

## CCENT Study Guide 4

### Section 9.4 Troubleshooting Layer 3 Routing Issues

As you work through this troubleshooting section, you can review the material necessary to prepare you to obtain a CCENT certification. To obtain a CCENT certification, you must pass the 640-822 ICND1 examination. These study guides provide a method to organize your review based on the ICND1 exam objectives.

#### Implement a small routed network

**Objective:** Describe basic routing concepts (including: packet forwarding, router lookup process)

**Discovery 1** Review Chapters:

**Connecting to the Network:** The concept of separate local networks separated by routers is first introduced in the section *Building the Distribution Layer of Network*. The topic *Function of Routers* explains how packets are forwarded from one local network to another. The concept of a router serving as a default gateway for hosts on a local network to use to send packets to destinations located on remote networks is explained in the *Default Gateway* topic. The topic *Tables Maintained by Routers* introduces the routing table and the default route.

**Discovery 2** Review Chapters:

**Configuring Network Devices:** The section *Initial ISR Router Configuration* describes the various components of the 1841 ISR. Many of these components are common in all Cisco routers.

**Routing:** The process used by routers to determine the best path to a destination address and to forward the packet is described in the *Routing Basics* and *Routing Protocols* topics within the *Enabling Routing* section. It is important to understand how a router determines which route to use to reach a destination. Pay close attention to the lab activity at the end of the *Routing Protocols* topic.

**Objective:** Access and utilize the router CLI to set basic parameters

**Objective:** Implement password and physical security

**Discovery 1** Review Chapters: none

**Discovery 2** Review Chapters:

**Configuring Network Devices:** The entire section *Configuring a Router Using IOS CLI* contains important information about how to use the CLI commands to configure and verify the operation of a Cisco router. The topic *Basic Configuration* describes how to set passwords and security banners on the device. These are critical skills that will be assessed on the ICND1 exam. Pay close attention to the illustrations of the various show command output.

**Objective:** Connect, configure, and verify operation status of a device interface

**Discovery 1** Review Chapters: none

**Discovery 2** Review Chapters:

**Configuring Network Devices:** It is important to know which parameters are necessary to configure either an Ethernet or serial router interface. Some of the common parameters are: speed, duplex, encapsulation types, and IP addressing information. The topic **Configuring an Interface** describes the process and commands necessary to configure and activate interfaces on a Cisco router. More information regarding the configuration of a serial interface can be found in the topic **Configuring WAN Connections** in the **Connecting the CPE to the ISP** section.

**Troubleshooting:** Verifying the successful operation of a Cisco router interface involves the use of various show commands. The output of these commands is shown and discussed in the **Troubleshooting Cable and Device Port Errors** topic.

**Objective:** Perform and verify routing configuration tasks for a static or default route given specific routing requirements.

**Discovery 1 Review Chapters:** none

**Discovery 2 Review Chapters:**

**Configuring Network Devices:** The concept of a default route and the method for configuring one is described in the **Configuring a Default Route** topic within the **Configuring a Router using IOS CLI** section.

**Routing:** The different types of routes (static, default, connected, and dynamically updated) are described in the **Routing Basics** topic. It is very important to understand how each of these routes is indicated in the output of the show ip route command. The procedure and commands to use to configure a static route are contained in this topic as well. The Packet Tracer activity at the end of the topic provides practice in this important skill.

**Objective:** Configure, verify, and troubleshoot RIPv2

**Discovery 1 Review Chapters:** none

**Discovery 2 Review Chapters:**

**Routing:** The necessary procedure and commands to configure a small RIPv2 routed network are described in the **Configuring and Verifying RIP** topic within the **Enabling Routing Protocols** section. Pay close attention to the steps outlined in the graphic within this section.

**Troubleshooting:** The most common RIPv2 errors are described in the **Dynamic Routing Errors** topic within the **Troubleshooting Layer 3 Routing Issues** section. The Packet Tracer activity at the end of this section provides additional configuration and verification practice.

### Practice Activities:

1. Create a checklist to configure and test a small routed network. Include setting passwords, configuring interfaces and the commands necessary to configure a default route and RIPv2 routing.
2. Use Packet Tracer to create a small routed network of at least three interconnected routers, each with at least one LAN attached. Configure both Ethernet and serial interfaces. Create static routes on each router to enable devices on each LAN to reach devices on the remote LANs. Use ping and traceroute to verify connectivity.
3. Using the same small routed network, remove the static routes and configure RIPv2 to exchange routes between the routers. Observe the changes in the routing table on each router. Telnet to each of the routers to ensure that all routes are updated correctly.
4. Connect to one of the routers using a console cable and execute the debug ip rip command. Observe the messages that appear as the routers exchange RIP information.

5. Intentionally shut down one LAN interface on one of the routers and observe the changes in the routing tables on the other routers.

## Manage Cisco IOS and Configuration Files

**Objective:** Manage IOS configuration files (including: save, edit, upgrade, restore)

**Discovery 1** Review Chapters: none

**Discovery 2** Review Chapters:

**Configuring Network Devices:** Having current backups of configuration files is critical when a network or device malfunctions. The procedure to backup and restore configuration files is described in the ***Backing Up a Cisco Router Configuration*** topic of the ***Configuring a Router Using IOS CLI*** section. Using a TFTP server to store configuration files is a common practice. HyperTerminal can be configured to copy a configuration to a text file. It is also very common to use cut and paste to save configurations in text files. Cut and paste can be used to load commands in either HyperTerminal or through a Telnet connection to the device.

**ISP Responsibility:** Using TFTP to backup and restore IOS images is described in the ***Backups and Disaster Recovery*** section. The topic ***Cisco IOS Software Backup and Recovery*** includes information on how to use ROMmon when the IOS image stored on the device becomes corrupted.

### Practice Activities:

1. Create a diagram of the process to backup and restore a configuration file using either the TFTP server or a stored text file.
2. Create a diagram of the process to follow if the IOS image file on a router becomes corrupted.