Installing, Configuring, Monitoring and Troubleshooting Cisco Catalyst SD-WAN (SDWAN)

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In this Installing, Configuring, Monitoring and Troubleshooting Cisco Catalyst SD-WAN 5-day immersive, hands-on course covering Cisco Catalyst (Viptela) SD-WAN version 20.18 / IOS-XE 17.18, students will gain in-depth knowledge and practical skills to deploy, configure, manage, and troubleshoot Cisco SD-WAN environments. The course explores controller and edge device deployment, Zero Touch Provisioning (ZTP), device and feature template creation, and SD-WAN Manager interface operations. Students will work with advanced features including OMP, BFD, QoS, DRE, security integration (SASE, Umbrella, FW, IPS), and local and centralized policy design. Labs include deploying controllers, onboarding routers (cEdge, ISR, C8000V), upgrading environments, configuring policies, enabling Cloud On-Ramp for SaaS applications like O365 and Webex, and leveraging analytics and troubleshooting tools like ThousandEyes and vManage. By course end, students will be proficient in building robust, secure, and optimized enterprise SD-WAN solutions across cloud and hybrid infrastructures.

Why Attend with Current Technologies CLC

- Our Instructors are in 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

Course Duration
5 days

Course Price
$4,295.00 or 43 CLCs

Methods of Delivery

- Instructor Led
- Virtual ILT
- On-Site

Who Should Attend

The primary audience for this course is as follows:

- Network Engineers
- System Administrators
- IT Professionals
- Technical Support Staff
- Cisco Certified Professionals

Prerequisites

There are no prerequisites for this training. However, the knowledge and skills you are recommended to have before attending this training are:

- Knowledge of software-defined networking (SDN) concepts as applied to large scale live network deployments
- Strong understanding of enterprise WAN design
- Strong understanding of routing protocol operation, including both interior and exterior routing protocol operation
- Familiarity with transport layer security (TLS) and IP security (IPsec)

Module 1: Catalyst SD-WAN (Viptela) Platform Overview

- SD-WAN WAN Architecture Overview
  - Review SD-WAN architecture fundamentals.
- Cisco SD-WAN Solution Overview
  - Overview of Cisco SD-WAN platform.
- Licensing for Cisco SD-WAN
  - Understand licensing models and options.

Module 2: Cisco SD-WAN Controllers

- Cisco Catalyst SD-WAN Architecture
  - Architecture for Control plane components.
- Cisco Catalyst SD-WAN Portal
  - Portal-based access and management.
- Multitenant Tenancy
  - Controller tenancy model.
- Controller High Availability
  - Controller redundancy and failover.
- Verify Control Plane
  - Confirm control connectivity and functions.

Module 3: Catalyst SD-WAN Platforms

- SD-WAN Platform Overview
  - Overview of SD-WAN compatible platforms.
- SD-WAN cEdge Platform Overview
  - Capabilities of cEdge hardware
- Cisco Secure Routers
- Cisco ISR 4000 Series Routers
  - Deployment using ISR 4000 routers.
- Cisco ASR 1000 Routing Portfolio
  - Use of ASR routers in SD-WAN.
- Catalyst 8000 Series Router Overview
  - Main platform for SD-WAN routers.
- Catalyst 8500 Series Routers
  - High-performance edge routers.
- Catalyst 8300 Series Routers
  - Branch and small office routers.
- Catalyst 8200 Series Routers
  - Compact branch routers.
- Catalyst 8000 SD-WAN Supported Modules
- Catalyst 8000v Series Virtual Router
  - Cloud-deployed router instance.
- Catalyst 8000 SD-WAN Supported Modules
  - Module compatibility and support.
- Cellular Gateways for SDWAN
  - Support for cellular transport options.
- SD-WAN WAN Edge High Availability
  - Redundancy options for WAN edge.

Module 4: Cisco SD-WAN WAN Edge Deployments

- Adding Device to the PNP Portal
  - Onboarding devices to SD-WAN.

