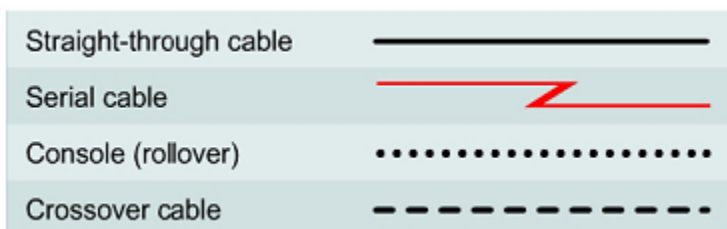
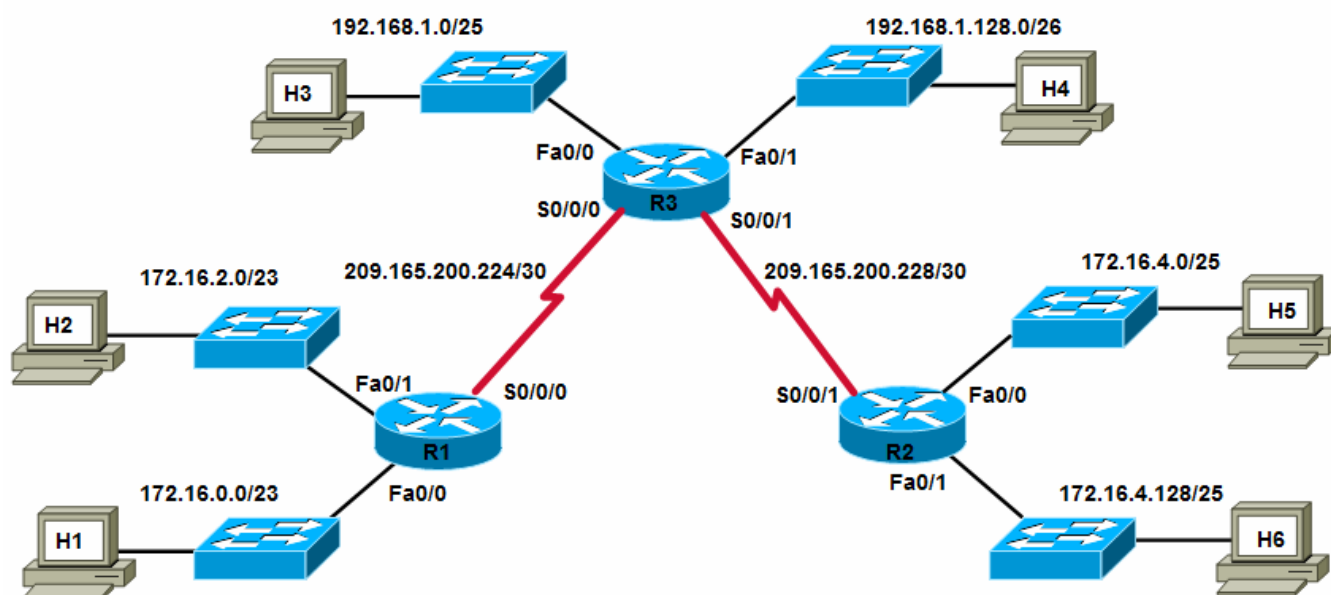


Lab 9.4.2 Correcting RIPv2 Routing Problems



Device	Host Name	Interface	IP Address	Subnet Mask	Default Gateway
R1	BRANCH1	Fast Ethernet 0/0	172.16.0.1	255.255.254.0	N/A
		Fast Ethernet 0/1	172.16.2.1	255.255.254.0	N/A
		Serial 0/0/0 (DCE)	209.165.200.226	255.255.255.252	N/A
R2	BRANCH2	Fast Ethernet 0/0	172.16.4.1	255.255.255.128	N/A
		Fast Ethernet 0/1	172.16.4.129	255.255.255.128	N/A
		Serial 0/0/1	209.165.200.230	255.255.255.252	N/A
R3	HQ	Fast Ethernet 0/0	192.168.1.1	255.255.255.128	N/A
		Fast Ethernet 0/1	192.168.1.129	255.255.255.192	N/A
		Serial 0/0/0	209.165.200.225	255.255.255.252	N/A
		Serial 0/0/1 (DCE)	209.165.200.229	255.255.255.252	N/A
H1	H1	NIC	172.16.0.10	255.255.254.0	172.16.0.1
H2	H2	NIC	172.16.2.10	255.255.254.0	172.16.2.1

