

100-101: Interconnecting Cisco Networking Devices Part 1 v2.0 (ICND1)

Course Overview

This course provides students with the knowledge and skills to implement and support a small switched and routed network.

<u>Course Introduction</u>	2m
Course Introduction	
<u>Module 01 - Building a Simple Network</u>	3h 6m
Exploring the Functions of Networking	
What is a Network?	
Physical Components of a Network	
Interpreting a Network Diagram	
Impact of User Applications on the Network	
Characteristics of a Network	
Physical Topologies	
Logical Topologies	
Summary	
Understanding the Host-to-Host Communications Model	
Introducing Host-to-Host Communications	
OSI Reference Model	
TCP/IP Protocol Suite	
Data Encapsulation	
Data De-Encapsulation	
Peer-to-Peer Communications	
Summary	
Introducing LANs	
Local Area Networks	
LAN Components	
Need for Switches	
Switches	
Summary	
Operating Cisco IOS Software	
Cisco IOS Software Features and Functions	
Cisco IOS CLI Functions	
User EXEC Mode	
Privileged EXEC Mode	
Help Functions in the CLI	
CLI Error Messages	
Managing Cisco IOS Configurations	
Improving the User Experience in the CLI	
Summary	
Starting a Switch	
Switch Installation	
Switch LED Indicators	

Connecting to a Console Port
Basic Switch Configuration
Verifying the Switch Initial Startup Status
Summary
Understanding Ethernet and Switch Operation
Ethernet LAN Connection Media
Fiber Connector Types
Ethernet Frame Structure
MAC Addresses
Switching Operation
Duplex Communication
Configuring Duplex and Speed Options
Summary
Troubleshooting Common Switch Media Issues
Common Troubleshooting Tools
Media Issues - Copper
Media Issues - Fiber
Troubleshooting Switch Media Issues
Interface Status Verification
Port Issues
Troubleshooting Port Issues
Summary
Demo - Perform Switch Startup
Demo - Troubleshooting Switch Media Issues
Module 01 Review

Module 02 - Establishing Internet Connectivity

4h 37m

Understanding the TCP/IP Internet Layer
Internet Protocol
IPv4 Address Representation
IPv4 Header Address Fields
Decimal and Binary Systems
Base X Number System (eNotes)
Decimal-to-Binary Conversion
IP Address Classes
Reserved IPv4 Address
Domain Name System
Verifying the IPv4 Address of a Host
Summary
Understanding IP Addressing and Subnets
Subnets
Subnet Masks
Octet Values of a Subnet Mask
Default Gateways
Possible Subnets and Hosts for a Class B Network
Applying Subnet Masks
Determining the Network Addressing Scheme
Example: Addressing Scheme
Variable-Length Subnet Masking
VLSM Example

Summary

Understanding the TCP/IP Transport Layer

TCP/IP Transport Layer Functions

Reliable vs. Best-Effort Transport

TCP vs. UDP Analogy

UDP Characteristics

TCP Characteristics

TCP/IP Applications

TCP 3-Way Handshake (eNotes)

Summary

Exploring the Functions of Routing

Role of a Router

Router Characteristics

Router Functions

Path Determination

Routing Table

Types of Routes

Dynamic Routing Protocols

Distance Vector vs. Link State

Summary

Configuring a Cisco Router

Initial Router Startup

Initial Router Setup

Configuring Router Interfaces

Configuring the Cisco Router IP Address

Router show ip interface brief Command

Router show interfaces Command

Exploring Connected Devices

Cisco Discovery Protocol

Discovering Neighbors Using Cisco Discovery Protocol

Using the show cdp neighbors detail Command

Summary

Exploring the Packet Delivery Process

Layer 2 Addressing

Layer 3 Addressing

Address Resolution Protocol

Host-to-Host Packet Delivery (Step 1 of 16)

Host-to-Host Packet Delivery (Step 2 of 16)

Host-to-Host Packet Delivery (Step 3 of 16)

Host-to-Host Packet Delivery (Step 4 of 16)

Host-to-Host Packet Delivery (Step 5 of 16)

Host-to-Host Packet Delivery (Step 6 of 16)

Host-to-Host Packet Delivery (Step 7 of 16)

Host-to-Host Packet Delivery (Step 8 of 16)

Host-to-Host Packet Delivery (Step 9 of 16)

Host-to-Host Packet Delivery (Step 10 of 16)

Host-to-Host Packet Delivery (Step 11 of 16)

Host-to-Host Packet Delivery (Step 12 of 16)

Host-to-Host Packet Delivery (Step 13 of 16)

Host-to-Host Packet Delivery (Step 14 of 16)

Host-to-Host Packet Delivery (Step 15 of 16)

Host-to-Host Packet Delivery (Step 16 of 16)

Role of a Switch in Packet Delivery (Step 1 of 4)

Role of a Switch in Packet Delivery (Step 2 of 4)

Role of a Switch in Packet Delivery (Step 3 of 4)

Role of a Switch in Packet Delivery (Step 4 of 4)