- Device Initial Bootup and Image Selection
    - Initial software provisioning.
- SD-WAN Zero Touch Provisioning
    - Auto-provisioning with ZTP.
- SD-WAN Quick Connect
    - Rapid manual setup.
- Manually Provision SD-WAN IOS-XE
    - CLI-based setup of edge devices.
- Verifying WAN Edge Configuration
    - Confirming WAN edge deployment.

Module 5: Catalyst SD-WAN SD Routing

- SD Routing Overview
    - Routing technologies supported in SD-WAN.
- SD Routing Onboarding
    - Enable SD routing in the platform.
- SD Routing Configuration
    - Configure routing protocols and policies.
- SD Routing Management
    - Monitoring and verification.

Module 6: Configuring SD-WAN Manager

- Dashboard Overview and Changes
    - Updates in new SD-WAN manager UI.
- SD-Wan Manager Monitoring Dashboard
    - Monitor devices and events.
- SD-WAN Manager Historical Traffic Logs
- SD-WAN Manager Configuration
    - Create and edit configurations.
- SD-WAN Manager Tools
    - Available tools for operations.
- SD-WAN Manager Maintenance
    - Maintenance workflows.
- Administrative Settings
    - System-wide settings.
- Users and Groups
    - Identity and access management.
- Tag Management
- RADIUS and TACACS
    - Authentication integrations.
- Single Sign-On / IDP Management
    - Integrate identity platforms.
- License Management
    - Track and assign licenses

Module 7: SD-WAN Software Upgrades

- Upgrading the SD-WAN Environment
    - Upgrade best practices.
- Upgrade SD-WAN Controllers
    - Update controller software.
- Control Components Upgrade Workflow
- Control Components Patch Workflow

- Software Upgrade Workflow Version 20.10 / 17.10
    - Step-by-step process.
- Upgrading Devices via CLI
    - Command-line driven upgrade.

Module 8: SD-WAN OMP/Fabric

- SD-WAN Fabric Overview and Terminology
    - Control, data, and management planes.
- SD-WAN Segmentation
    - Isolating traffic across the fabric.
- OMP / TLOCs / Routes
    - OMP route propagation.
- SD-WAN BFD
    - Reliable transport detection.
- On-Demand Tunnels
    - Build tunnels only as needed.
- SD-WAN Fabric Verification
    - Test and validate fabric operation.

Module 9: SD-WAN QoS / QoE

- QoE / QoS Challenges
    - Common performance problems.
- Quality of Experience (QoE) / Quality of Service (QoS)
    - Understanding SD-WAN's approach.
- Per-Tunnel QoS
    - Traffic shaping per tunnel.
- Adaptive QoS
    - Dynamic quality adjustment.
- Per VPN QoS
    - Traffic management by VPN.
- Application Quality of Experience (AppQoE)
    - App-based optimization.
- Forward Error Correction (FEC) / Packet Duplication
    - Mitigation for lossy networks.
- TCP Optimization
    - Improve TCP performance.
- Data Redundancy Elimination (DRE) / Lempel-Ziv Compression (LZ)
    - Compression options.
- SD-AVC / Microsoft O365 Telemetry
    - Deep app-level analytics.

Module 10: SD-WAN Security

- Security Overview
    - Security in SD-WAN.
- StealthWatch Integration
    - Integration with telemetry tools.
- SD-WAN Fabric Security
    - Secure data and control planes.
- IPSec Key Exchange in SD-WAN Fabric
    - Encryption and key exchange.
- SD-WAN Security Options
    - Firewall, IPS, URL filtering.

