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## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

***WHERE GREAT TRAINING  
HAPPENS EVERYDAY!***

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Duration

5 days

### Course Price

\$4,795.00

46 CLCs

### Methods of Delivery

In-Person ILT

Virtual ILT

Onsite ILT

### Certification Exam

300-415

### Cisco CE Credit

40

### About this Class

This is a 5-day hands-on Cisco (Viptela) SD-WAN instructor-led course where students will learn how to administer SD-WAN. Students will learn about Device Template, Feature Template, Configuration Groups and CLI Templates. Students will learn how SD-WAN implements Security using SASE, SIG, Umbrella, FW, IPS, AMP, Threat grid, TLS Decryption and Direct Internet Access (DIA). Students will learn about Local and Central Policies. Students will also learn how Cisco SD-WAN allows Enterprises to deploy an effective Cloud Solutions such as Amazon AWS, Microsoft Azure, and Google Cloud, MegaPort, Equinix, and SAAS application such as O365 and Webex. Students will also learn how to Monitor and Troubleshoot the SDWAN Solution.

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### How you will benefit

This class will help you:

- Deploy and Configure SD-WAN Controllers, vEdge Devices, and Cisco IOS-XE Devices
- Tune OMP, BFD, TLOCs, QoS, TCP OPT, DRE, FEC, Packet Duplication

### Why Attend with Current Technologies CLC

- Our Instructors are the top 10% rated by Cisco
- Our Lab has a dedicated 1 Gig Fiber Connection for our Labs
- Our Labs run up to Date Code for all our courses

### Who Should Attend

The job roles best suited to the material in this course are:

- System Installers
- System Integrators
- System Administrators
- Network Administrators
- Solutions Designers
- Systems Architects

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Objectives

Upon completing this course, students will be able to meet these objectives:

- SD-WAN Overview
- Controllers
- Allow Lists and Certificates
- Platforms
- Router Deployment
- Configure vManage
- SD-WAN Software Updates
- OMP / Fabric
- QoS / QoE
- Security / SASE
- Creating and Applying SD-WAN Templates
- Local and Central Policy
- Deploying using Templates
- ThousandEyes Integration
- Cloud Onramp for SaaS
- vAnalytics
- Monitoring & Troubleshooting the SD-WAN Solution

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Module 0: Introductions

#### Module 1: Cisco SD-WAN (Viptela) Platform Overview

- Lesson 1: Legacy WAN Architecture
- Lesson 2: Cisco SD-WAN Solution Overview
- Lesson 3: Licensing for Cisco SD-WAN

#### Module 2: Cisco SD-WAN Controllers

- Lesson 1: Cisco SD-WAN Controller Architecture
- Lesson 2: Cisco SD-WAN Self-Service Portal
- Lesson 3: vManage Multitenant Mode
- Lesson 4: Verify Control Plane
- Lesson 5: Controller High Availability

#### Module 3: Cisco SD-WAN Allow Lists and Certificates

- Lesson 1: Certificate Fundamentals
- Lesson 2: SD-WAN Certificates
- Lesson 3: Certificate Configuration
- Lesson 4: Certificate Validity
- Lesson 5: Monitoring and Troubleshooting Certificates



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### Course Outline

#### Module 4: Cisco SD-WAN Platforms

- Lesson 1: SD-WAN Platform Overview
- Lesson 2: SD-WAN vEdge Platform
- Lesson 3: SD-WAN cEdge Platform Overview
- Lesson 4: SD-WAN Industrial Router Portfolio
- Lesson 5: SD-WAN ISR 1000/1100 Series Routers
- Lesson 6: Cisco ISR 4000 Series Routers
- Lesson 7: Cisco ASR 1000 Routing Portfolio
- Lesson 8: Catalyst 8000 Series Router Overview
- Lesson 9: Catalyst 8500 Series Routers
- Lesson 10: Catalyst 8300 Series Routers
- Lesson 11: Catalyst 8200 Series Routers
- Lesson 12: Catalyst 8000 SD-WAN Supported Modules
- Lesson 13: Catalyst 8000v Series Virtual Router
- Lesson 14: ENCS 5000 and CSP 5000
- Lesson 15: Cellular Gateways for SDWAN
- Lesson 16: SD-WAN WAN Edge High Availability