Summary

Enabling Static Routing

Routing Operations

Static and Dynamic Routing Comparison

When to Use Static Routing

Static Route Configuration

Default Routes

Static Route Configuration Verification

Verifying the Default Route Configuration

Summary

Managing Traffic Using ACLs

Understanding ACLs

ACL Operation

ACL Wildcard Masking

Wildcard Bit Mask Abbreviations

Types of ACLs

Testing An IP Packet Against a Numbered Standard Access List

Basic Configuration of Numbered Standard IPv4 ACLs

Summary

Enabling Internet Connectivity

The Demarcation Point

Dynamic Host Configuration Protocol

Options for Configuring a Provider-Assigned IP Address

Configuring a Static Provider-Assigned IP Address

Configuring a DHCP Client

Public vs. Private IPv4 Addresses

Introducing NAT

Types of Addresses in NAT

Types of NAT

Understanding Static NAT

Configuring Static NAT

Verifying Static NAT Configuration

Understanding Dynamic NAT

Configuring Dynamic NAT

Verifying Dynamic NAT Configuration

Understanding PAT

Configuring PAT

Verifying PAT Configuration

Troubleshooting NAT

Troubleshooting NAT Case Study

Summary

Demo - Performing Initial Router Setup Media Issues

Demo - Connecting to the Internet

Module 02 Review

Module 03 - Managing Network Device Security

2h 45m

Securing Administrative Access

Network Device Security Overview
Securing Access to Privileged EXEC Mode
Securing Console Access
Securing Remote Access
Enabling Remote Access Connectivity
Limiting Remote Access ACLs
External Authentication Options
Configuring the Login Banner
Summary

Implementing Device Hardening

Securing Unused Ports
Disabling an Interface (Port)
Port Security
Configuring Port Security
Port Security Verification
Disabling Unused Services
Network Time Protocol
Configuring NTP
Verifying NTP
Summary

Implementing Traffic Filtering with ACLs

Using ACLs to Filter Network Traffic
ACL Operation
Applying ACLs to Interfaces
The Need for Extended ACLs
Configuring Numbered Extended IPv4 ACLs
Configuring Named ACLs
ACL Configuration Guidelines
Monitoring ACLs
Troubleshooting Common ACL Errors: Scenario 1
Troubleshooting Common ACL Errors: Scenario 2
Troubleshooting Common ACL Errors: Scenario 3
Troubleshooting Common ACL Errors: Scenario 4
Troubleshooting Common ACL Errors: Scenario 5
Troubleshooting Common ACL Errors: Scenario 6
Troubleshooting Common ACL Errors: Scenario 7
Summary
Demo - Enhancing the Security of the Initial Configuration
Demo - Device Hardening
Demo - Filtering Traffic with ACLs
Module 03 Review

Module 04 - Building a Medium-Sized Network

3h 20m

Implementing VLANs and Trunks

Issues in a Poorly Designed Network
VLAN Introduction
Trunking with 802.1Q
Creating a VLAN

Assigning a Port to a VLAN
Configuring an 802.1Q Trunk
VLAN Design Considerations
Physical Redundancy in a LAN
Summary

Routing Between VLANs

Purpose of Inter-VLAN Routing
Options for Inter-VLAN Routing
Configuring a Router with a Trunk Link
Summary

Using a Cisco Network Device as a DHCP Server

Need for a DHCP Server
Understanding DHCP
Configuring a DHCP Server
Monitoring DHCP Server Functions
DHCP Relay Agent
Summary

Introducing WAN Technologies

Introducing WANs
WANs vs. LANs
Role of Routers in WANs
WAN Communication Link Options
Point-to-Point Connectivity
Configuring a Point-to-Point Link
Summary

Introducing Dynamic Routing Protocols

Purpose of Dynamic Routing Protocols
Interior and Exterior Routing Protocols
Distance Vector and Link-State Routing Protocols
Understanding Link-State Routing Protocols
Summary

Implementing OSPF

Introducing OSPF
OSPF Adjacencies
SPF Algorithm
Router ID
Configuring Single-Area OSPF
Verifying OSPF Configuration
Summary
Demo - Configuring Expanded Switch Networks
Demo - Configuring DHCP Server
Demo - Implementing OSPF
Demo - Troubleshooting OSPF
Module 04 Review

Module 05 - Introducing IPv6

1h 23m

Introducing Basic IPv6

IPv4 Addressing Exhaustion Workarounds
Problems with IPv4 Addressing Workarounds
IPv6 Features

IPv6 Addresses
IPv6 Address Types
IPv6 Unicast Addresses
EUI-64 Interface ID Assignment
IPv6 Addresses Allocation
Basic IPv6 Connectivity
Cisco IOS IPv6 Configuration Example
Basic IPv6 Connectivity (Cont.)
Summary
Understanding IPv6
IPv6 Header Changes and Benefits
ICMPv6
Neighbor Discovery
Stateless Autoconfiguration
Summary
Configuring IPv6 Routing
Routing for IPv6
Static Routing
OSPFv3
Summary
Demo - IPv6 Addresses
Demo - Configure and Verify IPv6 Routing
Module 05 Review
Course Closure

Total Duration: 15h 23m