

Interconnecting Cisco Networking Devices, Part 1 (ICND1) v3.0

COURSE OVERVIEW:

Interconnecting Cisco Networking Devices, Part 1 (ICND1) v3.0 is a five-day, instructor-led training course that teaches learners how to install, operate, configure, and verify a basic IPv4 and IPv6 network, including configuring a LAN switch, configuring an IP router, managing network devices, and identifying basic security threats.

Optionally, this course can be followed by the Interconnecting Cisco Networking Devices, Part 2 (ICND2) v3.0 course, which covers topics in more depth and teaches learners how to perform basic troubleshooting steps in enterprise branch office networks, preparing learners for Cisco CCNA certification.

Several topics have been added including; understanding the interactions and network functions of firewalls, wireless controllers and access points, along with additional focus on IPv6 and basic network security.

All configuration commands are introduced through examples and supported with lab exercises. A full suite of labs have been developed using the virtual IOS environment with flexible topologies that reinforce concepts with hands-on, guided discovery and challenge labs that align to each lesson module.

WHO WILL BENEFIT FROM THIS COURSE?

Target candidates: Individuals seeking the Cisco CCENT certification, or Cisco CCNA Routing and Switching certification. The course is also appropriate for support technicians involved in the basic installation, operation, and verification of LAN networks.

Target Jobs: Entry-level network engineer, network administrator, network support technician, and help desk technician

Certifications Associated With This Class:

- Cisco CCENT
- Cisco CCNA Routing and Switching
- Cisco CCDA
- Cisco CCNA Security
- Cisco CCNA Wireless

PREREQUISITES:

The knowledge and skills that a learner must have before attending this course are as follows:

- Basic computer literacy
- Basic PC operating system navigation skills
- Basic Internet usage skills
- Basic IP address knowledge

RELATED COURSES:

- Interconnecting Cisco Networking Devices, Part 2 (ICND2) v3.0
- Interconnecting Cisco Networking Devices Accelerated (CCNAX)

COURSE OBJECTIVES:

The goal of the course is to provide learners with the knowledge and skills necessary to install, configure, and operate a small- to medium-sized network.

- Describe network fundamentals and build simple LANs
- Establish Internet connectivity
- Manage and secure network devices
- Expand small to medium sized networks
- Describe IPv6 basics

COURSE OUTLINE:**Module 1: Building a Simple Network****Lesson 1: Exploring the Functions of Networking**

- What Is a Computer Network?
- Physical Components of a Network
- Characteristics of a Network
- Physical vs. Logical Topologies
- Interpreting a Network Diagram
- Impact of User Applications on the Network
- Challenge Lab

Lesson 2: Understanding the Host-to-Host Communications Model

- Introducing Host-to-Host Communications
- OSI Reference Model
- TCP/IP Protocol Suite
- Peer-to-Peer Communications
- Encapsulation and De-Encapsulation
- Challenge Lab

Lesson 3: Introducing LANs

- Local Area Networks
- LAN Components
- Need for Switches
- Switches
- Challenge Lab

Lesson 4: Operating Cisco IOS Software

- Cisco IOS Software Features and Functions
- Cisco IOS CLI Functions
- Cisco IOS Software Modes
- Discovery Lab 1: Get Started with Cisco CLI
- Challenge Lab

Lesson 5: Starting a Switch

- Switch Installation
- Switch LED Indicators
- Connecting to a Console Port
- Basic Show Commands and Information
- Discovery Lab 2: Perform Basic Switch Configuration
- Challenge Lab

Lesson 6: Understanding Ethernet and Switch Operation

- Ethernet LAN Connection Media
- Ethernet Frame Structure
- MAC Addresses
- Frame Switching
- Duplex Communication
- Discovery Lab 3: Observe How a Switch Operates
- Challenge Lab

Lesson 7: Troubleshooting Common Switch Media Issues

- Troubleshooting Methods
- Troubleshooting Tools
- Troubleshooting Common Switch Media Issues
- Troubleshooting Common Switch Port Issues
- General Troubleshooting Process
- Discovery Lab 4: Troubleshoot Switch Media and Port Issues
- Challenge Lab

Module 2: Establishing Internet Connectivity

Lesson 1: Understanding the TCP/IP Internet Layer

- Internet Protocol
- IPv4 Address Representation
- IPv4 Header Address Fields
- Decimal and Binary Systems
- Decimal-to-Binary Conversion
- IP Address Classes
- Reserved IPv4 Addresses
- Private vs. Public IP Addresses
- Domain Name System
- Verifying the IPv4 Address of a Host
- Challenge Lab

Lesson 2: Understanding IP Addressing and Subnets

- Subnets
- Subnet Masks
- Implementing Subnetting: Borrowing Bits
- Implementing Subnetting: Determining the Addressing Scheme
- Benefits of VLSM and Implementing VLSM
- Challenge Lab

