Configuration Labs

Part 1: Router Configuration

Lab 3: Configuring RIP V2 Routing—Solutions

Overview

The overall objective of this lab is to configure Routing Information Protocol (RIP) routing between two routers so that there is a routed network connection between computers in the two LANs. You will have to configure the computer's IP address, the gateway address, and the IP addresses for the appropriate router interfaces. This will require that the serial connection between routers be configured and enabled.

Topology

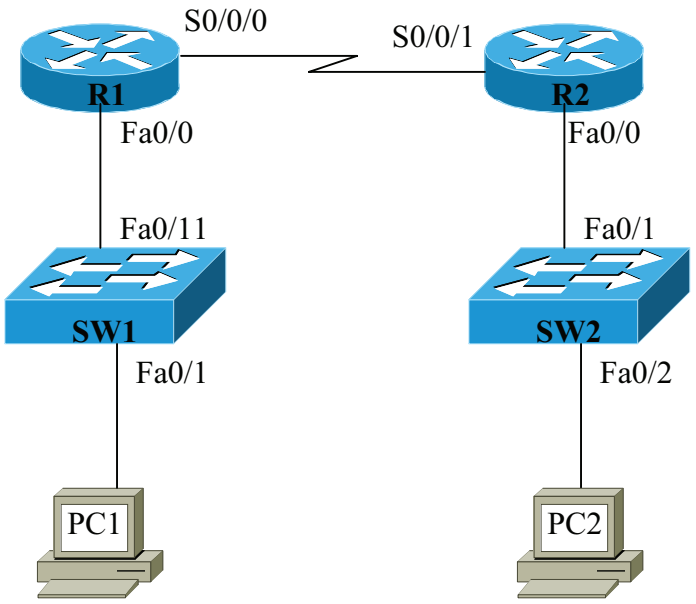

Figure 1 Network Topology for This Lab

Reference

The following simulator exercises provided with the CCNA 640-802 Network Simulator should be reviewed prior to starting this virtual laboratory exercise:

- RIP-2 Configuration I, II
- RIP Configuration I–VI
- RIP Auto-summary
- RIP Verification I
- Examining the IP Routing Table

Key Concepts

The following concepts, terms, commands, and steps should have been mastered in this laboratory exercise:

- How to set the clock rate for the router.
- Which router controls the clock rate, DCE, and DTE?
- How to configure the IP address, subnet mask, and default gateway for the computers in your LAN.
- How is the gateway address for your LAN router configured?
- The steps for configuring the host name for your router.
- The steps for configuring the router interface's IP addresses and subnet masks.
- The commands for configuring RIP routing from LAN-A to LAN-B.
- Two commands that can be used to verify that the routes are configured on the router.
- The steps to use the computers in your LAN to ping the computers in the adjacent LAN.
- Use the proper command to trace the route from a PC in LAN-A to the host in the connected LAN-B.
- Use the proper command to trace the route from your router in LAN-A to the host computer in LAN-B.
- Use the command to make a Telnet connection to your router. Know the steps to enable a Telnet connection to the router.
- Use the router command that displays the network routes stored in your router's routing table.
- Use the command to save your router configuration to NVRAM.

Reference Tables

Table 1 provides the IP addresses and masks of all necessary interfaces used to complete the lab.

Table 1 Computer IP Addresses, Subnet Masks, and Gateway Addresses for Lab 3

Computer/Interface - R1	IP Address	Subnet Mask	Gateway Address
PC1	10.10.12.1	255.255.255.0	10.10.12.250
R1-Fa0/0	10.10.12.250	255.255.255.0	—
R1-S0/0/0	10.20.200.1	255.255.255.0	—
Computer/Interface – R2	**IP Address**	**Subnet Mask**	**Gateway Address**
PC2	10.10.30.65	255.255.255.0	10.10.30.250
R2-Fa0/0	10.10.30.250	255.255.255.0	—
R2-S0/0/1	10.20.200.2	255.255.255.0	—

Detailed Lab Steps

Task 1

In this lab, you will configure RIP V2 to the adjacent LANs, LAN-A to LAN-B, based on the network topology provided in Figure 1. You are to use the IP addresses provided in Table 1. You will be asked to verify that computers in your LAN can ping the neighbor LAN. You are configuring routing for both 10.10.12.0 and 10.10.30.0 networks. A subnet mask of 255.255.255.0 is being used. Note that a serial interface is being used to interconnect the LANs. Use 56000 for the clock rate on the serial link (DCE interface). The enable secret and line console 0 password should be set to ciscopress.

