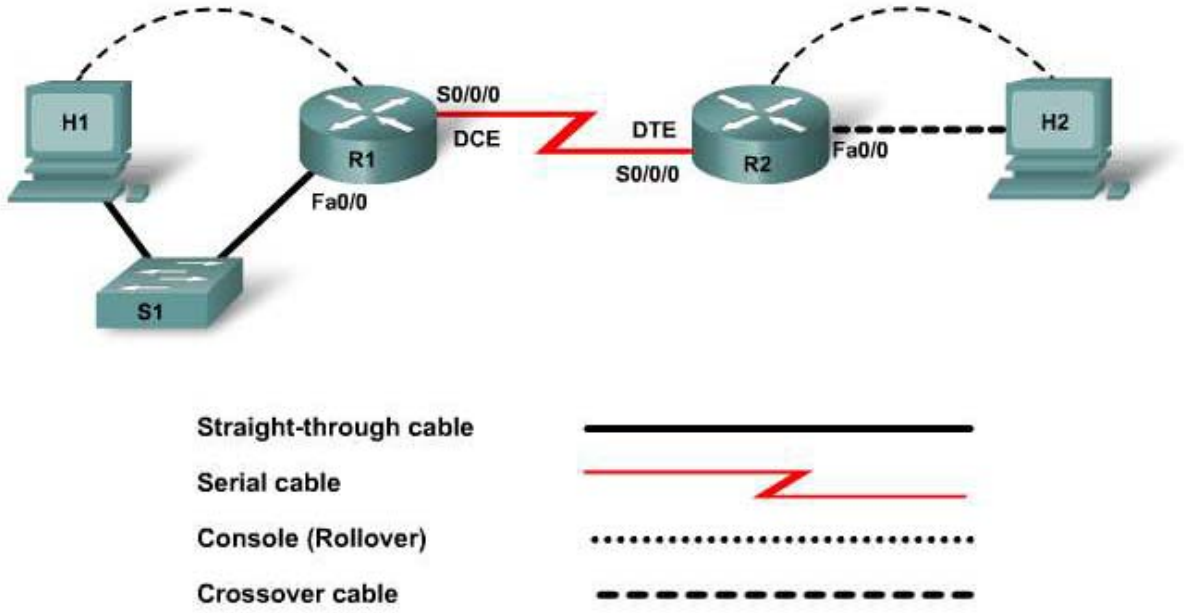
Lab 9.3.1 Troubleshooting RIPv2 Routing Issues



Device	Host Name	Fast Ethernet 0/0 IP Address	Serial 0/0/0 IP Address	Serial 0/0/0 Interface Type	Enable Secret Password	Enable, vty, and Console Password	Default Gateway
Router 1	R1	172.16.0.1/16	172.17.0.1/16	DCE	class	cisco	N/A
Router 2	R2	172.18.0.1/16	172.17.0.2/16	DTE	class	cisco	N/A
Switch 1	S1				class	cisco	N/A
Host 1	H1	172.16.0.2/16					172.16.0.1
Host 2	H2	172.18.0.2/16					172.18.0.1

Objectives

- Configure RIPv2 on routers.
- Discover where communication is not possible.
- Implement solutions to network errors.
- Examine the routing configuration with the **`show ip protocols`** command.
- Examine routing tables using the **`show ip route`** command.
- Observe routing activity using the **`debug ip rip`** command.

Background / Preparation

In this lab, you will learn how to troubleshoot the routing protocol RIPv2 using the network shown in the topology diagram. This lab uses an 1841 router and Cisco IOS commands. Any router that meets the interface requirements displayed on the above diagram may be used. For example, router series 800, 1600, 1700, 1800, 2500, 2600, 2800, or any combination can be used.

The information in this lab applies to the 1841 router. Other routers may be used; however, the command syntax may vary. Depending on the router model, the interfaces may differ. For example, on some routers Serial 0 may be Serial 0/0, Serial 0/0/0 and Ethernet 0 may be FastEthernet 0/0. The Cisco Catalyst 2960 switch comes preconfigured and only needs to be assigned basic security information before being connected to a network.

The following resources are required:

- One Cisco 2960 switch or other comparable switch (optional if using crossover cables between the PCs and routers)
- Two Cisco Routers with 2 serial interfaces and 1 FastEthernet interface (preferably the same model number and IOS version)
- Two Windows-based PCs, each with a terminal emulation program and set up as a host
- At least one RJ-45-to-DB-9 connector console cable to configure the routers and switch
- Two straight-through Ethernet cables to connect from the router to the switch and the switch to the host
- One crossover cable to connect to the router
- One 2-part (DTE/DCE) serial cable

NOTE: Make sure that the routers have been erased and have no startup configurations. For instructions on erasing and reloading a switch and a router please refer to the Lab Manual. The Lab Manual can be found and downloaded on the Academy Connection in the Tools section.