Lesson 3: Understanding the TCP/IP Transport Layer

- TCP/IP Transport Layer Functions
- Reliable vs. Best-Effort Transport
- TCP vs. UDP Analogy
- TCP Characteristics
- UDP Characteristics
- TCP/IP Applications
- Discovery Lab 5: Inspect TCP/IP Applications
- Challenge Lab

Lesson 4: Exploring the Functions of Routing

- Role of a Router
- Router Components
- Router Function
- Routing Table
- Dynamic Routing Protocol
- Path Determination
- Route Selection
- Challenge Lab

Lesson 5: Configuring a Cisco Router

- Initial Router Setup
- Configuring Router Interfaces
- IP Addresses on Router Interfaces
- Checking Interface Configuration and Status
- Exploring Connected Devices
- Using Cisco Discovery Protocol
- Configuring LLDP
- Discovery Lab 6: Start with Cisco Router Configuration
- Discovery Lab 7: Configure Cisco Discovery Protocol
- Challenge Lab

Lesson 6: Exploring the Packet Delivery Process

- Address Resolution Protocol
- Default Gateways
- Host-to-Host Packet Delivery
- Role of a Switch in Packet Delivery
- Troubleshooting Common Problems Associated with IP Addressing
- Discovery Lab 8: Configure Default Gateway
- Discovery Lab 9: Exploration of Packet Forwarding
- Challenge Lab

Lesson 7: Enabling Static Routing

- Routing Operation
- Static and Dynamic Routing Comparison
- When to Use Static Routing
- Static Route Configuration
- Default Routes
- Verifying the Static Route Configuration
- Verifying the Default Route Configuration
- Discovery Lab 10: Configure and Verify Static Routes
- Challenge Lab

Lesson 8: Learning the Basics of ACL

- ACL Overview
- ACL Operation
- ACL Wildcard Masking
- Wildcard Bit Mask Abbreviations
- Types of ACLs
- Testing an IP Packet Against a Numbered Standard Access List
- Configuring Standard IPv4 ACLs
- Using ACLs to Filter Network Traffic
- Applying ACLs to Interfaces
- Configuring Named ACLs
- Discovery Lab 11: Configure and Verify ACLs
- Challenge Lab

Lesson 9: Enabling Internet Connectivity

- Demarcation Point
- Provider-Assigned IP Addresses
- Public vs. Private IPv4 Addresses
- Introducing NAT
- Types of Addresses in NAT
- Types of NAT
- Understanding Static NAT
- Configuring and Verifying Static NAT
- Understanding Dynamic NAT
- Configuring and Verifying Dynamic NAT
- Understanding PAT
- Configuring and Verifying PAT
- Troubleshooting NAT
- Discovery Lab 12: Configure a Provider-Assigned IP Address
- Discovery Lab 13: Configure Static NAT
- Discovery Lab 14: Configure Dynamic NAT and PAT
- Discovery Lab 15: Troubleshoot NAT
- Challenge Lab

Module 3: Summary Challenge

Lesson 1: Establish Internet Connectivity

- Challenge Lab

Lesson 2: Troubleshoot Internet Connectivity

- Challenge Lab

Module 4: Building a Medium-Sized Network

Lesson 1: Implementing VLANs and Trunks

- Enterprise Network Design
- Issues in a Poorly Designed Network
- VLAN Introduction
- Creating a VLAN
- Assigning a Port to a VLAN
- Trunking with 802.1Q
- Configuring an 802.1Q Trunk
- VLAN Design Consideration
- Physical Redundancy in a LAN
- Discovery Lab 16: Configure VLAN and Tru
- Challenge Lab

Lesson 2: Routing Between VLANs

- Purpose of Inter-VLAN Routing
- Options for Inter-VLAN Routing
- Discovery Lab 17: Configure a Router on a Stick
- Challenge Lab

Lesson 3: Using a Cisco IOS Network Device as a DHCP Server

- Need for a DHCP Server
- Understanding DHCP
- Configuring a DHCP Server
- Understanding DNS
- Discovery Lab 18: Configure a Cisco Router as a DHCP Server
- Discovery Lab 19: Troubleshoot DHCP Issues
- Challenge Lab

Lesson 4: Implementing RIPv2

- Overview of Routing Protocols
- Distance Vector and Link-State Routing Protocols
- Understanding RIPv2
- Configure RIPv2
- Verify RIPv2
- Discovery Lab 20: Configure and Verify RIPv2
- Discovery Lab 21: Troubleshoot RIPv2
- Challenge Lab

Module 5: Network Device Management and Security

Lesson 1: Securing Administrative Access

- Network Device Security Overview
- Securing Access to Privileged EXEC Mode
- Securing Console Access
- Securing Remote Access
- Limiting Remote Access with ACLs
- Configuring the Login Banner
- Discovery Lab 22: Enhance Security of Initial Configuration
- Discovery Lab 23: Limit Remote Access Connectivity
- Challenge Lab

