

# SWITCH (IMPLEMENTING CISCO IP SWITCHED NETWORKS) 2.0

## Objetivo

O treinamento SWITCH (Implementing Cisco IP Switched Networks) v2.0 apresenta teoria focada e intensivo uso de laboratório, os participantes aprenderão a planejar, configurar e implementar soluções de switching avançado utilizando a Cisco Enterprise Architecture. Este treinamento visa dar uma sólida compreensão a respeito das redes locais escaláveis de grande porte e redes multicamadas que utilizam os Multilayer Switches Cisco. Será possível entender a integração das tecnologias de Routing and Switching e como essa integração proporciona uma rede local de alta disponibilidade com suporte à voz, vídeo e acesso wireless de forma segura. Após concluir este treinamento, o aluno será capaz de:

- Analisar projetos de rede campus
- Implementar VLANs em uma rede campus
- Otimizar uma rede comutada implementando Spanning Tree Protocol
- Melhorar a performance da rede através do RSTP e MST
- Implementar uma rede multicamada para realizar o roteamento entre VLANs
- Implementar redundância e alta disponibilidade utilizando switches multilayer
- Implementar recursos de segurança em uma rede comutada
- Integrar WLANs em uma rede comutada
- Integrar recursos de voz e vídeo em uma rede comutada

## Público Alvo

Este treinamento é recomendado aos profissionais de rede que atuam na implementação de soluções de Switching avançado, bem como aos parceiros e revendas Cisco. É recomendado também aos candidatos as certificações CCNP Routing & Switching e CCDP. Esse curso serve como preparação para a prova de certificação 300-115 (SWITCH).

## Pré-Requisitos

Para maior aproveitamento é recomendado que o aluno possua a certificação Cisco CCNA ou conhecimento e experiência equivalentes. Estes conhecimentos podem ser adquiridos com os treinamentos ICND (Interconnecting Cisco Network Devices) partes 1 e 2.

## Carga Horária

40 horas (5 dias).

## Conteúdo Programático

- Analyzing Campus Network Designs
- Enterprise Campus Architecture
  - Cisco Lifecycle Services and Network Implementation

## Course Introduction

- Overview
- Course Goal and Objectives
- Course Flow
- Additional References
- Your Training Curriculum

## 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
- Investigating the CAM
- 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

## Implementing VLANs and Trunks

- Configuring 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 Operation
- VTP Versions
- Default VTP Configuration
- Overwriting VTP Configuration
- VTP Configuration Recommendation

## Implementing DHCP

- DHCP Overview

- Discovery 4: Exploring DHCP
- DHCP Relay
- DHCP Options
- Configure DHCP

#### Implementing DHCP for IPv6

- Stateless Autoconfiguration Overview
- DHCPv6 Overview
- DHCPv6 Operation
- Stateless DHCPv6 Overview
- Obtaining IPv6 Addresses Dynamically
- DHCPv6 Relay Agent
- Configure DHCPv6

#### Configuring Layer 2 Port Aggregation

- The Need for EtherChannel
- EtherChannel Mode Interactions
- Layer 2 EtherChannel Configuration Guidelines
- EtherChannel Configuration and Load Balancing
- EtherChannel Load-Balancing Options
- EtherChannel Load-Balancing Operation
- EtherChannel Guard
- Configure EtherChannel

#### 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
- Discovering and Modifying STP Behavior
- RSTP Port Roles
- Comparison of RSTP and STP Port States

- STP Topology Changes
- RSTP Topology Changes
- RSTP Link Types
- Implementing Rapid Spanning-Tree

## Implementing STP Stability Mechanisms

- Cisco STP Toolkit
- UplinkFast
- BackboneFast
- PortFast
- Securing a PortFast Interface with BPDU guard
- Disabling STP with BPDU filter
- Root Guard
- 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
- Improve STP Configuration

## Implementing MST

- Introducing MST
- MST Regions
- STP Instances with MST
- Extended System ID for MST
- Configuring MST
- Configuring MST Path Cost
- Configuring MST Port Priority
- MST Protocol Migration
- MST Recommended Practices
- Configure MST

