



## CCNA Certification Online – IT102 70 hours

### CCNA

The Cisco Certified Network Associate (CCNA) certification is Cisco's entry-level Network Installation and Support certification. CCNAs exhibit basic networking skills, and should be able to install simple LAN and WAN networks. This program provides a comprehensive introduction to deploying Cisco routers in an inter-networked environment. Through extensive hands-on exercises, students gain the fundamental knowledge and skills needed to install, configure and troubleshoot Cisco routers. A single exam must be passed to attain this certification.

### Basic Networking Concepts

#### Overview/Description

To identify the major components of a computer system, to define basic computer and networking terminology, and to describe the benefits and functions of the OSI reference model

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Lesson Objectives

#### Basic Networking Concepts

- identify the major components of a computer system and their functionality, and list the resources required to install a NIC.
- identify the main purposes and functions of networking.
- distinguish between the OSI reference model and the TCP/IP stack.
- distinguish between basic computer and networking terms, and between the principles of the OSI reference model and the TCP/IP protocol stack.

### Creating a Simple Ethernet Network

#### Overview/Description

To demonstrate how to build a simple Ethernet network

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam



## Lesson Objectives

### Creating a Simple Ethernet Network

- identify the standards, functions, and operation of important LAN technologies.
- differentiate between the different network media types.
- differentiate between the different network media types.
- determine the appropriate network media type to use in a given scenario.

### Extending Ethernet Networks

#### Overview/Description

To describe the functions and operations of switched LANs and virtual LANs

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

## Lesson Objectives

### Extending Ethernet Networks

- distinguish between the features of different network topologies.
- identify the functions, features, and operation of network devices used at different layers of the OSI model.
- match network devices to their function and distinguish between different network topologies.
- recall methods used to extend Ethernet LANs and reduce the size of collision domains.
- determine how to resolve problems with bridging loops in a switched environment, for a given scenario.
- differentiate between the features and characteristics of shared and switched LANs.
- identify the components of a VLAN and the benefits and advantages provided by VLANs.
- relate the benefits and costs of establishing a VLAN for a given scenario.

### Networks with Cisco Devices

#### Overview/Description

To identify the basic operations of routing and to describe the operations of routing protocols, and to identify the functions of specific network layer protocols

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

## Lesson Objectives



## Connecting Networks with Cisco Devices

- distinguish between different network layer protocols and their functions, and identify the fields of the IP datagram.
- differentiate between the functions of protocols used at the network layer.
- identify the basic operations involved in the routing process.
- distinguish between different routing protocol classes.
- describe the features and operations of interior and exterior routing protocols.
- distinguish between the functions and application of common interior and exterior routing protocols.**

## Constructing IP Network Addresses

### Overview/Description

To describe the major aspects of IP addressing and calculate valid IP subnet addresses and masks

### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Lesson Objectives

#### Constructing IP Network Addresses

- distinguish between the processes used to convert between decimal, binary, and hexadecimal numbering systems.
- interpret numerical systems.
- distinguish between the types of IP address classes and between the types of reserved IP addresses.
- recognize how the use of IPv4, IPv6, and CIDR affects IP address availability.
- convert a 32-bit binary number to its corresponding IP address.
- recognize how to calculate the number of usable subnets and host addresses.
- recognize how to calculate a subnet number.
- calculate a subnet assignment.

#### Ensuring Data Delivery in Networks

### Overview/Description

To demonstrate how to ensure the reliability of data delivery through the transport layer

### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Lesson Objectives



## Ensuring Data Delivery in Networks

- identify the functionality of common transport layer protocols and recognize the applications supported by TCP/IP.
- recognize the functionality of the TCP/IP transport layer.
- After completing this topic, you should be able to sequence the steps required to establish, maintain, and terminate a TCP connection in a TCP/IP network environment.

## Remote Network Connectivity

### Overview/Description

To describe the functions of major WAN technologies

### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Lesson Objectives

#### Remote Network Connectivity

- recognize the functions, operation, and primary components of a WAN.
- identify the features and functions of major WAN technologies.
- determine the WAN connection types and multiplexing used in a given scenario.
- recognize the structure and functionality of the Internet.
- identify the characteristics and functions of the PPP and HDLC protocols.
- identify the function and operation of ISDN, DSL, Frame Relay, ATM, and SONET connection technologies.
- identify the function and operation of analog modems and cable modems.
- determine the appropriate connection medium to use when connecting a WAN in a given scenario.
- distinguish between the functions, operations, and primary components of a MAN, SAN, CN, and VPN.
- match an appropriate WAN connection technology and modem to a corporate network, for a given scenario.

