

MEF – SDWAN

Duration: 04 Days (32 HRS)

Note: This course maintains a vendor-neutral focus; however, to enhance understanding, we will demonstrate key concepts using the Cisco SD-WAN platform

Outline

1: Overview of Basic Networking

- Network Definitions
 - Node
 - Endpoint
 - Local Area Network (LAN)
 - MAC Address
 - Ethernet
 - Ethernet Frame
 - Virtual Local Area Network (VLAN)
 - IEEE 802.1ad, Q-in-Q
 - Wide Area Network (WAN)
 - Subscriber
 - Service Provider
 - Multiprotocol Label Switching (MPLS)
 - Routing
 - Routing Information Protocol (RIP)
 - Border Gateway Protocol (BGP)
 - Open Shortest Path First (OSPF)
 - Intermediate System – Intermediate System (IS-IS)

- Source Packet Routing in Networking (SPRING)/Segmented Routing (SR)
- Network Robustness
 - Bidirectional Forwarding Detection (BFD)
 - Fast Reroute (FRR)
- Network Failures and Performance Issues
 - Two-Way Active Measurement Protocol (TWAMP)
 - Simple Network Management Protocol (SNMP)
 - Internet Control Message Protocol (ICMP)
 - Internet Control Message Protocol for IPv6 (ICMPv6)
 - Ping
 - Ping6
 - Traceroute
 - Traceroute6
- Traffic Addresses
 - Internet Protocol version 4 (IPv4)
 - IPv4 Address
 - Classless Inter Domain Routing (CIDR)
 - Dynamic Host Configuration Protocol (DHCP)
 - Internet Protocol version 5 (IPv5)
 - Internet Protocol version 6 (IPv6)
 - IPv6 Packet
 - Stateless Address Auto Configuration (SLAAC)

2: Assessing, Planning, and Designing

- Characteristics and Benefits of an SD-WAN Service
- SD-WAN Components
 - SD-WAN UNI

- Underlay Connectivity Service, UCS UNI, and UCS End Point
- Tunnel Virtual Connection (TVC)
- SD-WAN Virtual Connection (SWVC)
- SD-WAN Virtual Connection End Point
- SD-WAN Edge
- Virtual Topology
- Zone
- Internet Breakout
- Introduction to Application Flow Specification Groups and Policies
 - Application Flows
 - Application Flow Specifications and Application Flow Criteria
 - Application Flow Specification Groups
 - Policies and Policy Criteria
- Matching Traffic to Application Flows
- Legacy Migration to SD-WAN
 - SOHO or Small Office Branch Type
 - Medium or Larger Offices Branch Type
 - SD-WAN Use Policies

3: Attributes and Policy Criteria

- SWVC Service Attributes
 - SWVC Identifier Service Attribute
 - SWVC End Point List Service Attribute
 - SWVC List of UCSs Service Attribute
 - Service Uptime Objective Service Attribute
 - SWVC Reserved Prefixes Service Attribute
 - SWVC List of Zones Service Attribute

- SWVC List of Virtual Topologies Service Attribute
 - vtType=multipoint-to-multipoint
 - vtType=rooted-multipoint
- SWVC Performance Time Intervals Service Attribute
- SWVC List of Security Policies Service Attribute
- SWVC List of Policies Service Attributes
- SWVC List of Application Flow Specifications Groups Service Attribute
- SWVC List of Application Flows Specifications Service Attribute
- SWVC End Point Service Attributes
 - SWVC End Point Identifier Service Attribute
 - SWVC End Point Associated UNI Service Attribute
 - SWVC End Point List of UCS End Points Service Attribute
 - SWVC End Point Policy Map Service Attribute
 - Ingress Policy Assignment
 - Ingress Policy Examples
 - Egress Policy Assignment
- SD-WAN UNI Service Attributes
 - SD-WAN UNI Identifier Service Attribute
 - SD-WAN UNI L2 Interface Service Attribute
 - SD-WAN UNI L2 Maximum Frame Size Service Attribute
 - SD-WAN UNI IPv4 Connection Addressing Service Attribute
 - SD-WAN UNI Ipv6 Connection Addressing Service Attribute
 - SD-WAN UNI Routing Protocols Service Attribute
 - Static Routing Protocol
 - BGP Routing Protocol
 - OSPF Routing Protocol

