



# VIPTELA: Viptela.Cisco SD-WAN Deployment and Troubleshooting

Course ID #: 1575-VIP-TELA-W

Hours: 21

## Course Content

### Course Description:

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.

### At Course Completion:

Upon completing this course, the learner will be able to meet these overall 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

### Target Student:

The primary audience for this course is as follows:

- Engineering and Planning team evaluating WAN evolution
- Personnel involved in SD-WAN Design, Implementation and Operation



# VIPTELA: Viptela.Cisco SD-WAN Deployment and Troubleshooting

Course ID #: 1575-VIP-TELA-W

Hours: 21

- Network Operations team with SD-WAN solution
- Cisco partners who sell and support SD-WAN solutions

## Prerequisites:

The knowledge and skills that a learner should have before attending this course are as follows:

- 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

## Topics:

### 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



# VIPTELA: Viptela.Cisco SD-WAN Deployment and Troubleshooting

Course ID #: 1575-VIP-TELA-W

Hours: 21

## 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



# VIPTELA: Viptela.Cisco SD-WAN Deployment and Troubleshooting

Course ID #: 1575-VIP-TELA-W

Hours: 21

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

- vAnalytics
- Dashboard
- Data Analytics
- vManage Rest API