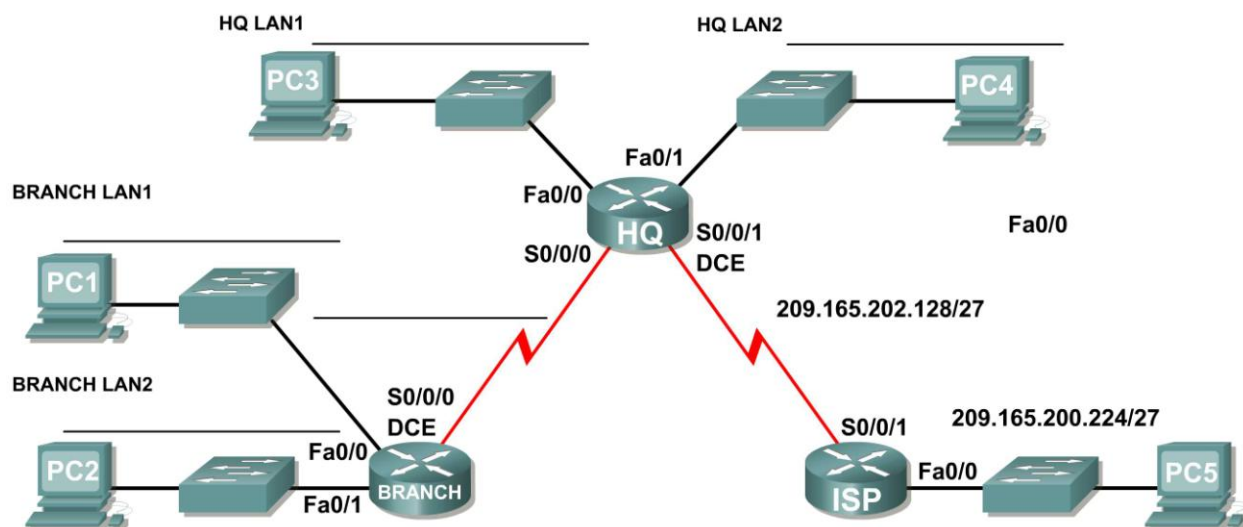# Lab 7.5.2: RIPv2 Challenge Configuration Lab

Topology Diagram

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
BRANCH	Fa0/0			N/A
	Fa0/1			N/A
	S0/0/0			N/A
HQ	Fa0/0			N/A
	Fa0/1			N/A
	S0/0/0			N/A
	S0/0/1			N/A
ISP	Fa0/0			N/A
	S0/0/1			N/A
PC1	NIC			
PC2	NIC			
PC3	NIC			
PC4	NIC			
PC5	NIC			

Learning Objectives

Upon completion of this lab, you will be able to:

- Create an efficient VLSM design given the requirements.
- Assign appropriate addresses to interfaces and document the addresses.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Configure routers including RIP version 2.
- Configure and propagate a static default route.
- Verify RIP version 2 operation.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

Scenario

In this lab activity, you will be given a network address that must be subnetted using VLSM to complete the addressing of the network shown in the Topology Diagram. A combination of RIP version 2 and static routing will be required so that hosts on networks that are not directly connected will be able to communicate with each other.

Task 1: Subnet the Address Space.

Step 1: Examine the network requirements.

The addressing for the network has the following requirements:

- The ISP LAN will use the 209.165.200.224/27 network.
- The link between ISP and HQ will use the 209.165.202.128/27 network.
- The 192.168.40.0/24 network must be subnetted using VLSM for all other addresses in the network.
    - The HQ LAN1 will require 50 host IP addresses.
    - The HQ LAN2 will require 50 host IP addresses.
    - The BRANCH LAN1 will require 30 host IP addresses.
    - The BRANCH LAN2 will require 12 host IP addresses.
    - The link between HQ and BRANCH will require an IP address at each end.
    (**Note:** Remember that the interfaces of network devices are also host IP addresses and are included in the above addressing requirements.)

