TABLE OF CONTENTS

CCIE Enterprise Infrastructure v1.1

1.0 Routing

- DAY-1: Exam introduction & Lab preparation Setup

1.1 Basics of routing

DAY-2: Basics of networking concept
- Computer Networks
- OSI and TCP/IP
- Internet Layer Deep dive (IPv4)
  - Internet Protocol Packet overview
  - Fragmentation
- L2 and L3 MTU
- ARP
- ICMP
- Path MTU Discovery

Packet flow
- ARP
- ICMP
- Local network
- Remote network
- DHCP / DNS

1.2 Static Routing

DAY-3: Static Routing
- Static routing theory
- Lab 1: - Different types of static routes

1. Static route with exit interface only and Proxy Arp
2. Static route with next hop only and recursive routing
3. Full static route
4. Floating static route with changing AD values
5. Reliable static routing routes with IP SLA and Object tracking
6. Reliable static routes with enhanced object tracking
7. VRF aware static routes
8. Multicast static routes

- Policy based routing and Lab 2

1.3 EIGRP

Day - 4: EIGRP Adjacencies, unicast adjacencies, EIGRP Terminologies, Packet types

Day - 5: Topology change (Feasible successors, SIA) Classic metrics and wide metrics

Day - 6: Day 1.Lab 1 in Classical and named EIGRP
- Building adjacencies with multicast and unicast neighborship
- Performing summarization with Leak maps and summary route metrics manipulation
- EIGRP Authentication using Key chains with SHA and MD5
- Other features like
  - Passive Interface
  - Graceful shutdown

Day - 7: Lab 2 Advanced features

- Unequal cost load balancing
- Summarization and Stub with leak maps
- Route Filtering in EIGRP using distribute list and route-maps

1.4   OSPF (All days Lab Included)

Day - 8: OSPF adjacencies, Operations, Areas, Flooding Mechanism, Network types, DR & BDR election

Dat - 9: Lab 1: - LSA type 1, type 2, type 3

- Router LSA type 1
  - Router LSAs in broadcast network
  - Router LSAs in point-to-point network
  - Relation with type 2

- Network LSA type 2
  - DR and BDR election manipulation

- Network-Summary LSA type 3
  - How type 1 – to – type 3 conversion is performed
  - How metric is perceived
  - Summarization at the ABR level
  - Filtering with area range command at the ABR level
  - Changing cost of the Type 3 LSA

Day - 10: Lab 2: - LSA type 4,5,7

- External routes, redistribution
  - Filtering with area range command at the ABR level
  - Changing cost of the Type 3 LSA
  - Use cases of tags in LSA type 5
  - Summarization at ASBR level

- Filtering routes with summarization
- Using route-maps to filter out LSA type 5
- Filtering routes with tags

- Stub areas and NSSA
  - Stubby areas
  - Totally stubby areas
  - Not so stubby areas
  - P-bit scenarios for NSSA
  - Metric types in LSA 7 (O N1, O N2)
  - Using route-maps to filter out LSA type 7
  - Changing metrics of external routes
  - Default route in NSSA

Day - 11: Lab 3: - Route manipulation and changing route preference
- Path preference
  - Using path preference to prefer the External route
  - Using path preference with default route
- Route manipulation
  - Manipulating the cost to achieve the desired design consideration
- Route filtering using other options available

Day - 12: Lab 4: OSPF features and optimization techniques
- LSA throttling, SPF tuning, LSA pacing.
- Stub router feature
- Prefix suppression and relation with Router LSA
- Passive interface
- Authentication using (plain text and)
- BFD with OSPF
- Graceful shutdown
- Generic TTL security mechanism

1.5 BGP
Day - 13: History of BGP, iBGP and EBGP sessions,
Adjacency states, TCP session with Active and passive
router

Day - 14: Lab 1: -iBGP vs eBGP, Transport Establishment,
TTL and Next HOP processing
i. Full Mesh
ii. Route Reflector
iii. Confederations

Day - 15: Lab2: Peer Groups (peer-groups, update groups
and Dynamic BGP adjacencies)
- BGP Templates
- Aggregation (Summary only and AS_SET)

Day - 16: Policies
- Route-maps Deep dive
- Conditional matching
- Managing the route changes with Hard reset and
  route refresh
- Soft reconfiguration inbound
- BGP database types
- RIB Failures

Day - 17: Day 1.Lab 1: Well-Known Path Attributes
- Attribute Classification
- Well-Known Mandatory Attributes
  ○ Next HOP attribute
  ○ Origin
  ○ AS_PATH

- AS_PATH Manipulation
  - Local AS
  - Remove Private AS
  - Allow AS in
  - AS override
  - AS Path Prepending

Day - 18: Lab 2: Best path algorithm
- Best Path Algorithm
- BGP Weight (Lab Included)
- BGP Local Preference (Lab Included
- Multi Exit Discriminator (Lab Included
- BGP Communities (Lab Included)