Lesson 2: Implementing Device Hardening

- Securing Unused Ports
- Port Security
- Configuring Port Security
- Verifying Port Security
- Discovery 24: Configure and Verify Port Security
- Disabling Unused Services
- Network Time Protocol
- Configuring NTP
- Verifying NTP
- Discovery Lab 25: Configure and Verify NTP
- Challenge Lab

Lesson 3: Configuring System Message Logging

- Syslog Overview
- Syslog Message Format
- Syslog Configuration
- Discovery Lab 26: Configure Syslog
- Challenge Lab

Lesson 4: Managing Cisco Devices

- Router Internal Components
- ROM Functions
- Stages of the Router Power-On Boot Sequence
- Configuration Register
- Locating Cisco IOS Image Files
- Loading Cisco IOS Image Files
- Loading Cisco IOS Configuration Files
- Cisco IOS Integrated File System and Devices
- Managing Cisco IOS Images
- Deciphering Cisco IOS Image Filenames
- Managing Device Configuration Files
- Password Recovery
- Challenge Lab

Lesson 5: Licensing

- Licensing Overview
- Licensing Verification
- Permanent License Installation
- Evaluation License Installation
- Backing Up the License
- Uninstalling the License
- Cisco Smart Software Manager
- Challenge

Module 6: Summary Challenge

Lesson 1: Implementing a Medium-Sized Network

- Challenge Lab

Lesson 2: Troubleshooting a Medium-Sized Network

- Challenge Lab

Module 7: Introducing IPv6

Lesson 1: Introducing Basic IPv6

- IPv4 Addressing Exhaustion Workarounds
- IPv6 Features
- IPv6 Addresses
- IPv6 Address Scopes and Prefixes
- IPv6 Address Allocation
- Challenge Lab

- **Lesson 2: Understanding IPv6 Operation**
- Comparison of IPv4 and IPv6 Headers
- Internet Control Message Protocol Version 6
- Neighbor Discovery
- Stateless Address Autoconfiguration
- Discovery Lab 27: Configure Basic IPv6 Connectivity
- Challenge Lab

Lesson 3: Configuring IPv6 Static Routes

- Routing for IPv6
- Configuring IPv6 Static Routes
- Discovery Lab 28: Configure IPv6 Static Routes
- Challenge Lab

Labs:

- Discovery 1: Get Started with Cisco CLI
- Discovery 2: Perform Basic Switch Configuration
- Discovery 3: Observe How a Switch Operates
- Discovery 4: Troubleshoot Switch Media and Port Issues
- Discovery 5: Inspect TCP/IP Applications
- Discovery 6: Start with Cisco Router Configuration
- Discovery 7: Configure Cisco Discovery Protocol
- Discovery 8: Configure Default Gateway
- Discovery 9: Exploration of Packet Forwarding
- Discovery 10: Configure and Verify Static Routes
- Discovery 11: Configure and Verify ACLs
- Discovery 12: Configure a Provider-Assigned IP Address
- Discovery 13: Configure Static NAT
- Discovery 14: Configure Dynamic NAT and PAT
- Discovery 15: Troubleshoot NAT
- Discovery 16: Configure VLAN and Trunk
- Discovery 17: Configure a Router on a Stick
- Discovery 18: Configure a Cisco Router as a DHCP Server
- Discovery 19: Troubleshoot DHCP Issues
- Discovery 20: Configure and Verify RIPv2
- Discovery 21: Troubleshoot RIPv2
- Discovery 22: Enhance Security of Initial Configuration
- Discovery 23: Limit Remote Access Connectivity
- Discovery 24: Configure and Verify Port Security
- Discovery 25: Configure and Verify NTP
- Discovery 26: Configure Syslog
- Discovery 27: Configure Basic IPv6 Connectivity
- Discovery 28: Configure IPv6 Static Routes

- Challenge 1: Implementing the Initial Switch Configuration
- Challenge 2: Implementing the Initial Router Configuration
- Challenge 3: Implementing Static Routing
- Challenge 4: Implementing Basic Numbered and Named ACLs
- Challenge 5: Implementing PAT
- Challenge 6: Summary Challenge Lab: 1
- Challenge 7: Summary Challenge Lab: 2
- Challenge 8: Troubleshooting VLANs and Trunk
- Challenge 9: Implement Multiple VLANs and Basic Routing Between the VLANs
- Challenge 10: Implementing a DHCP Server in on a Cisco IOS Device
- Challenge 11: Implementing RIPv2
- Challenge 12: Securing Device Administrative Access
- Challenge 13: Implementing Device Hardening
- Challenge 14: Configuring System Message Logging
- Challenge 15: Summary Challenge Lab: 3
- Challenge 16: Summary Challenge Lab: 4
- Challenge 17: Implement IPv6 Static Routing

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