Implementing and Troubleshooting Cisco SD-Access – Advanced

Description

The Implementing and Troubleshooting Cisco SD-Access – Advanced training develops the practical skills required to design, deploy, operate, and troubleshoot Cisco Software-Defined Access (SD-Access) enterprise networks using Cisco Catalyst Center and Cisco Identity Services Engine (ISE).

The training focuses heavily on hands-on implementation and troubleshooting of wired SD-Access environments. You will build an SD-Access fabric from the underlay through the LISP/VXLAN overlay, deploy Virtual Networks and Anycast Gateways, integrate Cisco ISE for identity-based access, implement Group-Based Policy using Scalable Group Tags (SGTs), configure Border connectivity and multi-site fabrics, and troubleshoot SD- Access at both the control-plane and packet-forwarding levels.

Students will build, verify, break, diagnose, and restore an enterprise SD-Access environment.

How you'll benefit

This training will help you:

- Deploy a complete wired Cisco SD-Access fabric using Catalyst Center.
- Understand SD-Access underlay, LISP control plane, and VXLAN data plane operation.
- Deploy Virtual Networks, IP pools, and Anycast Gateways.
- Implement Border Nodes and external network connectivity.
- Integrate SD-Access Fabric with Cisco ISE and Active Directory.
- Deploy 802.1X and MAB endpoint authentication.
- Implement identity-based segmentation using SGTs and Group-Based Policy.
- Design and deploy multiple SD-Access fabric sites and transit connectivity.
- Diagnose SD-Access problems using Catalyst Center, ISE, IOS-XE CLI.

Who should enroll

- Enterprise network engineers
- Network implementation engineers
- Network architects
- Network administrators
- Cisco Catalyst Center engineers

- Technical consultants
- Engineers responsible for deploying or supporting Cisco SD-Access

Technology areas

- Enterprise networking
- Cisco SD-Access
- Cisco Catalyst Center
- Cisco Identity Services Engine
- Network security
- Campus networking

Objectives

After taking this training, you should be able to:

- Explain the architecture and operation of Cisco SD-Access.
- Describe the interaction between the SD-Access underlay, LISP control plane, VXLAN data plane, and policy plane.
- Analyze endpoint registration and forwarding using LISP EIDs and RLOCs.
- Analyze VXLAN encapsulation and SD-Access packet forwarding.
- Deploy and verify an SD-Access routed underlay.
- Use LAN Automation to provision an SD-Access underlay.
- Create and provision Fabric Sites, Fabric Edge Nodes, Control Plane Nodes, and Border Nodes.
- Deploy Virtual Networks and fabric IP pools.
- Configure and verify Anycast Gateways.
- Configure SD-Access Layer 3 handoffs and external routing.
- Integrate Cisco Catalyst Center with Cisco ISE.
- Configure 802.1X and MAB authentication for fabric endpoints.
- Implement dynamic endpoint classification and SGT assignment.
- Design macro-segmentation using Virtual Networks.
- Design micro-segmentation using Scalable Groups.
- Implement Group-Based Access Control and SGACL policies.
- Determine and verify Group-Based Policy enforcement points.
- Deploy multiple SD-Access fabric sites.
- Compare IP Transit and SD-Access Transit architectures.
- Verify inter-site VN, endpoint, and policy behavior.
- Troubleshoot IS-IS, LISP, VXLAN, ISE, SGT, SGACL, Border, and transit problems.

Prerequisites

The knowledge and skills recommended before attending this training are:

- Professional-level understanding of enterprise routing and switching
- Understanding of VLANs, trunks, SVIs, and Layer 3 campus design
- Working knowledge of IPv4 routing
- Basic understanding of BGP and IS-IS
- Basic understanding of VRFs
- Basic understanding of Cisco Catalyst Center
- Basic understanding of Cisco ISE
- Familiarity with 802.1X and RADIUS
- Basic understanding of Cisco SD-Access architecture

Students should preferably already have knowledge equivalent to:

- CCNA
- CCNP Enterprise / ENCOR
- Cisco Catalyst Center Foundations (CCFND) or equivalent experience

This is not an introductory Catalyst Center course. Cisco's CCFND already introduces SDA architecture, underlay/overlay routing, fabric roles, policies, and endpoint visibility; this advanced course starts from that foundation and takes those concepts into implementation and troubleshooting.