- Policies
 - Policy Criteria
 - Policy Criteria Specification and Interaction
 - Ingress Policy Criteria
 - ENCRYPTION Ingress Policy Criterion
 - INTERNET-BREAKOUT Ingress Policy Criterion
 - PUBLIC-PRIVATE Ingress Policy Criterion
 - BACKUP Ingress Policy Criterion
 - VIRTUAL-TOPOLOGY Ingress Policy Criterion
 - ALLOWED-DESTINATION Ingress Policy Criterion
 - BILLING-METHOD Ingress Policy Criterion
 - PERFORMANCE Ingress Policy Criterion
 - PERFORMANCE Scenario
 - BANDWIDTH Ingress Policy Criterion
 - AF-SECURITY-INGRESS Ingress Policy Criterion
 - Egress Policy Criteria
 - BLOCK-SOURCE Egress Policy Criterion
 - AF-SECURITY-EGRESS Egress Policy Criterion

4: Underlay Connectivity Services

- Types of Underlay Connectivity Services
- Characteristics of Underlay Connectivity Services
 - Carrier Ethernet Services
 - IP Services
 - L1 Connectivity Services
 - Public Internet
- Underlay Connectivity Service Attributes

- UCS Service Attributes
 - UCS Identifier Service Attribute
 - UCS Type Service Attribute
 - UCS Billing Method Service Attribute
- UCS UNI Service Attributes
 - UCS UNI Identifier Service Attribute
- UCS End Point Service Attributes
 - UCS End Point Identifier Service Attribute
 - UCS End Point Backup Service Attribute
 - UCS End Point Breakout Service Attribute
- Public versus Private
 - Private UCS
 - Public UCS
 - Backup UCS
- Traffic Requirements and Allocation of Bandwidth across Multiple Underlay Connectivity Services
 - Allocation of Bandwidth
 - BANDWIDTH Policy Effect on Packets
 - BANDWIDTH Policy Application

5: SD-WAN LSO Components

- Using an SD-WAN Gateway to Interconnect an SD-WAN Service to an External Service
 - Defining an SD-WAN Gateway
 - SD-WAN Gateway Use Case
- Defining the SD-WAN Controller and SD-WAN Orchestrator
 - SD-WAN Controller
 - SD-WAN Service Orchestrator

6: SD-WAN Security

- Security
 - End-to-End Encryption
 - Cyberthreats
 - Security in the SD-WAN Context
- Firewall Usage with SD-WAN
 - Firewalls and Intrusion Detection Systems (IDS)
 - Firewalls in SD-WAN Context
- Security Protocols
 - Transport Layer Security (TLS)
 - Secure Sockets Layer (SSL)
 - Internet Protocol Security (IPSec)
- Encryption
 - IPSec Cryptographic Algorithms
 - WireGuard
- Security Functions
 - Middle-Box Function (MBF)
 - Required Capabilities in Support of Security Functions
 - Security Action Lists
 - Block List
 - Allow List
 - Quarantine List
 - Requirements Pertaining to All of the Lists
 - IP, Port and Protocol Filtering
 - DNS Protocol Filtering
 - Domain Name Filtering

- URL Filtering
 - Malware Detection and Removal
 - Security Functions Example Scenarios
- Service Readiness Testing for SD-WAN Services
 - Service Readiness Testing Terms and Components
 - Service Readiness Measurement Point Locations
 - Service Readiness Measurement Point Requirements
 - SRT Attribute Reporting
- SD-WAN Performance Monitoring
 - Performance Monitoring Metrics
 - Application Flow PM Metrics
 - TVC PM Metrics
 - Performance Monitoring Framework
 - PM Metric Configuration
 - PM Metric Calculation and Reporting
 - Threshold Crossing Alerts (TCAs)
 - Stateful Threshold Crossing Alerts
 - Stateless Threshold Crossing Alerts