Step 1. Configure the gateway address for your LAN routers according to the addresses listed in Table 1. List the prompts and the commands used to configure the gateway address and subnet mask on each of the routers.

```
R1# configure terminal
R1(config)# interface fa0/0
R1(config-if)# ip address 10.10.12.250 255.255.255.0
R1(config-if)# no shut

R2# configure terminal
R2(config)# interface fa0/0
R2(config-if)# ip address 10.10.30.250 255.255.255.0
R2(config-if)# no shut
```

Step 2. Configure the host name for your routers; R1 should be renamed LAN-A and R2 should be renamed LAN-B. List the router prompts and commands used to configure the router's host name.

```
R1# configure terminal
R1(config)# hostname LAN-A
LAN-A(config)#

R2# configure terminal
R2(config)# hostname LAN-B
LAN-B(config)#
```

Step 3. Configure the routers' interfaces and include any relevant interface-specific commands and associated IP addresses and enable each of them; for this lab R1's S0/0/0 interface is the DCE with a rate of 56,000 kbps. Use the proper command to verify that the interfaces are properly configured. List the router prompts and commands used to accomplish this task.

```
LAN-A(config)# interface s0/0/0
LAN-A(config-if)# ip address 10.20.200.1 255.255.255.0
LAN-A(config-if)# clock rate 56000
LAN-A(config-if)# no shut

LAN-A# show ip interface brief
Interface          IP-Address    OK?  METHOD    Status                  Protocol
FastEthernet0/0    10.10.12.250  YES  manual    up                      up
FastEthernet0/1    unassigned    YES  NVRAM     administratively down   down
Serial0/0/0        10.20.200.1   YES  manual    up                      down
Serial0/0/1        unassigned    YES  NVRAM     administratively down   down

LAN-B(config)# interface s0/0/1
LAN-B (config-if)# ip address 10.20.200.2 255.255.255.0
LAN-B (config-if)# no shut
LAN-B (config-if)#

LAN-B# sh ip interface brief
Interface         IP-Address     OK?  METHOD  Status                  Protocol
FastEthernet0/0   10.10.30.250   YES  manual  up                      up
FastEthernet0/1   unassigned     YES  NVRAM   administratively down   down
Serial0/0/0       unassigned     YES  NVRAM   administratively down   down
Serial0/0/1       10.20.200.2    YES  manual  up                      up
LAN-B#
```

Step 4. Configure a RIP V2 route for both the LAN-A and LAN-B routers. Use two commands to verify that the routes are configured. List the router prompts and commands used to accomplish this.

```
LAN-A(config)# router rip
LAN-A(config-router)# version 2
LAN-A(config-router)# network 10.0.0.0

LAN-B(config)# router rip
LAN-B(config-router)# version 2
LAN-B(config-router)# network 10.0.0.0

LAN-A# sh ip route
```

```
Codes: C -  connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route.

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 3 subnets
C    10.20.200.0 is directly connected, Serial0/0/0
R    10.10.30.0 [120/1] via 10.20.200.2, 00:22:39, Serial0/0/0
C    10.10.12.0 is directly connected, FastEthernet0/0

LAN-A#
```

```
LAN-B# sh ip route

Codes: C -  connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route.

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 3 subnets
C    10.20.200.0 is directly connected, Serial0/0/1
C    10.10.30.0 is directly connected, FastEthernet0/0
R    10.10.12.0 [120/1] via 10.20.200.1, 00:23:16, Serial0/0/1

LAN-B#
```

```
Use the show running-configuration command

!
router rip
 version 2
 network 10.0.0.0
!
```

Step 5. Use the computers in each LAN to ping the computers in the adjacent LAN, PC1-PC2, and PC2-PC1. List the router prompts and commands used to accomplish this.

```
C:\> ping 10.10.30.65

Pinging 10.10.30.65 with 32 bytes of data:

Reply from 10.10.30.65: bytes=32 time=7ms TTL=126
Reply from 10.10.30.65: bytes=32 time=5ms TTL=126
Reply from 10.10.30.65: bytes=32 time=6ms TTL=126
Reply from 10.10.30.65: bytes=32 time=5ms TTL=126

Ping statistics for 10.10.30.65

    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum =  1ms, Average =  1ms


C:\> ping 10.10.12.1

Pinging 10.10.12.1 with 32 bytes of data:

Reply from 10.10.12.1: bytes=32 time=6ms TTL=126
Reply from 10.10.12.1: bytes=32 time=5ms TTL=126
Reply from 10.10.12.1: bytes=32 time=4ms TTL=126
Reply from 10.10.12.1: bytes=32 time=7ms TTL=126

Ping statistics for 10.10.12.1

    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum =  1ms, Average =  1ms
```

Step 6. Use the proper command to trace the route from a PC in LAN-A to a host in LAN-B. Your trace should pass through two routers. List the router prompts and commands used and record the trace information. How may hops did you record?

2 router hops, 3 total hops

```
C:\> tracert 10.10.12.1
Tracing route to 10.10.12.1 over a maximum of 30 hops:

1    8ms    5ms    8ms    10.10.30.250
 2   17ms   12ms   13ms   10.20.200.1
 3   24ms   17ms   19ms   10.10.12.1
Trace complete.
2 router hops, 3 total hops
C:\> tracert 10.10.30.65
Tracing route to 10.10.30.65 over a maximum of 30 hops:
```

```
1    6ms    6ms    8ms     10.10.12.250
 2   15ms    13ms    13ms    10.20.200.2
 3   21ms    22ms    18ms    10.10.30.65
Trace complete.
```