Day - 19: Lab 3: Filtering
- AS Path prefix filtering
- Prefix filtering
- Standard Access lists
- Extended Access lists
- Maximum Prefix
- BGP Regular Expression
- ORF

Day - 20: Lab 4: MP-BGP
- What is MP-BGP
- IPv6 BGP sessions and other address families
- Next Hop problem with IPv6 routes exchanged over IPv4 session

1.6 Multiprotocol Label Switching

Day - 21: Lab1 :- Label Distribution Protocol
- LDP Adjacencies
- Security mechanisms
- Graceful Restart Features
- IGP Synchronization
- LDP Autoconfigurations

Day - 22: Lab 2:- MPLS and introduction with Layer 3 VPN
- BGP free Core
- VRFs
- VPNv4 routes
- VPN Label Stacking
- MPBGP
- VPNv4 and VPNv6 Lab
- PE-CE routing and Advanced MPLS with RT values

1.7 DMVPN

Day - 23: GRE and Need to DMVPN

Day - 24: DMVPN Phase 1-3

Day - 25: Routing in DMVPN
- OSPF in phase 1-3
- EIGRP in phase 1-3

Day - 26: BGP in phase 1-3
Day - 27: Multi-Cloud DMVPN behaviour

1.7 Multicast

Day - 28: Multicast Introduction, IGMP, PIM Dense Mode

Day - 29: Different trees, PIM Sparse Mode, RP, Auto RP and BSR

Day - 30: Bidirectional PIM, SSM, Anycast RP and MSDP

Day - 31: Multicast Features

Day - 32: Lab1: - Multicast Lab with all the features

2.0 Software-Defined Infrastructure

2.1 SD-Access

Day - 33: SD-Access Solution and understanding control plane with LISP

Day - 34: Lab 1: - Building Underlay
- Manual Discovery
- Lan automation
- Plug-n-Play feature

Day - 35: Lab 2: - Building Fabric and assigning roles

Day - 36: Lab 3: - Security
- Catalyst Centre and ISE integration
- HOST Onboarding

Day - 37: Lab 4: - Network assurance and other features like SWIM
- Performing image upgradation and Golden image
- Solving normal and critical issues using DNAC.
- Client 360 and device health

Day - 38: Lab 5: - Wireless in SD-Access
- WLC Support in SD-Access
- Wireless SD-access fabric
- Converting Catalyst 9300 Switch into a WLC
- AP join and CMX process integration

2.2   SD-WAN

Day - 39: Introduction to Catalyst SD-WAN Architecture

Day - 40: Onboarding of Controllers on different platforms
- Lab: - On-controllers on-Premises on EVE-NG
- Lab: - On ESXI server as a virtual machines
- On Azure

Day - 41: Onboarding of WAN Edges in different platforms
- Lab: - Onboarding of vEdge cloud router on EVE-NG
- Lab: - Onboarding of Cloud routers like 8000v on ESXI server or Private clouds
- Onboarding of ISR Wan edge hardware router

Day - 42: Single WAN circuit and Dual WAN circuit with and without TLOC extension feature

Day - 43: Deep dive into OMP - OMP attribute / IPSEC / Redistribution

Day - 44: Templates

Day -45: Centralized Policies -1
- Building Hub and Spoke topology
- Route leaking
- Per VPN topologies
- VPN Membership policies

Day - 46 Centralized Policies -2
- Application Aware Routing

Day - 47: Centralized Policies -3
- Data Policies (NAT DIA, QOE, Service Chaining)

Day - 48: Localized Policies
- Route Policies
- QOS

Day - 49: SD-WAN Security
- Security Service insertion
- Routing SD-WAN traffic via the Umbrella tunnel

3.0 IP-Services (Self-Paced)

3.1 IP Services
- FHRP mechanism
- DHCP v4/v6
- NTP
- NAT

3.2 Security Features
- Switch Security
- Copp and AAA
- IPv6 Security

4.0 Network Automation (Self-Paced)

- Basics of Linux
- Guest shell and EEM
- Python for network Engineers
- Data Models and parsing data using Python
- API calls using Restconf

5.0 Layer 2 Switching

Day - 50: Basics of Layer 2 switching, Switch Administrations &VLANs

5.1 Spanning tree

Day - 51: Spanning Tree - 1
- Why Spanning Tree?
- Spanning Tree Flavours
- PVST and Topology change

Day - 52: Spanning Tree – RSTP
- States and Ports and Link types
- RSTP topology changes
- Proposal/Agreement mechanism

Day - 53: Spanning Tree - Multiple Spanning Tree 802.1s
- MST vs PVST
- Instances
- MST and VTPv3
- MST Regions

Day - 54: Spanning Tree – Features
- Root Bridge Placement
- Manipulating Path Cost
- Manipulating Port Priorities
- Root Guard
- Portfast
- BPDU Guard
- Err-disabler
- BPDU Filter
- Loop Guard and UDLD

5.2 EtherChannel

Day - 55: EtherChannel's
- LACP, Static EtherChannel
- Layer 2, Layer 3, Load Balancing
- Misconfiguration guard