

COURSE OVERVIEW:

This Viptela training is targeted to engineers and technical personnel involved in deploying, implementing, operating and optimizing Cisco SD-WAN solution (Viptela), both in enterprise and Service Provider environments, including advanced features for Multi-tenant deployment, QoS, application performance routing, configuration templates, control policies and troubleshooting common operating issues. The Cisco SD-WAN course is lab-intensive, and objectives are accomplished mainly through hands on learning. Students taking this Viptela training course should be familiar with Wide Area Networks (WANs) in a variety of ways, which can be found below. Ideal candidates for this course include engineering and planning teams who evaluate WAN evolution, personnel involved in SD-WAN Design, Implementation and Operation, and others.

WHO SHOULD ATTEND:

- Engineering and Planning team evaluating WAN evolution
- Personnel involved in SD-WAN Design, Implementation and Operation
- Network Operations team with SD-WAN solution
- Cisco partners who sell and support SD-WAN solutions

PREREQUISITES:

Familiarity with Wide Area Networks (WANs)

- Describe why customers desire SD-WAN.
- Explain the basic components of Cisco SD-WAN.
- Describe use cases of SD-WAN.
- Describe management features of Cisco SD-WAN.
- Understand the business areas to leverage Cisco SD-WAN.

COURSE OBJECTIVES:

Upon completing the course, students will be able to meet the following objectives:

- Know and understand Cisco's SD-WAN concepts, features, benefits, terminology and the way this approach innovates common administrative tasks on today's networks.



- Differentiate and explain each of the building blocks of SD-WAN Solution
- Explain the concept of “Fabric” and the different node types that conform it (Fabric Edge Nodes, Control Plane Nodes, Management Nodes and Orchestration Nodes)
- Identify the roles and functions of vEdge, vSmart, vManage and vBond entities
- Know and understand the Zero Touch Provisioning Model
- Know and understand the Zero Trust Provisioning Model
- Identify Overlay Management Protocol (OMP) as a key element of the SD-WAN solution and the role it plays for Control Plane setup
- Understand segmentation of SD-WAN fabric, through the use of VPN’s (VRF’s)
- Understand the role that templates have in SD-WAN solution, differentiate templates and know how to apply them
- Differentiate Control, Data and Application Route Policies and know how they are used in SD-WAN
- Identify and apply QoS mechanisms to SD-WAN fabric
- Discuss Use Cases for SD-WAN

COURSE OUTLINE:

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

LAB OUTLINE

- 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