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### Course Outline

#### Module 5: Cisco SD-WAN WAN Edge Deployments

- Lesson 1: Adding Device to the PNP Portal
- Lesson 2: Device Initial Bootup and Image Selection
- Lesson 3: SD-WAN Zero Touch Provisioning
- Lesson 4: SD-WAN Quick Connect
- Lesson 5: SD-WAN One Touch Provisioning
- Lesson 6: Manually Provision SD-WAN Edge Configuration
- Lesson 7: Verifying SD-WAN WAN Edge Configuration

#### Module 6: Configuring vManage

- Lesson 1: Dashboard Overview and Changes
- Lesson 2: vManage Monitoring Dashboard
- Lesson 3: vManage Configuration
- Lesson 4: vManage Tools
- Lesson 5: vManage Maintenance
- Lesson 6: Administrative Settings
- Lesson 7: Resource Groups
- Lesson 8: Users and Groups
- Lesson 9: RADIUS and TACACS
- Lesson 10: Single Sign-On / IDP Management
- Lesson 11: License Management
- Lesson 12: Network Wide Path Insight

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### Course Outline

#### Module 7: SD-WAN Software Upgrades

- Lesson 1: Upgrading the SD-WAN Environment
- Lesson 2: Upgrade SD-WAN Controllers
- Lesson 3: Software Upgrade Workflow Version 20.10 / 17.10
- Lesson 4: Upgrading Devices via CLI

#### Module 8: SD-WAN OMP/Fabric

- Lesson 1: SD-WAN Fabric Overview and Terminology
- Lesson 2: SD-WAN Segmentation
- Lesson 3: OMP / TLOCs / Routes
- Lesson 4: SD-WAN BFD
- Lesson 5: On-Demand Tunnels
- Lesson 6: SD-WAN Fabric Verification

#### Module 9: SD-WAN QoS/QoE

- Lesson 1: QoE / QoS Challenges
- Lesson 2: Quality of Experience (QoE) / Quality of Service (QoS)
- Lesson 3: Per-Tunnel QoS
- Lesson 4: Adaptive QoS
- Lesson 5: Per VPN QoS
- Lesson 6: Application Quality of Experience (AppQoE)



## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Cont. Module 9

- Lesson 7: Forward Error Correction (FEC) / Packet Duplication
- Lesson 8: TCP Optimization
- Lesson 9: Data Redundancy Elimination (DRE) / Lempel-Ziv Compression (LZ)
- Lesson 10: SSL Optimization
- Lesson 11: SD-AVC / Microsoft O365 Telemetry

#### Module 10: SD-WAN Security / SASE

- Lesson 1: Security Overview
- Lesson 2: Secure Access Service Edge (SASE)
- Lesson 3: SD-WAN Fabric Security
- Lesson 4: SD-WAN Security Options
- Lesson 5: SD-WAN Integrated Security
- Lesson 6: SD-WAN Security Configuration
- Lesson 7: Cisco Umbrella
- Lesson 8: Secure Internet Gateway (SIG)
- Lesson 9: Cisco Zscaler SIG
- Lesson 10: vManage ZScaler Workflow for Auto GRE SIG Tunnel
- Lesson 11: Zscaler Workflow
- Lesson 12: L7 Health Check Inside ZScaler Auto-GRE Tunnel

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Module 11: Creating and Applying SD-WAN Templates

- Lesson 1: Security Overview
- Lesson 2: Secure Access Service Edge (SASE)
- Lesson 3: SD-WAN Fabric Security
- Lesson 4: SD-WAN Security Options
- Lesson 5: SD-WAN Integrated Security
- Lesson 6: SD-WAN Security Configuration
- Lesson 7: Cisco Umbrella
- Lesson 8: Secure Internet Gateway (SIG)
- Lesson 9: Cisco Zscaler SIG
- Lesson 10: vManage ZScaler Workflow for Auto GRE SIG Tunnel
- Lesson 11: Zscaler Workflow
- Lesson 12: L7 Health Check Inside ZScaler Auto-GRE Tunnel