Step 2: Consider the following questions when creating your network design:

How many subnets need to be created from the 192.168.40.0/24 network? _____

How many total IP addresses are required from the 192.168.40.0/24 network? _____

What subnet mask will be used for the HQ LAN1 subnet? _____

What is the maximum number of host addresses that could be used on this subnet? _____

What subnet mask will be used for the HQ LAN2 subnet? _____

What is the maximum number of host addresses that could be used on this subnet? _____

What subnet mask will be used for the BRANCH LAN1 subnet? _____

What is the maximum number of host addresses that could be used on this subnet? _____

What subnet mask will be used for the BRANCH LAN2 subnet? _____

What is the maximum number of host addresses that could be used on this subnet? _____

What subnet mask will be used for the link between the HQ and BRANCH routers? _____

What is the maximum number of host addresses that could be used on this subnet? _____

Step 3: Assign subnetwork addresses to the Topology Diagram.

1. Assign subnet 0 of the 192.168.40.0 network to the HQ LAN1 subnet.
   What is the network address of this subnet? _____

2. Assign subnet 1 of the 192.168.40.0 network to the HQ LAN2 subnet.
   What is the network address of this subnet? _____

3. Assign subnet 2 of the 192.168.40.0 network to the BRANCH LAN1 subnet.
   What is the network address of this subnet? _____

4. Assign subnet 3 of the 192.168.40.0 network to the BRANCH LAN2 subnet.
   What is the network address of this subnet? _____

5. Assign subnet 4 of the 192.168.40.0 network to the link between the HQ and BRANCH routers.
   What is the network address of this subnet? _____

Task 2: Determine Interface Addresses.

Step 1: Assign appropriate addresses to the device interfaces.

1. Assign the first valid host address in the 209.165.200.224/27 network to the LAN interface on the ISP router.

2. Assign the last valid host address in 209.165.200.224/27 network to PC5.

3. Assign the first valid host address in the 209.165.202.128/27 network to the WAN interface of ISP.

4. Assign the last valid host address in the 209.165.202.128/27 network to the Serial 0/0/1 interface of HQ.

5. Assign the first valid host address in the HQ LAN1 network to the LAN1 interface of HQ.

6. Assign the last valid host address in the HQ LAN1 network to PC 3.

7. Assign the first valid host address in the HQ LAN2 network to the LAN2 interface of HQ.

8. Assign the last valid host address in the HQ LAN2 network to PC 4.

9. Assign the first valid host address in the HQ/BRANCH WAN link to the Serial 0/0/0 interface of HQ.

10. Assign the last valid host address in the HQ/BRANCH WAN link to the Serial 0/0/0 interface of BRANCH.

11. Assign the first valid host address in the BRANCH LAN1 network to the LAN1 interface of BRANCH.

12. Assign the last valid host address in the BRANCH LAN1 network to PC 1.

13. Assign the first valid host address in the BRANCH LAN2 network to the LAN2 interface of BRANCH.

14. Assign the last valid host address in the BRANCH LAN2 network to PC 2.

Step 2: Document the addresses to be used in the table provided under the Topology Diagram.

Task 3: Prepare the Network.

Step 1: Cable a network that is similar to the one in the Topology Diagram.

You can use any current router in your lab as long as it has the required interfaces as shown in the topology.

Note: If you use 1700, 2500, or 2600 routers, the router outputs and interface descriptions will appear different.

Step 2: Clear any existing configurations on the routers.

Task 4: Perform Basic Router Configurations.

Perform basic configuration of the BRANCH, HQ, and ISP routers according to the following guidelines:

1. Configure the router hostname.
2. Disable DNS lookup.
3. Configure an EXEC mode password.
4. Configure a message-of-the-day banner.
5. Configure a password for console connections.
6. Configure a password for VTY connections.
7. Synchronize unsolicited messages and debug output with solicited output and prompts for the console and virtual terminal lines.
8. Configure an EXEC timeout of 15 minutes.