## Implementing Inter-VLAN Routing Using a Router

- Inter-VLAN Routing Using an External Router
- Routing with an External Router
- External Router: Advantages and Disadvantages
- Configure Routing Between VLANs with a Router

## Configuring a Switch to Route

- Switch Virtual Interfaces
- Routed Switch Ports
- Routing on a Multilayer Switch
- SVI autostate exclude Command
- SVI Configuration Checklist
- Layer 2 EtherChannel vs. Layer 3 EtherChannel
- Layer 3 EtherChannel Configuration
- Configure Routing on a Multilayer Switch

## Configuring Network Time Protocol

- The Need for Accurate Time
- Configuring the System Clock Manually
- Network Time Protocol
- NTP Modes
- NTP Configuration
- Securing NTP
- NTP Source Address
- NTP Versions
- NTP in an IPv6 Environment
- Simple Network Time Protocol
- SNTP Configuration
- Configure NTP

## 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 Echo Configuration
- IP SLA Operation with Responder
- IP SLA Responder Time Stamps
- Configuring Authentication for the IP SLA
- Configuration Example: UDP Jitter
- Configure IP SLA Monitoring

## 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

## Configuring Layer 3 Redundancy with HSRP

- The Need for First-Hop Redundancy
- The Idea Behind the First-Hop Redundancy Process
- Configuring and Tuning HSRP
- 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
- Configure HSRP with Load Balancing

#### Configuring Layer 3 Redundancy with VRRP

- About VRRP
- Configure VRRP and Spot the Differences from HSRP
- Tracking and VRRP
- VRRP Interface-Tracking Configuration
- Configure VRRP with Load Balancing

#### Configuring Layer 3 Redundancy with GLBP

- Introducing GLBP
- GLBP vs. HSRP
- GLBP States
- Configure GLBP
- GLBP Load-Balancing Options
- GLBP Authentication
- GLBP and STP
- Tracking and GLBP
- Implement GLBP

#### Configuring First Hop Redundancy Protocol for IPv6

- IPv6 Native First-Hop Redundancy
- Why FHRP in IPv6?
- HSRP for IPv6
- GLBP for IPv6
- Configure HSRP for IPv6

#### 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 Security
- Port Error Conditions
- Error-Disabled Port Automatic Recovery
- Port Access Lists
- Configure Port Access Lists
- Controlling Network Access Using Port Security

#### 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

## Labs

- Discovery 1: Investigating the CAM
- Discovery 2: Configuring VLANs and Trunks
- Discovery 3: VTP Operation
- Discovery 4: Exploring DHCP
- Discovery 5: Obtaining IPv6 Addresses Dynamically
- Discovery 6: EtherChannel Configuration and Load Balancing
- Discovery 7: Discovering and Modifying STP Behavior
- Discovery 8: Root Guard
- Discovery 9: Configuring MST
- Discovery 10: Routing with an External Router
- Discovery 11: Routing on a Multilayer Switch
- Discovery 12: NTP Configuration
- Discovery 13: IP SLA Echo Configuration
- Discovery 14: Configuring and Tuning HSRP
- Discovery 15: Configure VRRP and Spot the Differences from HSRP

- Discovery 16: Configure GLBP
- Discovery 17: Port Security
- Challenge 1: Network Discovery
- Challenge 2: Configure DHCP
- Challenge 3: Configure DHCPv6
- Challenge 4: Configure EtherChannel
- Challenge 5: Implement RSTP
- Challenge 6: Improve STP Configuration
- Challenge 7: Configure MST
- Challenge 8: Configure Routing Between VLANs with a Router
- Challenge 9: Configure Routing on a Multilayer Switch
- Challenge 10: Configure NTP
- Challenge 11: Configure Network Monitoring Using the Cisco IOS IP SLA
- Challenge 12: Configure HSRP with Load Balancing
- Challenge 13: Configure VRRP with Load Balancing
- Challenge 14: Implement GLBP
- Challenge 15: Configure HSRP for IPv6
- Challenge 16: Control Network Access with Port Security