## Operation and Configuration of Cisco IOS Switches

### Overview/Description

To use the available configuration tools to establish connectivity to the appropriate network device in order to complete initial switch configurations and to verify the default configuration and status of switch devices

### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam



## Lesson Objectives

### Operation and Configuration of Cisco IOS Switches

- recognize the setup of console connections for Cisco devices.
- identify the requirements for configuring a Cisco network device from an external source.
- start a Cisco IOS EXEC session and change EXEC modes.
- recognize the LED sequence that verifies successful POST completion for a Catalyst switch.
- interpret initial boot-up output and use the CLI help facilities on a Catalyst switch.
- use the command line interface to configure basic switch details, and to examine the status and configuration of the switch.
- implement the initial configuration for a Catalyst 2950 switch.

### Operation and Configuration of Cisco IOS Routers

#### Overview/Description

To use available configuration tools to establish connectivity to a router in order to complete the initial router configuration and to verify the default configuration and status of a functioning access-layer router

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Operation and Configuration of Cisco IOS Routers

- recognize the router startup sequence and the initial router setup.
- recognize the keyboard help, enhanced editing key functions, and command history feature associated with the command line interface.
- use the router command line interface to locate and complete commands, correct command line errors, and observe and verify the status of a router.
- identify the router status commands used to verify initial startup of a router.
- verify the initial router startup sequence and configuration process.
- identify the different router configuration modes and their functions.
- configure basic router features and interfaces.
- implement a basic router configuration.
- modify the configuration files to configure a router in a given scenario.

### Managing the Cisco Network Environment

#### Overview/Description

To discover and determine the status of connected devices on a network and enable connections to these devices

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam



## Lesson Objectives

### Managing the Cisco Network Environment

- use CDP to determine the host names and addresses of neighboring Cisco devices, and recognize how to create a network map of the environment.
- use CDP to determine the host names and addresses of neighboring Cisco devices and create a map of the network environment, given operational access-layer switches and routers.
- identify how to connect to a remote device using Telnet.
- use CDP and Telnet to collect information from network devices.
- use IOS commands to manage Telnet sessions.

### Cisco Network Device Administration

#### Overview/Description

To manage devices on a network according to designated best practices

#### Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

### Cisco Network Device Administration

- use Cisco IOS commands to manage device configuration files.
- manage Cisco IOS image files and device configuration files.
- implement the correct methods for managing device configurations.
- recognize how to execute adds, moves, and changes on a router, and troubleshoot operational Cisco devices.
- execute adds, moves, or changes on a router, and use the debug troubleshooting tool to minimize potentially adverse impacts on Cisco devices.

### Configuring Cisco Catalyst Switch Operations

#### Overview/Description

To discuss and implement specific bridging and VLAN Catalyst switch configurations, which provide for scalability, security, and enhanced management of the local area switched network

#### Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

## Lesson Objectives

### Configuring Cisco Catalyst Switch Operations

- explain the fundamentals of layer 2 switching.



- describe redundant topologies in switched environments.
- describe how the spanning-tree algorithm is used to eliminate switching loops.
- describe how the Spanning-Tree and Rapid Spanning-Tree Protocols affect frame forwarding on bridges and switch ports.
- discuss Spanning-Tree Protocol operation.
- describe how to configure ports on a switch.
- configure port security, add, move, and change MAC addresses and manage device configuration files.
- explain how to implement port and MAC security on a switch.
- configure a Catalyst 2950 series switch.
- describe the operation of VLANs.
- explain how VTP is used to manage VLANs.
- determine the appropriate commands used in VLAN configuration and trunking.
- scale the size and number of VLANs and troubleshoot their operation.
- verify VLAN configuration on a switch.

## **Routing in Cisco Networks**

### **Overview/Description**

To describe the different forms of routing and explain the concepts of distance vector and link state routing

### **Target Audience**

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

### **Lesson Objectives**

#### **Routing in Cisco Networks**

- outline the basic principles of routing.
- distinguish the features and operation of dynamic routing protocols.
- discuss the operation and method used for routing between VLANs and choose the commands used to configure trunking modes.
- analyze the operation of distance vector routing protocols.
- explain the mechanisms used to eliminate routing loops.
- describe the features and operation of link state and balanced hybrid routing protocols.
- use IOS software commands to discover routing protocols supported and in use on a router.