Step 7. Use the command to make a Telnet connection from the LAN-A router to the LAN-B router. Set the VTY password to ciscopress on the LAN-B router and enable remote login. List the prompts and the commands used to establish the Telnet connection. What IP address did you use? Repeat this so that a Telnet connection is established from the LAN-B router to the LAN-A router.

```
LAN-B(config)# line vty 0 4
LAN-B(config-line)# password ciscopress
LAN-B(config-line)# login
LAN-A# telnet 10.10.30.250            This is LAN-B Fa0/0 interface
Trying 10.10.30.250 … Open
     User Access Verification
     Password :
LAN-B>

LAN-A(config)# line vty 0 4
LAN-A(config-line)# password ciscopress
LAN-A(config-line)# login
LAN-A(config-line)#

LAN-B# telnet 10.10.12.250
Trying 10.10.12.250 … Open
    User Access Verification
    Password :
LAN-A>
```

Step 8. Use the router command that lists the network routes stored in the LAN-A router's routing table. List the prompts, the commands used, and the available routes. Are all the routes defined for your network? What does the statement "Gateway of last resort is not set" mean?

```
LAN-A# sh ip route

Gateway of last resort is not set   "This indicates that data packets with an
IP address not already defined cannot be forwarded.

     10.0.0.0/24 is subnetted, 3 subnets
C    10.20.200.0 is directly connected, Serial0/0/0
R    10.10.30.0 [120/1] via 10.20.200.2, 01:33:34, Serial0/0/0
C    10.10.12.0 is directly connected, FastEthernet0/0
```

Yes, all the available routes have been defined.

"Gateway of last resort is not set" indicates that data packets with an IP address not already defined in the routing table cannot be forwarded.

Step 9. Use the command to save your router configuration to the startup configuration on the LAN-A router. What command did you use? Use the proper command to verify that the configuration has been saved to NVRAM. What command did you use?

This copies the running-configuration to the startup configuration:

```
LAN-A# copy running-config startup-config
Destination filename [startup-config]?
LAN-A#
```

This verifies the contents of the startup configuration:

```
LAN-A# show startup-config
```

Task 2

In this task, you are to observe the status and protocol states for the FastEthernet interfaces provided and determine whether the routers are properly configured. Then explain what could cause the following conditions:

1.
```
Interface              status         protocol
fastethernet 0/0       up             up
```

This indicates that the interface has been enabled by the network administrator. Protocol up indicates that the interface is seeing the keepalive packets, indicating that the interface is connected to another networking device.

2.
```
Interface              status                          protocol
fastethernet 0/0       administratively down           down
```

This indicates that the interface has been not been enabled by the network administrator. Protocol down indicates that the interface is not seeing the keepalive packets. This indicates that the FastEthernet port is not attached or the link is broken.

3.
```
Interface              status                   protocol
fastethernet 0/0       administratively down    up
```

This indicates that the interface has been not been enabled by the network administrator. Protocol up indicates that the interface is seeing the keepalive packets, indicating that the interface is connected to another networking device.

4.
```
Interface              status                protocol
fastethernet 0/0          down                down
```

This indicates that the interface has been enabled by the network administrator but the interface is not communicating with another networking device. Protocol down indicates that the interface is not seeing the keepalive packets. This indicates that the FastEthernet port is not attached or the link is broken.

Task 3: Configuration List

The following is a partial list of the items displayed when you issue the **show running-configuration [sh run]** command on a router. Your task is to define each item and its purpose. You might need to go to the Cisco website (http://www.cisco.com) and look up what each of these commands means.

1. **interface FastEthernet 0/0**

   What does 0/0 indicate? What is the difference between FastEthernet and Ethernet?

   This indicates slot number/port number.

   FastEthernet supports both 10 and 100 Mbps.

   Ethernet supports 10 Mbps.

2. **ip address 10.10.20.0 255.255.255.224**

   How many host IP addresses are available in each subnet using this subnet mask?

   Each subnet can support 30 usable IP addresses. There are a total of 32 IP addresses, but one is used for the network address and the other is used for the broadcast address.

3. **shutdown**

   What is the purpose of this command when it is applied to an interface?

   This indicates that the interface is shut down, or this command is used to shut down the interface.

4. **router rip**

   What is the purpose of this command, and from what prompt is this command issued?

   This command is used to enable RIP routing, and this command is issued as follows: LAN-A(config)# router rip

5. **version 2**

   What is the purpose of using this command, and from what prompt is this command issued?

   This command is issued from the LAN-A(config-router)# version prompt.

   This is used to select the version of RIP routing.

   <1-2> version

6. **network 10.0.0.0**

   What is the purpose of this command, and from what prompt is this command issued?

   This command is used to specify the network that is to use the routing specified. The command is issued as follows: LAN-A(config-router)# network 10.0.0.0

7. **ip http server**

   What is the purpose of this command, and from what prompt is this command issued?

   When enabled, the router listens to port 80. To disable port 80, use the **no** form of this command in global configuration mode.

8. **no ip http secure-server**

   What is the purpose of using this command, and from what prompt is this command issued?

   The command is issued from the privileged EXEC mode.

   To disable HTTPS, use the **no** form of this command in global configuration mode. To enable HTTPS, use the **ip http secure-server** command in global configuration mode.