Task 5: Configure and Activate Serial and Ethernet Addresses

Step 1: Configure the BRANCH, HQ, and ISP routers.

Configure the interfaces on BRANCH, HQ, and ISP with the IP addresses from the Addressing Table provided under the Topology Diagram.

When you have finished, be sure to save the running configuration to the NVRAM of the router.

Step 2: Configure the Ethernet interfaces of PC1, PC2, PC3, PC4, and PC5.

Configure the Ethernet interfaces of PC1, PC2, PC3, PC4, and PC5 with the IP addresses from the Addressing Table provided under the Topology Diagram.

Task 6: Verify Connectivity to Next-Hop Device.

You should *not* have connectivity between end devices yet. However, you can test connectivity between two routers and between an end device and its default gateway.

Step 1: Verify BRANCH connectivity.

Verify that BRANCH can ping across the WAN link to HQ and that HQ can ping across the WAN link it shares with ISP.

Step 2: Verify that PC1, PC2, PC3, PC4, and PC5 can ping their respective default gateways.

Task 7: Configure RIPv2 Routing on the BRANCH Router.

Consider the networks that need to be included in the RIP updates that are sent out by BRANCH.

What networks are present in the BRANCH routing table? List the networks with slash notation.

_____

_____

_____

What commands are required to enable RIP version 2 and include the connected networks in the routing updates?

_____

_____

_____

_____

_____

Are there any router interfaces that do not need to have RIP updates sent out? _____

What command is used to disable RIP updates on these interfaces?

_____

_____

Task 8: Configure RIPv2 and Static Routing on HQ.

Consider the type of static routing that is needed on HQ.

What networks are present in the HQ routing table? List the networks with slash notation.

_____

_____

_____

A static default route will need to be configured to send all packets with destination addresses that are not in the routing table to ISP. What command is needed to accomplish this? Use the appropriate exit interface on HQ in the command.

_____

What commands are required to enable RIP version 2 and include the LAN1 and LAN2 networks as well as the link between HQ and BRANCH in the routing updates?

_____

_____

_____

_____

_____

Are there any router interfaces that do not need to have RIP updates sent out? _____

What command is used to disable RIP updates on these interfaces?

_____

_____

HQ needs to send the default route information to BRANCH in the RIP updates. What command is used to configure this?

_____

Task 9: Configure Static Routing on the ISP Router.

Note: In a real-world implementation of this topology, you would not be configuring the ISP router. However, your service provider is an active partner in solving your connectivity needs. Service provider administrators are human, too, and make mistakes. Therefore, it is important that you understand the types of errors an ISP could make that would cause your networks to lose connectivity.

Static routes will need to be configured on ISP for all traffic that is destined for the RFC 1918 addresses that are used on the BRANCH LANs, HQ LANs, and the link between the BRANCH and HQ routers.

What are the commands that will need to be configured on the ISP router to accomplish this?

_____

Task 10: Verify the Configurations.

Answer the following questions to verify that the network is operating as expected:

From PC1, is it possible to ping PC3? _____

From PC1, is it possible to ping the PC5? _____

From PC4, is it possible to ping the PC5? _____

The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations. Refer to your basic troubleshooting techniques used in the Chapter 1 labs.

What routes are present in the routing table of the BRANCH router?

_____

_____

_____

_____

_____

_____

What is the gateway of last resort in the routing table of BRANCH?

_____

What routes are present in the routing table of the HQ router?

_____

_____

_____

_____

_____

_____

_____

What networks are present in the routing table of ISP?

_____

_____

_____

What networks are present in the RIP updates sent from HQ?

_____

_____

_____

What networks are present in the RIP updates sent from BRANCH?

_____

_____

Task 11: Reflection

Why is it necessary to use RIPv2 instead of RIPv1 with this network design?

_____

_____

_____

Task 12: Document the Router Configurations

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

- Running configuration
- Routing table
- Interface summarization

Task 13: Clean Up

Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.