Cisco® Implementing Cisco® Switched Networks v2.0 (SWITCH)

Course Overview

View Course Dates & Register Today

This is a 5-day class

SWITCH v2.0, a five-day ILT course, includes major updates and follows an updated blueprint. (However, note that this course does not cover all items listed on the blueprint.) Some older topics have been removed or simplified, while several new IPv6 routing topics have been added. The course content has been adapted to Cisco IOS Software Release 15 and technically updated. Students will gain the knowledge and skills needed to create an efficient enterprise network while focusing on such topics as Layer 2 and multilayer switch functions including VLANs, trunks, inter-VLAN routing, as well as network security and high availability features.

Who Should Attend

Learners who aim to be network professionals and who have knowledge that is obtained from Cisco CCNA courses.

Course Objectives

Describe the hierarchical campus structure, basic switch operation, use of SDM templates, PoE, and LLDP. Implement VLANs and trunks, explain VTP, implement DHCP in IPv4 and IPv6 environments, and configure port aggregation. Implement and optimize the STP mechanism that best suits your network: PVST+, Rapid PVST+, or MST. Configure routing on a multilayer switch. Configure NTP, SNMP, IP SLA, and port mirroring, and verify StackWise and VSS operation. Implement first-hop redundancy in IPv4 and IPv6 environments. Secure the campus network according to recommended practices.

Course Outline

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1 Basic Concepts and Network Design

Lesson 1: Analyzing Campus Network Structure
Hierarchical Network Design
Layers in the Hierarchical Model
Building Cisco Enterprise Campus Architecture
Access Layer
Distribution Layer
Core Layer
Is a Core Layer Needed?
Types of Cisco Switches
Routed vs. Switched Campus Architecture
Lesson 2: Comparing Layer 2 and Multilayer Switches
Layer 2 Switch Operation
Multilayer Switch Operation
Frame Rewrite
CAM and TCAM
Distributed Hardware Forwarding
Cisco Switching Methods
Route Caching
Topology-Based Switching
Lesson 3: Using Cisco SDM Templates
What Are SDM Templates?
SDM Template Types
Changing the SDM Template
Choosing the Correct Template
Lesson 4: Implementing LLDP
LLDP Introduction
Enabling LLDP
Discovering Neighbors Using LLDP
Lesson 5: Implementing PoE
The Need for PoE
PoE Components
PoE Standards
PoE Negotiation
Configuring and Verifying PoE

2 Campus Network Architecture

Lesson 1: Implementing VLANs and Trunks
The Native VLAN
Switch Port Mode Interactions
Deploying VLANs
End-to-End vs. Local VLANs
Voice VLAN Overview
Voice VLAN Configuration
Switch Configuration for Wireless Network Support
Lesson 2: Introducing VTP
The Role of VTP
VTP Modes
VTP Versions
Default VTP Configuration
Overwriting VTP Configuration
VTP Configuration Recommendation
Lesson 3: Implementing DHCP
DHCP Overview
DHCP Relay
DHCP Options
Lesson 4: Implementing DHCP for IPv6
Stateless Autoconfiguration Overview
DHCPv6 Overview
DHCPv6 Operation
Stateless DHCPv6 Overview
DHCPv6 Relay Agent
Lesson 5: Configuring Layer 2 Port Aggregation
The Need for EtherChannel
EtherChannel Mode Interactions
Layer 2 EtherChannel Configuration Guidelines
EtherChannel Load-Balancing Options
EtherChannel Load-Balancing Operation
EtherChannel Guard

3 Spanning Tree Implementation

Lesson 1: Implementing RSTP
STP Overview
STP Standards
STP Operation
Bridge Protocol Data Units
Root Bridge Election
Root Port Election
Designated Port Election
STP Port States
Per VLAN Spanning Tree
RSTP Port Roles
Comparison of RSTP and STP Port States
STP Topology Changes
RSTP Topology Changes
RSTP Link Types
Lesson 2: Implementing STP Stability Mechanisms
Cisco STP Toolkit
UplinkFast
BackboneFast
PortFast
Securing a PortFast Interface with BPDU guard
Disabling STP with BPDU filter
The Problem with Unidirectional Links
Loop Guard Overview
Loop Guard Configuration
Loop Guard Verification
UDLD Overview
UDLD Configuration
Comparing Loop Guard with UDLD
UDLD Recommended Practices
STP Stability Mechanism Recommendations
Flex Links
Lesson 3: Implementing MST
Introducing MST
MST Regions
STP Instances with MST
Extended System ID for MST
Configuring MST Path Cost
Configuring MST Port Priority
MST Protocol Migration
MST Recommended Practices

