NetMet Solutions
Your Trusted Learning Partner

CCIE ENTERPRISE INFRASTRUCTURE v1.1 END-END TRAINING

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Zoom Ahead to Next Level Networking Career

Comprehensive Program to Learn the New CCIE 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

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- 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

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- 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

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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

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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

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- 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

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- 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

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- 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

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