Outline

Cisco SD-Access Fabric Architecture and Internals

- SD-Access architecture and fabric roles
- Underlay, control, data, and policy planes
- IGP underlay operation
- LISP control-plane architecture
- EID and RLOC operation
- LISP Pub/Sub
- Endpoint registration and mobility
- VXLAN data-plane operation
- VNIDs and VTEPs
- Anycast Gateway operation

Cisco SD-Access Fabric Deployment

- SD-Access deployment planning
- Catalyst Center site and network design
- Device discovery and provisioning
- LAN Automation

- Manual and automated underlays
- Fabric Site creation
- Fabric node provisioning
- Virtual Networks
- Fabric IP pools
- Anycast Gateways
- Endpoint onboarding
- Deployment verification

Cisco SD-Access Border and External Connectivity

- Border Node architecture and roles
- North-south forwarding
- Layer 3 handoff
- VRF-Lite
- BGP handoff
- Fusion routing
- Internet connectivity

Cisco ISE Integration and Endpoint Identity

- Cisco ISE role in SD-Access
- Catalyst Center and ISE integration
- Fabric AAA infrastructure
- 802.1X authentication
- Authentication policies
- Authorization policies
- MAB
- ISE Profiling
- Fabric authentication templates
- Dynamic endpoint classification
- Dynamic SGT assignment

Cisco SD-Access Segmentation and Group-Based Policy

- Macro-segmentation with Virtual Networks
- Micro-segmentation with SGTs
- SGT architecture and classification
- SGT transport across the fabric
- Group-Based Access Control
- Policy matrix design
- SGACLs and contracts
- Group-Based Policy enforcement

- Default policy behavior
- Unknown and unclassified endpoints
- Policy across the Border
- Combined VN and SGT designs
- Group-Based Policy troubleshooting

Cisco SD-Access Multi-Site and Transit

- IP Transit
- SD-Access Transit
- Inter-site packet forwarding
- Inter-site VN connectivity
- Inter-site SGT and policy behavior
- Centralized and local Internet exits

Lab Outline

This is an advanced, hands-on course built around a single enterprise SD-Access lab environment that students deploy, expand, secure, and troubleshoot throughout the course. The main lab begins on Day 1 and evolves as new technologies and concepts are introduced.

The lab environment includes:

- HQ Fabric Site — A multi-device SD-Access site with dedicated Border/Control Plane node(s) and Fabric Edge (Access) nodes.
- Remote Fabric Site — A compact SD-Access site using a single device with combined Border, Control Plane, and Fabric Edge roles. This allows students to gain practical experience with both distributed and collapsed fabric designs.
- Device Onboarding — Students practice both manual device onboarding and LAN Automation, including deployment and verification of the SDA underlay.
- Cisco ISE Integration — The fabric is integrated with Cisco ISE, reflecting a corporate deployment. ISE is used both for network-device AAA and for endpoint identity, authentication, and authorization.
- Active Directory and Network Services — ISE is integrated with Microsoft Active Directory for user and computer identity. The Windows infrastructure also provides DHCP and DNS services to the lab environment.
- Wired 802.1X — Students deploy and troubleshoot wired 802.1X authentication, using ISE policies and Active Directory identities to dynamically authorize endpoints.
- Micro-Segmentation — Students create Scalable Groups (SGTs) and Group-Based Access Control policies and verify that identity-based policy operates end-to-end across both fabric sites.

- SD-Access Transit — The HQ and Remote fabric sites are interconnected using SD-Access Transit, allowing students to examine inter-site LISP/VXLAN operation and preservation of segmentation policy between fabrics.
- SD-WAN and SGT Propagation — Students examine a separate lab scenario demonstrating SGT propagation across an SD-WAN environment, showing how identity and policy information can be maintained beyond the local SDA fabric.
- Fusion Router Integration — Students connect the Fabric Site(s) to Fusion Routers and implement external connectivity, VRF/VN integration, shared-services connectivity, and inter-domain routing.
- Continuous Build-and-Troubleshoot Lab — Rather than using isolated labs that are reset after each topic, students continuously develop the same enterprise environment. Configuration introduced in earlier modules becomes the foundation for later modules, allowing students to experience the dependencies and operational consequences of a complete SDA deployment.