Device	Host Name	Interface	IP Address	Subnet Mask	Default Gateway
H3	H3	NIC	192.168.1.10	255.255.255.128	192.168.1.1
H4	H4	NIC	192.168.1.138	255.255.255.192	192.168.1.129
H5	H5	NIC	172.16.4.10	255.255.255.128	172.16.4.1
H6	H6	NIC	172.16.4.138	255.255.255.128	172.16.4.129

Objectives

- Cable a network according to the topology diagram.
- Load the routers with supplied scripts.
- Gather information about the non-converged portion of the network, along with any other errors.
- Analyze information using Cisco IOS show and debug commands to determine network errors.
- Propose solutions to network errors.
- Implement solutions to network errors.
- Document the corrected network.

Background / Preparation

Many different types of problems can cause dynamic routes to not appear in the routing table. With dynamic routing, routers receive routing updates from neighbors. If an expected route does not appear in the routing table of one of the routers, the cause is most likely a configuration error. This configuration error could occur on any of the routers connected between the source and the destination.

In this lab, you begin by loading configuration scripts on each of the routers. These scripts contain errors that prevent end-to-end communication across the network. After loading the corrupted scripts, troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations. When you have corrected all the configuration errors, all the hosts on the network should be able to communicate with each other.

The network should also have the following requirements met:

- RIPv2 routing is configured on all routers.
- RIP updates must be disabled on all router LAN interfaces.

Required Resources

The following resources are required:

- Two routers, each with two Fast Ethernet and one serial interface
- One router, with two Fast Ethernet and two serial interfaces
- Six switches or hubs (or crossover cables from hosts to routers)
- Six Windows XP computers
- Straight-through Category 5 Ethernet cables, as required
- Two null serial cables
- Console cables, as required
- Access to the host command prompt
- Access to the host network TCP/IP configuration

Note: Make sure that the routers and the switches have been erased and have no startup configurations. Instructions for erasing are provided in the Lab Manual, located on Academy Connection in the Tools section. Check with the instructor if you are unsure of how to do this.

Task 1: Build the Network and Configure Devices

Step 1: Build a network similar to the one shown in the topology diagram.

Step 2: Configure the hosts.

Configure each host IP address, subnet mask, and default gateway according to the device configuration chart.

Task 2: Load Routers with the Supplied Scripts

Step 1: Load the script onto the BRANCH1 router.

```
hostname BRANCH1
!
line console 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
enable secret class
banner motd #Unauthorized Use Prohibited#
no ip domain lookup
!
interface FastEthernet0/0
ip address 172.16.0.1 255.255.254.0
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/1
ip address 172.16.2.1 255.255.254.0
duplex auto
speed auto
no shutdown
!
interface Serial0/0/0
ip address 209.165.200.226 255.255.255.252
clock rate 64000
no shutdown
!
router rip
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 172.16.0.0
network 209.165.200.0
!
ip classless
!
line con 0
line vty 0 4
login
!
end
```

Step 2: Load the script onto the BRANCH2 router.

```
hostname BRANCH2
!
line console 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
enable secret class
banner motd #Unauthorized Use Prohibited#
no ip domain lookup
!
interface FastEthernet0/0
ip address 172.16.4.129 255.255.255.128
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/1
ip address 172.16.4.1 255.255.255.128
duplex auto
speed auto
no shutdown
!
interface Serial0/0/1
ip address 209.165.200.230 255.255.255.252
no shutdown
!
router rip
version 2
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 209.165.200.0
!
ip classless
!
line con 0
line vty 0 4
login
!
end
```

Step 3: Load the script onto the HQ router.

```
hostname HQ
!
line console 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
```

```
enable secret class
banner motd #Unauthorized Use Prohibited#
no ip domain lookup
!
interface FastEthernet0/0
ip address 192.168.1.1 255.255.255.128
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/1
ip address 192.168.1.129 255.255.255.192
duplex auto
speed auto
no shutdown
!
interface Serial0/0/0
ip address 209.165.200.225 255.255.255.252
no shutdown
!
interface Serial0/0/1
ip address 209.165.200.229 255.255.255.252
clock rate 64000
no shutdown
!
router rip
version 2
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 192.168.1.0
network 209.165.200.0

!
ip classless
!
line con 0
line vty 0 4
login
!
end
```

Task 3: Troubleshoot the BRANCH1 Router

Step 1: Begin troubleshooting at the host connected to BRANCH1.

