Implementing Cisco IP Switched Networks v2.0 - SWITCH (Professional)

Course Details

Course Outline

1. **Basic Concepts and Network Design**
   - 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
   - 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
   - Using Cisco SDM Templates
   - What Are SDM Templates?
   - SDM Template Types
   - Changing the SDM Template
   - Choosing the Correct Template
   - Implementing LLDP

- LLDP Introduction
- Enabling LLDP
- Discovering Neighbors Using LLDP
- Implementing PoE
- The Need for PoE
- PoE Components
- PoE Standards
- PoE Negotiation
- Configuring and Verifying PoE

2. **Campus Network Architecture**
   - 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
   - Introducing VTP
   - The Role of VTP
   - VTP Modes
   - VTP Versions
   - Default VTP Configuration
   - Overwriting VTP Configuration
   - VTP Configuration Recommendation
   - Implementing DHCP
   - DHCP Overview
   - DHCP Relay
   - DHCP Options
   - Implementing DHCP for IPv6
   - Stateless Autoconfiguration Overview

- DHCPv6 Overview
- DHCPv6 Operation
- Stateless DHCPv6 Overview
- DHCPv6 Relay Agent
- 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**
   - 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
   - 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
- 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**
- Implementing Inter-VLAN Routing Using a Router
- Inter-VLAN Routing Using an External Router
- External Router: Advantages and Disadvantages
- 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**
   - 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
   - Implementing SNMP Version 3
   - SNMP Overview
   - SNMP Versions
   - SNMP Recommendations
   - SNMPv3 Configuration
   - Verifying the SNMPv3 Configuration
   - 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
   - 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
- 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**
   - 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
   - Configuring Layer 3 Redundancy with VRRP
   - About VRRP
   - Tracking and VRRP
   - VRRP Interface-Tracking Configuration

- 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
- 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**
   - 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
   - Implementing Storm Control
   - Storm Control
   - Configuring Storm Control
   - Verifying Storm Control Behavior
   - 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
- 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
- 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
- Configuring PVLANs
- The Need for PVLANs
- Introduction to PVLANs

- PVLAN Port Types

- PVLAN Configuration

- PVLAN Verification

- PVLANs Across Multiple Switches

- Protected Port Feature

8. **Lab**

- Discovery: Investigating the CAM

- Discovery: Configuring VLANs and Trunks

- Discovery: VTP Operation

- Discovery: Exploring DHCP

- Discovery: Obtaining IPv6 Addresses Dynamically

- Discovery: EtherChannel Configuration and Load Balancing

- Discovery: Discovering and Modifying STP Behavior

- Discovery: Root Guard

- Discovery: Configuring MST

- Discovery: Routing with an External Router

- Discovery: Routing on a Multilayer Switch

- Discovery: NTP Configuration

- Discovery: IP SLA Echo Configuration

- Discovery: Configuring and Tuning HSRP

- Discovery: Configure VRRP and Spot the Differences from HSRP

- Discovery: Configure GLBP

- Discovery: Port Security

- Challenge: Network Discovery

- Challenge: Configure DHCP

- Challenge: Configure DHCPv6

- Challenge: Configure EtherChannel

- Challenge: Implement RSTP

- Challenge: Improve STP Configuration

- Challenge: Configure MST

- Challenge: Configure Routing Between VLANs with a Router

- Challenge: Configure Routing on a Multilayer Switch
- Challenge: Configure NTP
- Challenge: Configure Network Monitoring Using the Cisco IOS IP SLA
- Challenge: Configure HSRP with Load Balancing
- Challenge: Configure VRRP with Load Balancing
- Challenge: Implement GLBP
- Challenge: Configure HSRP for IPv6
- Challenge: Control Network Access with Port Security