

## **VIPTELA/Cisco SD-WAN Deployment and Troubleshooting**

### **Module 1: SD-WAN Solution Overview**

- Traditional WAN – Challenges
- SD-WAN Overview and definitions
- SD-WAN Benefits
- SD-WAN Key Concepts
- SD-WAN Main Components
  - vEdge
  - vSmart
  - vManage
  - vBond
- On-Premise vs. Cloud-based Control Plane

### **Module 2: SD-WAN Licensing Model**

- Pricing Model
- License Options by Features
- License Options by Bandwidth capacity

### **Module 3: Secure Control Plane Bring-Up**

- Zero Trust Security Principles
- Secure Control Channels
- Establishing vEdge Router Identity
- Establishing Control Elements Identities (vBond, vSmart, vEdge)
- Secure Control Channel between vEdge Router and vBond
- Secure Control Channel between vEdge Router and vSmart/vManage

### **Module 4: Secure Data Plane Bring-Up**

- Limitations of traditional key exchange mechanisms (IKE)
- SD-WAN new centralized Encryption key distribution
- Traffic Encryption for data privacy
- Authentication Header for Data Plane Integrity
- Anti-Replay Protection (man-in-the-middle)
- Role of Bidirectional Forwarding Detection (BFD)
- Considerations about MTU and MSS
- End to End Segmentation (VPN's)
- Role of Application Visibility and Recognition

- Infrastructure DDoS Mitigation
- Security Policies and Services
- Cloud Security: Secure Direct Internet Access

### **Module 5: Overlay Management Protocol (OMP)**

- Definition of overlay routing
- Role and characteristics of Overlay Management Protocol (OMP)
- OMP Advertised Routes
- Route Redistribution (edge routing protocol to OMP and vice versa)
- Best Path Algorithm

### **Module 6: Using Templates**

- Basic Elements in the configuration for any device
- Need for Templates
- Options to Apply Templates to Devices
- Overview of Feature Templates
- Categories of Feature Templates
- Workflow for Applying Templates to Devices

### **Module 7: Using Policies**

- Policy Architecture
- Application Aware Routing Policies
- Control Policies
- Data Policies
- VPN Membership Policies
- Routing Policies
- Cflowd Templates

### **Module 8: Quality of Service (QoS)**

- QoS Pipeline – vEdge Router
- Data Packet Flow
- Queueing Management
- Control Traffic Prioritization
- Random Early Detection (RED)
- Traffic Policing
- Traffic Shaping
- Marking and Remarking
- Class-Map
- QoS Scheduler

- QoS Map
- Applying QoS policies

### **Module 9: Basic Troubleshooting**

- Troubleshooting Control Plane Bring Up
- GUI validation in vManage
- CLI validation with “Show” commands in vEdge Router
- Troubleshooting Data Plane
- Troubleshooting OMP

### **Module 10: Additional Topics**

- Solution Redundancy
- Control Policies
- Route Filtering
- TLOC
- Direct Internet Access (DIA)
- BFD
- Contrasting Cisco IWAN with Viptela SD-WAN approach
- Comparing Cisco’s SD-WAN with other vendors solutions

### **Module 11: Cloud on Ramp**

### **Module 12: Use Cases & Design**

- Guest Wi-Fi
- Bandwidth Augmentation
- Cloud onRamp for SAAS
- Critical Applications SLA
- Regional Secure Perimeter

### **Module 13: Multi-Tenancy**

- Multi-Tenant Mode
- Creating Tenants
- Adding Controller
- Adding Vedges
- RBAC

### **Module 14: vAnalytics and Rest API**

- vAnalytics

- Dashboard
- Data Analytics
- vManage Rest API

**Labs:**

- Lab 1: Accessing the Lab Devices
- Lab 2: Reset vEdge Cloud Router
- Lab 3: Remove vEdge Router from vManage Inventory
- Lab 4: Add vEdge Router to vManage Inventory
- Lab 5: Configure and Deploy Control-Plane Connectivity
- Lab 6: Configure and Deploy an Overlay Network
- Lab 7: Provision and Deploy vManage Templates
- Lab 8: Provision and Deploy vManage Policies
- Lab 9: Deploy Multi-Tenant vManage

Please note: Topics marked in yellow will be covered theoretically only. No hands-on possible for these.