4 Inter-VLAN Routing

Lesson 1: Implementing Inter-VLAN Routing Using a Router
Inter-VLAN Routing Using an External Router
External Router: Advantages and Disadvantages
Lesson 2: Configuring a Switch to Route
Switch Virtual Interfaces
Routed Switch Ports
SVI autostate exclude Command
SVI Configuration Checklist
Layer 2 EtherChannel vs. Layer 3 EtherChannel
Layer 3 EtherChannel Configuration

5 High-Availability Networks

Lesson 1: Configuring Network Time Protocol
The Need for Accurate Time
Configuring the System Clock Manually
Network Time Protocol
NTP Modes
Securing NTP
NTP Source Address
NTP Versions
NTP in an IPv6 Environment
Simple Network Time Protocol
SNTP Configuration
Lesson 2: Implementing SNMP Version 3
SNMP Overview
SNMP Versions
SNMP Recommendations
SNMPv3 Configuration
Verifying the SNMPv3 Configuration
Lesson 3: Implementing the Cisco IOS IP SLA
Cisco IOS IP SLA Introduction
IP SLA Source and Responder
IP SLA Operation with Responder
IP SLA Responder Time Stamps
Configuring Authentication for the IP SLA
Configuration Example: UDP Jitter
Lesson 4: Implementing Port Mirroring for Monitoring Support
What Is SPAN?
SPAN Terminology
Remote SPAN
Local SPAN Configuration
Verifying the Local SPAN Configuration
RSPAN Configuration
Verifying the RSPAN Configuration
Lesson 5: Verifying Switch Virtualization
The Need for Logical Switching Architectures
What Is StackWise?
StackWise Benefits
Verifying StackWise
Redundant Switch Supervisors
Supervisor Redundancy Modes
What Is VSS?
VSS Benefits
Verifying VSS

6 First Hop Redundancy Protocol Implementation

Lesson 1: Configuring Layer 3 Redundancy with HSRP
The Need for First-Hop Redundancy
The Idea Behind the First-Hop Redundancy Process
HSRP State Transition
HSRP and STP
Load Sharing with HSRP
The Need for Interface Tracking with HSRP
HSRP Interface Tracking
HSRP and Object Tracking
HSRP Authentication
HSRP Timers
HSRP Versions
Lesson 2: Configuring Layer 3 Redundancy with VRRP
About VRRP
Tracking and VRRP
VRRP Interface-Tracking Configuration
Lesson 3: Configuring Layer 3 Redundancy with GLBP
Introducing GLBP
GLBP vs. HSRP
GLBP States
GLBP Load-Balancing Options
GLBP Authentication
GLBP and STP
Tracking and GLBP
Lesson 4: Configuring First Hop Redundancy Protocol for IPv6
IPv6 Native First-Hop Redundancy
Why FHRP in IPv6?
HSRP for IPv6
GLBP for IPv6

7 Campus Network Security

Lesson 1: Implementing Port Security
Overview of Switch Security Issues
Recommended Practices for Switch Security
Unauthorized Access by Rogue Devices
Switch Attack Categories
MAC Flooding Attack
Introducing Port Security
Port Error Conditions
Error-Disabled Port Automatic Recovery
Port Access Lists
Configure Port Access Lists
Lesson 2: Implementing Storm Control
Storm Control
Configuring Storm Control
Verifying Storm Control Behavior
Lesson 3: Implementing Access to External Authentication
AAA Framework Overview
Benefits of AAA Usage
Authentication Options
RADIUS and TACACS+
Enabling AAA and Configuring a Local User for Fallback

Configuring RADIUS for Console and vty Access
Configuring TACACS+ for Console and vty Access
Configuring Authorization and Accounting
Limitations of TACACS+ and RADIUS
Identity-Based Networking
IEEE 802.1X Port-Based Authentication
IEEE 802.1X Configuration Checklist
Lesson 4: Mitigating Spoofing Attacks
DHCP Spoofing Attacks
DHCP Snooping
DHCP Snooping Configuration
IP Source Guard
IP Source Guard Configuration
ARP Spoofing
Dynamic ARP Inspection
DAI Configuration
Lesson 5: Securing VLAN Trunks
Switch Spoofing
Protecting Against Switch Spoofing
VLAN Hopping
Protecting Against VLAN Hopping
VLAN Access Lists
VACL Interaction with ACL and PACL
Configuring VACLs
Lesson 6: Configuring PVLANs
The Need for PVLANs
Introduction to PVLANs
PVLAN Port Types
PVLAN Configuration
PVLAN Verification
PVLANs Across Multiple Switches
Protected Port Feature