- SD-WAN Integrated Security
  - Built-in advanced security.
- SD-WAN Enterprise Firewall
  - Layer 7 NGFW protection.
- SD-WAN Identity Firewall
  - User-identity-based policies.
- SD-WAN Intrusion Prevention System
  - Detect and stop intrusions.
- URL Filtering
  - Web access control.
- Anti-Malware Protection / Threatgrid
  - Integrated malware detection.
- DNS Security
  - Secure DNS lookups.
- DNS Security
- TLS/SSL Decryption
- Unified Security Policy
- UX 2.0 Security Policies (NGFW PG)
- Security Policy Rollback and Version Control
- Secure Internet Gateway (SIG)
- SIG Deployment
- Secure Access

Module 11: SD-WAN Templates and Configuration Groups

- Template Overview
  - Use of templates to simplify management.
- Feature Templates
  - Configure per-feature settings.
- Device Templates
  - Apply complete configurations.
- CLI Templates
  - Freeform CLI input.
- Create Device Templates
  - Combine templates for reuse.
- Attaching Devices to Template
  - Apply settings to devices.
- Configuration Groups Overview
  - Reusable config bundles.
- Creating Configuration Groups
  - How to define groups.
- Deploy Configuration Group Workflow
  - Deploy changes with review.
- View/Edit Configuration Groups
  - Manage groups over time.
- Configuration Catalog
  - Manage and browse configuration items.
- Control Components Settings (20.18)

Module 12: SD-WAN Local Policy

- Local Policy Overview
  - Device-specific policy application.
- Local Policy Lists

    - Match conditions for local policy.
- Local Data Policies
    - Routing or forwarding logic.
- Local Policy QoS Configuration
    - Bandwidth controls at device level.
- Local Data Policy Access Control Lists
- Localized Control Policy
    - Control-plane route influence.
- Save and Apply Local Policy
    - Policy enforcement process.

Module 13: SD-WAN Central Policies

- Central Policy Overview
    - Controller-wide policy model.
- Policy Construction
    - How to build a policy.
- Central Control Policy
    - Route influence using OMP.
- Control Policy - Dis-contiguous Data Planes
    - Cross-VPN path control.
- Control Policy - Data Center Priority
    - Traffic prioritization policies.
- Control Policy - VPN Topologies
    - Star and full-mesh configurations.
- Control Policy - VPN Membership Policy
    - Which VPNs access what.
- Control Policy - Application-Aware Routing
    - Path selection by application.
- Control Policy - Service Chaining
    - Traffic redirection via middlebox.
- Central Data Policies
    - Forwarding decisions centrally enforced.
- Central Data Policies - Use Cases
    - Practical implementations.
- Central Data Policies - Cflowd
    - Traffic visibility.
- Creating Centralized Policies
    - Putting the concepts into action.

Module 14: SD-WAN Policy Groups

- What are Policy Groups?
    - Logical grouping of policies.
- Groups of Interest (Policy Objects)
    - Reuse building blocks.
- Application Priority and SLA
    - Define app expectations.
- NGFW
    - Next-generation firewall control.
- SIG/SSE and DNS Security
    - Secure Internet Gateway integration.
- Policy Group Creation
    - Build new policy groups.

- Associate and Deploy Policy Groups
    - Activate across the network.
- UX 2.0 Topology
    - Improved interface for topology mapping.

Module 15: Cisco SD-WAN with ThousandEyes Integration

- ThousandEyes Introduction
    - Digital experience monitoring.
- Architecture and SD-WAN Deployment
    - Deploying with SD-WAN.

Module 16: Cloud On Ramp for SaaS

- Cloud OnRamp - Overview
    - What OnRamp enables.
- Cloud OnRamp for SaaS Overview
    - End-to-end SaaS Optimization.
- Cloud OnRamp for M365
    - Microsoft apps acceleration.
- Cloud OnRamp for Webex
    - Better experience for Webex.
- Cloud OnRamp for Enterprise & Custom Apps
    - Non-standard SaaS apps.
- Cloud OnRamp for SaaS – Security
    - Securing SaaS access.
- Deployment Use cases
    - Example architectures.
- Cloud OnRamp for SaaS Configuration
    - Initial deployment.
- Cloud OnRamp for SaaS Monitoring
    - Health visibility
- Cloud OnRamp for SaaS UX 2.0

Module 17: Analytics 3.0

- SD-WAN Analytics Overview
    - Data collection and use cases.
- SD-WAN Analytics Dashboards
    - Visual insights for metrics.
- SD-WAN Analytics KPIs and Scores
    - Performance indicators.
- SD-WAN Analytics Bandwidth Forecasting
    - Predict future bandwidth needs.
- SD-WAN Analytics Troubleshooting
    - Identify root causes.
- SD-WAN Analytics IDP Onboarding
    - IDP integration with analytics.
- SD-WAN Analytics Onboarding & Access Workflow
    - Enable analytics for sites.

