❖ Data encoding formats
 - JSON
 - XML
- ❖ Automation and scripting
 - EEM applets
 - Guest shell
 - ✓ Linux environment
 - ✓ CLI Python module
 - ✓ EEM Python module

❖ Programmability

- Interaction with vManage API
 - ✓ Python requests library and Postman
 - ✓ Monitoring endpoints
 - ✓ Configuration endpoints
- Interaction with Cisco DNA Center API
 - ✓ HTTP request (GET, PUT, POST) via Python requests library and Postman
- Interaction with Cisco IOS XE API
 - ✓ Via NETCONF/YANG using Python ncclient library
 - ✓ Via RESTCONF/YANG using Python requests library and Postman
- Deploy and verify model-driven telemetry
 - ✓ Configure on-change subscription using gRPC