- a. From H1, is it possible to ping H2 (172.16.0.10)? _____
- b. From H1, is it possible to ping H3 (192.168.1.10)? _____
- c. From H1, is it possible to ping H5 (172.16.4.10)? _____
- a. From H1, is it possible to ping the default gateway (172.16.0.1)? _____

Step 2: Examine BRANCH1 to find possible interface configuration errors.

- a. View the status information summary for the router interfaces.
- b. Are there any problems with the interface configurations? _____

- c. If there are problems with the interface configurations, record the commands necessary to correct the configuration errors.

- d. If you have recorded any commands, apply them to the router configuration now.
- e. If any changes were made to the configuration, view the status information summary for the router interfaces again.
- f. Does the information in the summary indicate any configuration errors? _____
- g. If the answer is **yes**, troubleshoot the status of the interfaces again.

Step 3: Troubleshoot the routing configuration on BRANCH1.

- a. What command displays the routing table? _____
- b. Which networks and routes are shown in the routing table?

- c. Which command displays the commands used to configure the routing protocol on this router?

- d. Are there any problems with the routing table because of the routing configuration?

- e. If there are any problems, record the commands necessary to correct the configuration errors.

- f. Are there any problems with the routing table that could be caused by errors in other parts of the network? _____

- g. What version of RIP and which local networks are included in the RIP updates being sent from BRANCH1?

- h. What commands could you use to determine the version of RIP updates? _____

- i. Use the **debug ip rip** command to determine which networks are included in the RIP updates being sent from BRANCH1.

- j. Are there any problems with the version of RIP updates that are being sent out from the router?

- k. If there are additional problems with the RIP configuration, record the commands necessary to correct the configuration errors.

Step 4: Fix the router configuration.

- a. If you have recorded any commands in the previous step, apply them to the router configuration.
- b. If any changes were made to the configuration, view the routing information again.
- c. Does the information in the routing table indicate any configuration errors? _____
- d. Does the information included in the RIP updates that are sent out indicate any configuration errors? _____
- e. If the answer to either of these questions is yes, troubleshoot the routing configuration again.
- f. Which networks and routes are shown in the routing table?

Step 5: Ping between the hosts again.

- a. From H1, is it possible to ping H3 (192.168.1.10)? _____
- b. From H1, is it possible to ping H4 (192.168.1.138)? _____
- c. From H1, is it possible to ping H5 (172.16.4.10)? _____
- d. From H1, is it possible to ping the serial 0/0/1 interface of the HQ router (209.165.200.229)? _____

Task 4: Troubleshoot HQ

Step 1: Begin troubleshooting at host H3.

- a. From H3, is it possible to ping H1 (172.16.0.10)? _____
- b. From H3, is it possible to ping H5 (172.16.4.10)? _____
- c. From H3, is it possible to ping the default gateway (192.168.1.1)? _____

Step 2: Examine the HQ router to find possible configuration errors.

- a. View the status information summary for the router interfaces. Are there any problems with the interface configurations? _____
- b. If there are problems with the interface configurations, record the commands necessary to correct the configuration errors.

- c. If you have recorded any commands, apply them to the router configuration now.

Step 3: Troubleshoot the routing configuration on HQ.

- a. Which networks and routes are shown in the routing table?

- b. If there any problems with the routing table, list them.

- c. If there are problems, record the commands necessary to correct the configuration errors.

- d. Which networks are included in the RIP updates?

- e. Are there problems with the RIP updates that are being sent out from HQ? _____

- f. If there are problems, record the commands necessary to correct the configuration errors.

- g. If you have recorded any commands, apply them to the router configuration now.

Step 4: View the routing information.

- a. If any changes were made to the configuration, view the routing information again.
- b. Does the information in the routing table indicate any configuration errors on HQ? _____
- c. Does the information included in the RIP updates that are sent out indicate any configuration errors on HQ? _____
- d. If the answer to either of these questions is **yes**, troubleshoot the routing configuration again.

Step 5: Ping between the hosts again.