Module 18: Monitoring & Troubleshooting the SD-WAN Solution

- SD-WAN Troubleshooting Overview
    - Approach to resolving issues.
- SD-WAN Technical Support Access

    - TAC support options.
- Controller Failure Scenarios
    - Recovering from controller issues.
- Troubleshooting Controllers
    - Isolate and fix controller faults.
- Troubleshooting Control Connections
    - Fix routing and tunnel issues.
- Typical Control Connection Issues
    - Common misconfigurations.
- Troubleshooting Data Plane
    - Check traffic flow issues.
- Troubleshooting Routing
    - Check route leaks or flaps.
- Centralized Policies Troubleshooting
    - Misapplied or misconfigured policies.
- Packet Forwarding Troubleshooting
    - Verify path decisions.
- Device Configuration and Upgrades Failure
    - Upgrade failure recovery.
- vDiagnose - Diagnostic Tool for SD-WAN
    - In-depth diagnostics.
- Troubleshooting cEdge
    - Troubleshoot IOS XE edges.
- Troubleshooting using SD-WAN Manager
    - GUI-based diagnosis.
- Device Troubleshooting
    - Command-based troubleshooting.
- Using the GUI for cli show command under Troubleshooting > Real-time
    - Real-time visibility.
- CLI Troubleshooting
    - Command line issue resolution.
- Diagnostic Center (20.18)
- EOX Security Advisories and Vulnerabilities (20.18)
- NetFlow Collectors
    - Flow visibility using NetFlow.
- SNMP Overview
    - Basic device monitoring.
- SD-WAN Logs
    - View event logs.
- SD-WAN Reporting
    - Custom and scheduled reporting.
- SD-WAN Manager APIs & Programmability
    - Automate via API.

Appendix A: Deploying SD-WAN Controllers

- On-Prem Controller Deployment
    - Manual deployment in local DC.
- Create vManage VM Instance on ESXi or KVM
    - Virtual appliance setup.
- Initial vManage Setup
    - Bootstrap process.
- Create vBond VM Instance on ESXI or KVM

    - Orchestrator deployment.
- Create vSmart VM Instance on ESXI or KVM
    - Control-plane setup.
- Add Controllers to vManage
    - Unified visibility in vManage.
- Enterprise CA Configuration
    - Configure certificate authority.

LAB OUTLINE

- Lab 0: Lab Access via View Horizon Client
- Lab 1: Exploring the Manager1 Interface
- Lab 2: Manually Deploying a WAN Edge
- Lab 3: Upgrade SD-WAN Environment
- Lab 4: vSmart CLI Template Configuration
- Lab 5: cEdge Feature Templates Configuration
- Lab 6: Modifying Feature Templates
- Lab 7: BR2 Device Templates Configuration
- Lab 8: Create EMEA-DC2 Configuration Group
- Lab 9: Editing the EMEA DC2 Configuration Group
- Lab 10: Deploying the Configuration Group for DC2
- Lab 11: Creating Security Groups of Interest
- Lab 12: Creating Groups of Interest
- Lab 13: Create and Deploy EMEA-DC2 Policy Group
- Lab 14: Creating Additional UX-2.0 Policies
- Lab 15: Topology
- Lab 16: Security Policy Lists Configuration
- Lab 17: Security Policy Configuration
- Lab 18: Local Policy List Configuration
- Lab 19: Localized Policy Configuration
- Lab 20: Central Policy List Configuration
- Lab 21: Centralized Policy Configuration
- Lab 23: Template Backup and Restore
- Appendix A: Optional Controller Configuration