NOTE: SDM Enabled Routers – If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. The steps provided in this lab use IOS commands and do not require the use of SDM. If you wish to use SDM for basic router configuration, refer to the instructions provided in the Lab Manual which can be found and downloaded on the Academy Connection in the Tools section or contact your instructor if necessary.

Step 1: Connect the equipment

a. Connect the Serial 0/0/0 interface of Router 1 to the Serial 0/0/0 interface of Router 2 using a serial cable.

b. Connect the Fa0/0 interface of Router 1 to the Fa0/1 interface of Switch 1 using a straight-through cable.

c. Connect Host H1 to the console of Router 1 using a rollover cable to perform configurations.

d. Connect Host H1 to the Fa0/2 interface of Switch 1 using a straight-through cable.

e. Connect Host H2 to the Fa0/0 interface of the Router 2 using a crossover cable.

f. Connect Host H2 to the console of Router 2 using a rollover cable to perform configurations.

Step 2: Load the preconfigurations for R1 and R2

a. See your instructor to obtain the preconfigurations for this lab.

b. Connect the PCs to the console ports of the routers for loading the preconfigurations using a terminal emulation program.

c. Transfer the configuration from H1 to Router 1:

1) In the terminal emulation program on H1, choose **Transfer > Send Text File**.

2) Locate the file for the configuration of Router 1 provided by your instructor and choose **Open** to start the transfer of the preconfiguration to Router 1.

3) When the transfer is complete, save the configuration.

d. Repeat the transfer process from H2 to Router 2:

4) In the terminal emulation program on H2, choose **Transfer > Send Text File**.

5) Locate the file for the configuration of Router 2 provided by your instructor, and choose **Open** this start the transfer of the preconfiguration to Router 2.

6) When the transfer is complete, save the configuration.

Step 3: Configure the hosts with IP address, subnet mask, and default gateway

e. Configure each host with the proper IP address, subnet mask, and default gateway.

1) H1 should be assigned 172.16.0.2 with a subnet mask of 255.255.0.0 and the default gateway of 172.16.0.1.

2) H2 should be assigned 172.18.0.2 with a subnet mask of 255.255.0.0 and the default gateway of 172.18.0.1.

Can H1 ping the FastEthernet interface of R1? _____

If the answer is no, troubleshoot as necessary to determine the problem. Use commands such as **`show ip interface brief,`** etc., to identify the problems.

Why or why not? _____

If a problem is found, enter the commands to correct the problem.

Each workstation should be able to ping the attached router. If the ping was not successful, troubleshoot further. Check and verify that the workstation has been assigned a specific IP address and default gateway.

Step 4: Check connectivity between hosts H1 and H2

a. Ping from Host H1 to Host H2. Is the ping successful? _____

If the answer is no, troubleshoot as necessary to determine the problem. Use commands such as **`show ip interface brief, on R1 and R2,`** to identify the problems.

Are all necessary interfaces up? _____

Step 5: Show the routing tables for each router

From the enable or privileged EXEC mode of both routers, examine the routing table entries, using the **`show ip route`** command on each router.

What are the entries in the R1 routing table?

_____

_____

_____

What are the entries in the R2 routing table?

_____

_____

_____

What is missing from the touting tables? _____

Step 6: Verify that routing updates are being sent

a. Type the command **debug ip rip** at the privileged EXEC mode prompt of R1. Wait for at least 45 seconds.

Was there any output from the debug command on R1? _____

What is missing from the debug output on R1? _____

_____

b. Use the **show ip protocols** command on R1 to determine the problem. Review the topology diagram and the networks that should be associated with each router interface.

What problem is occurring?

_____

_____

c. Make corrections to the configuration as necessary.

Was there any output from the debug command? _____

What did the output show? _____

_____

d. To turn off debug on R1. For example, **no debug ip rip**. To turn off all **debug** commands, enter **undebug all**.

e. Use the **show ip protocols** command on R1 to verify the proper RIP V2 configuration.

Step 7: Show the routing tables for each router

From the enable or privileged EXEC mode of both routers, examine the routing table entries, using the **show ip route** command on each router.

What are the entries in the R1 routing table?

_____

_____

_____

What are the entries in the R2 routing table?

_____

_____

_____

Step 8: Show the RIP routing table entries for each router

a. Enter the **show ip route rip** command on both routers.

b. List the routes shown in both routing tables.

_____

_____

What is the administrative distance of these routes? _____

Step 9: Test network connectivity

From H1, is it possible to ping the FastEthernet interface of R2? _____

From H1, is it possible to ping Host H2? _____

From H2, is it possible to ping the FastEthernet interface of R1? _____

From H2, is it possible to ping Host H1? _____

If the answer is no, troubleshoot to find the error. Ping again until successful.

Step 10: Reflection

a. What does **`ping`** test?

_____

_____

b. When should the **`show ip protocols`** and **`show ip route`** commands be used?

_____

_____

c. When should the **`debug ip rip`** command be used?

_____

_____

_____