- a. From H3, is it possible to ping H1 (172.16.0.10)? _____
- b. From H3, is it possible to ping H5 (172.16.4.10)? _____
- c. From H3, is it possible to ping the default gateway (192.168.1.1)? _____

Task 5: Troubleshoot BRANCH2

Step 1: Begin troubleshooting at host H5.

- From H5, is it possible to ping H6 (172.16.4.138)? _____
- From H5, is it possible to ping H1 (172.16.0.10)? _____
- From H5, is it possible to ping the default gateway (172.16.4.1)? _____

Step 2: Examine BRANCH2 to find possible configuration errors.

- View the status information summary for each interface on the router. Are there any problems with the configuration of the interfaces?

- If there are problems, record the commands necessary to correct the configuration errors.

- If you have recorded any commands, apply them to the router configuration now.
- If any changes were made, view the summary of the status information for the router interfaces again.
- Does the information in the interface status summary indicate any configuration errors? _____
- If the answer is **yes**, troubleshoot the interface status of the interfaces.

Step 3: Troubleshoot the routing configuration on BRANCH2.

- View the routing table.
- Which networks and routes are shown in the routing table?

Step 4: Examine the routes that are being sent out in the routing updates from BRANCH2.

- Are there any problems with the routing updates? If so, list them.

- b. If there are problems, record the commands necessary to correct the configuration errors.

- c. Apply any recorded commands to the router configuration.

Step 5: Ping the hosts again.

- a. From H5, is it possible to ping H6 (172.16.4.138)? _____
- b. From H5, is it possible to ping H1 (172.16.0.10)? _____
- c. From H5, is it possible to ping the default gateway (172.16.4.1)? _____
- d. From the HQ router, is it possible to ping H1 (172.16.0.10)? _____
- e. From the HQ router, is it possible to ping H5 (172.16.4.10)? _____

Step 6: Examine the routing updates that are being received on BRANCH2.

- a. Which networks are being received in the RIP updates on BRANCH2?

- b. Are there any problems with these routing updates? If so, list them.

- c. Display the routing table for the BRANCH2 router.

- d. Is there a route to network 172.16.0.0 or 172.16.2.0 on BRANCH1? _____ Why?

- e. Display the routing table for the HQ router.

- f. How many routes does HQ have to the 172.16.0.0/16 network?

- g. If there are problems with the routing configuration on BRANCH2, record the commands necessary to correct the configuration errors.

- h. Do these commands need to be applied only to BRANCH2, or do they also need to be applied to any other routers in the network? _____

Task 6: Remove Auto-Summary

Step 1: Remove auto-summary from all three routers.

Use the **no auto-summary** command in router rip configuration mode to disable auto-summary and allow the routers to advertise the individual subnets on each router.

Step 2: View the routing information for BRANCH2.

- View the routing table for BRANCH2. Does the information in the routing table indicate any configuration errors? _____
- If the answer is **yes**, troubleshoot the routing configuration.

Step 3: View the routing information for BRANCH1.

Are routes to all networks and subnets now present? _____

Step 4: View the routing information for HQ.

Are routes to all networks and subnets now present? _____

Step 5: Test overall network connectivity by pinging between the hosts.

- From H5, is it possible to ping H6 (172.16.4.138)? _____
- From H5, is it possible to ping H1 (172.16.0.10)? _____
- From H5, is it possible to ping H3 (192.168.1.10)? _____
- From H1, is it possible to ping H3 (192.168.1.10)? _____
- From the HQ router, is it possible to ping H1 (172.16.0.10)? _____
- From the HQ router, is it possible to ping H5 (172.16.4.10)? _____

Task 7: Reflection

There were a number of configuration errors in the scripts that were provided for this lab. Use the space below to write a brief description of the errors that you found.

Task 8: Documentation

On each router, use the following commands and capture the output to a text (.txt) file. Save the file for future reference.

- **show running-config**

- **show ip route**
- **show ip interface brief**
- **show ip protocols**

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)		
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
1700	Fast Ethernet 0 (FA0)	Fast Ethernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)
1800	Fast Ethernet 0/0 (FA0/0)	Fast Ethernet 0/1 (FA0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
2600	Fast Ethernet 0/0 (FA0/0)	Fast Ethernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)
Note: To find out exactly how the router is configured, look at the interfaces. The interface identifies the type of router and how many interfaces the router has. There is no way to effectively list all combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The information in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.				