#### **Implementing Routing Protocols on Cisco Networks**

### **Overview/Description**

To describe the operation and configuration of popular modern routing protocols

### **Target Audience**

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services



## Lesson Objectives

### Implementing Routing Protocols on Cisco Networks

- enable RIP on a router.
- configure and verify RIP operation on Cisco routers.
- explain the operation of IGRP.
- describe how to enable IGRP on a router.
- configure IGRP on a router.
- distinguish the various features and functions of EIGRP.
- describe the commands used to configure EIGRP.
- verify EIGRP configuration on routers.
- identify the features of OSPF and how they compare to distance vector routing protocols.
- describe the commands used to configure OSPF in a single area.
- configure and verify configuration of OSPF.
- explain the operation of variable-length subnet masks (VLSM) on Cisco routers.

### Managing IP Traffic on Cisco Networks

#### Overview/Description

To describe and configure efficient network traffic restrictions and security using properly implemented access list management and address translation

#### Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

## Lesson Objectives

### Managing IP Traffic on Cisco Networks

- explain the requirement for access lists.
- describe access list operation and configuration.
- describe how access lists filter by protocols and packet details.
- explain how wildcards are used in access list configuration.
- explain the rules governing access list configuration.
- demonstrate how to control network access using access control lists.
- implement and manage standard access lists using IOS commands.
- describe extended access lists, and explain how to configure them and determine their effectiveness.
- implement and manage standard access control lists (ACL) using IOS commands.
- explain the ideal implementation of access lists.
- describe the features and operation of Network Address Translation (NAT) and Port Address Translation (PAT).
- describe the commands used to configure address translation and overloading.
- verify and troubleshoot NAT and PAT configurations.

### Extending a Cisco Network to a WAN



### **Overview/Description**

To describe the implementation and configuration of the different technologies used on Cisco devices to enable wide area connections

### **Target Audience**

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

### **Lesson Objectives**

#### **Extending a Cisco Network to a WAN**

- discuss the elements of a wide-area network.
- describe the protocols used for WAN connectivity and how devices are connected to the network.
- detail HDLC and PPP protocol operation.
- detail the authentication and encapsulation processes used by PPP.
- configure PPP on a Cisco device interface.
- describe the terminology of Frame Relay and how it operates.
- describe the purpose and command syntax for defining static Frame Relay map entries on a router.
- configure Frame Relay subinterfaces on a router.
- discuss the typical types of Frame Relay connections made to service providers.
- configure a subinterface on a Cisco router.
- configure a Frame Relay connection.

#### **Completing ISDN Calls on Cisco Networks**

### **Overview/Description**

To detail the operation and configuration of ISDN and DDR

### **Target Audience**

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

### **Lesson Objectives**

#### **Completing ISDN Calls on Cisco Networks**

- describe the characteristics of ISDN.
- detail the functional elements of ISDN and describe the commands used to configure BRI and PRI interfaces.
- identify the different ISDN switch types and configure basic ISDN.
- configure ISDN PRI on a router.
- discuss the commands used to verify and troubleshoot ISDN connections.
- explain how DDR operates.
- detail the steps for configuring DDR.
- describe the configuration of dialer profiles on ISDN interfaces.
- configure and troubleshoot a given ISDN DDR connection.
- use context sensitive help and set up IP static routes.



## **TestPrep 640-801 Cisco Certified Network Associate (CCNA)**

### **Overview/Description**

Generally taken near the end of a program of certification-orientated study, the 640-801 Cisco Certified Network Associate (CCNA) TestPrep enables the learner to test their knowledge in a simulated certification testing environment. Learners can take TestPrep in two different modes: Study and Certification. Study mode is designed to maximize learning by providing feedback, while Certification mode is designed to mimic a certification exam.

### **Target Audience**

Individuals seeking practice in a simulated testing environment, covering the skills and competencies being measured by the actual certification exam.

### **Lesson Objectives**

#### **TestPrep 640-801 Cisco Certified Network Associate (CCNA)**

- Introduction to Networking
- Network Types
- Network Media
- Switching Fundamentals
- TCP/IP
- IP Addressing and Routing
- WAN Technologies
- Operating and Configuring Cisco IOS Devices
- Managing Your Network Environment
- Configuring Catalyst Switch Operations
- Extending Switched Networks with VLANs
- Determining IP Routes
- Managing IP Traffic with Access Lists
- Establishing Serial Point-to-Point Connections
- Establishing Frame Relay Connections
- Completing ISDN Calls