#### Module 12: SD-WAN Local Policy

- Lesson 1: Security Overview
- Lesson 2: Secure Access Service Edge (SASE)
- Lesson 3: SD-WAN Fabric Security
- Lesson 4: SD-WAN Security Options
- Lesson 5: SD-WAN Integrated Security

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Cont. Module 12

- Lesson 6: SD-WAN Security Configuration
- Lesson 7: Cisco Umbrella
- Lesson 8: Secure Internet Gateway (SIG)
- Lesson 9: Cisco Zscaler SIG
- Lesson 10: vManage ZScaler Workflow for Auto GRE SIG Tunnel
- Lesson 11: Zscaler Workflow
- Lesson 12: L7 Health Check Inside ZScaler Auto-GRE Tunnel

#### Module 13: SD-WAN Central Policy

- Lesson 1: Security Overview
- Lesson 2: Secure Access Service Edge (SASE)
- Lesson 3: SD-WAN Fabric Security
- Lesson 4: SD-WAN Security Options
- Lesson 5: SD-WAN Integrated Security
- Lesson 6: SD-WAN Security Configuration
- Lesson 7: Cisco Umbrella
- Lesson 8: Secure Internet Gateway (SIG)
- Lesson 9: Cisco Zscaler SIG
- Lesson 10: vManage ZScaler Workflow for Auto GRE SIG Tunnel
- Lesson 11: Zscaler Workflow
- Lesson 12: L7 Health Check Inside ZScaler Auto-GRE Tunnel

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Module 14: Cisco SD-WAN with ThousandEyes Integration

- Lesson 1: Security Overview
- Lesson 2: Secure Access Service Edge (SASE)
- Lesson 3: SD-WAN Fabric Security
- Lesson 4: SD-WAN Security Options
- Lesson 5: SD-WAN Integrated Security
- Lesson 6: SD-WAN Security Configuration
- Lesson 7: Cisco Umbrella
- Lesson 8: Secure Internet Gateway (SIG)
- Lesson 9: Cisco Zscaler SIG
- Lesson 10: vManage ZScaler Workflow for Auto GRE SIG Tunnel
- Lesson 11: Zscaler Workflow
- Lesson 12: L7 Health Check Inside ZScaler Auto-GRE Tunnel

#### Module 15: Cloud Onramp for SaaS

- Lesson 1: Cloud OnRamp - Overview
- Lesson 2: Cloud OnRamp for SaaS Overview
- Lesson 3: Cloud OnRamp for M365
- Lesson 4: Cloud OnRamp for Webex
- Lesson 5: Cloud OnRamp for Enterprise & Custom Apps

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Cont. Module 15

- Lesson 6: Cloud OnRamp for SaaS – Security
- Lesson 7: Deployment Use cases
- Lesson 8: Cloud OnRamp for SaaS Configuration
- Lesson 9: Cloud OnRamp for SaaS Monitoring

#### Module 16: vAnalytics 3.0

- Lesson 1: Analytics Overview
- Lesson 2: vAnalytics Dashboards
- Lesson 3: vAnalytics IDP Onboarding
- Lesson 4: vAnalytics KPIs and Scores
- Lesson 5: vAnalytics Onboarding & Access Workflow
- Lesson 6: vAnalytics Onboarding & Access Workflow

#### Module 17: Monitoring & Troubleshooting the SD-WAN Solution

- Lesson 1: SD-WAN Troubleshooting Overview
- Lesson 2: SD-WAN Technical Support Access
- Lesson 3: Controller Failure Scenarios
- Lesson 4: Troubleshooting Controllers
- Lesson 5: Troubleshooting Control Connections
- Lesson 6: Typical Control Connection Issues
- Lesson 7: Troubleshooting Data Plane

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Course Outline

#### Cont. Module 17

- Lesson 8: Troubleshooting Routing
- Lesson 9: Centralized Policies Troubleshooting
- Lesson 10: Packet Forwarding Troubleshooting
- Lesson 11: Device Configuration and Upgrades Failure
- Lesson 12: vDiagnose - Diagnostic Tool for SD-WAN
- Lesson 13: Troubleshooting cEdge
- Lesson 14: Troubleshooting using vManage
- Lesson 15: Device Troubleshooting
- Lesson 16: Using the GUI for cli show command Under Troubleshooting > Real-time
- Lesson 17: CLI Troubleshooting
- Lesson 18: Netflow Collectors
- Lesson 19: SNMP Overview
- Lesson 20: SD-WAN Logs
- Lesson 21: SD-WAN Reporting
- Lesson 22: vManage, APIs & Programmability



## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Lab Outline

**Lab 1:** Deploy the SD-WAN Controller

**Lab 2:** Deploy the vEdge, ISR 4K /C8000V Routers

**Lab 3:** vManage Configuration

**Lab 4-8:** Creating Device Templates

- Create CLI Policy Template
- Create Feature Policy Template
- Create vSmart Device CLI Template
- Create DC1 vEdges Device Feature Template
- Attach DC1 Devices to Template
- Create DC2 IOS-XE CSRs Device Feature Template
- Attach DC2 Devices to Template
- Create BR1 vEdges Device CLI Template using TLOC Extensions
- Attach BR1 Devices to Template
- Create BR2 IOS-XE CSRs Device Feature Template using TLOC Extensions
- Attach BR2 Devices to Template
- Create BR3 IOS-XE ISR4K Device Feature Template
- Attach BR3 Devices to Template
- Configuration Rollback

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Lab Outline Cont.

**Lab 9:** Use APIs to Import Feature Templates

**Lab 10:** Upgrade SDWAN Environment

**Lab 11-13:** Perform ZTP on SDWAN Environment

**Lab 14-17:** SDWAN Policies

- List types of policies that can be implemented in the SD-WAN solution
- Describe how policies can be implemented that affect the control plane
- Describe what affect policies can have on data traffic forwarding
- Identify the various components of the vSmart policy architecture
- Describe how different policies are enabled in different devices
- Detail how policies are processed and applied
- Control Policy Lab
  - Configure a Vpn-membership-policy
  - Configure Site-list Selection Policies
  - Configure a Service Chaining Policy
  - Configure an Extranet VPN Policy
  - Configure a Service path affinity Policy
  - Configure Fabric Policies
  - Configure Security Zones

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Lab Outline Cont.

#### Cont. Lab 14-17

- Data Policy Lab
  - Configure Shaping Policies
  - Configure QoS Policies
  - Configure a Service Chaining
  - Configure an Extranet VPN Policy
  - Configure Service path affinity Policy
  - Configure a NAT Policies for DIA
  - Configure an OSPF BGP Routing Policy
- Application Aware Routing Policy Lab
  - SLA Classes
  - Path Selection using Application Policies
- Create a cFlowd Policy
- Create a Local Control Policy
  - Configure OSPF and BGP
- Create a Local Data Policy
  - Create ACL
  - Create Device Access Policy
  - Configure QOS
  - Configure OSPF Route Policy

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### Lab Outline Cont.

#### Lab 18: Application Visibility

- Create a Centralized Policy for Application-Aware Routing
- Identify Application Groups (FTP/Office 365/Voice)
- Create Lists
  - Site Lists
  - Application Lists
  - Data Prefix Lists
  - VPN Lists
- Create a SLA Classes
- Create Traffic Rules
- Apply Policies to Sites and VPNs

#### Lab 19: Cloud On-RAMP

- Configure Cloud Onramp for SAAS

#### Lab 20: Monitoring / Troubleshooting

- Explore vManage Dashboard analytics
- Monitor Applications
- Monitor Loss, Latency, and Jitter

## Installing, Configuring, Monitoring and Troubleshooting Cisco SD-WAN 20.11 / IOS-XE 17.11 (SDWAN) V20

### Lab Outline Cont.

#### Cont. Lab 20

- Monitor Individual Device
  - Check system Status
  - Check Control Connections
  - Check OMP Status
  - Check BFD Status
  - Check Interfaces for Issues
- Use the CLI to view and troubleshooting debug Logs
- Troubleshoot BFD
- Troubleshoot OMP
- Use troubleshooting tools to diagnose issues
  - Use the Ping tool
  - Use the Traceroute tool
  - Use the App Route Visualization
  - Simulate traffic flows
  - Take a Packet
- Troubleshoot Application Routing