Lab 4.6.1: Routing Table Interpretation Lab

Addressing Table

Device	Interface	IP Address	Subnet Mask
HQ	S0/0/0	10.10.10.253	255.255.255.252
	S0/0/1	172.16.100.1	255.255.255.252
	Loopback0	192.168.4.1	255.255.255.0
	Loopback1	192.168.5.1	255.255.255.0
	Loopback2	192.168.6.1	255.255.255.0
BRANCH1	S0/0/0	10.10.10.254	255.255.255.252
	Loopback0	192.168.1.1	255.255.255.0
	Loopback1	192.168.2.1	255.255.255.0
	Loopback2	192.168.3.1	255.255.255.0
BRANCH2	S0/0/1	172.16.100.2	255.255.255.252
	Loopback0	192.168.7.1	255.255.255.0
	Loopback1	192.168.8.1	255.255.255.0
	Loopback2	192.168.9.1	255.255.255.0

Learning Objectives

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

- Interpret router outputs.
- Identify the IP addresses for each router.
- Draw a diagram of the network topology.
- Cable and configure a network based on the topology diagram.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

Scenario

In this lab activity, you must recreate a network based only on the outputs from the **`show ip route`** command. Match the addresses to the corresponding interfaces and enter the information in the above address table. Configure the routers and verify connectivity. When complete, the outputs from the **`show ip route`** must be exactly the same as the supplied outputs. The **`show ip route`** command displays the current state of the routing table.

Task 1: Examine the router outputs.

Step 1: Examine the output from the HQ router.

```
HQ#show ip route

Codes: C - connected, S - static, I - IGRP, 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, E – EGP
       i - IS-IS, 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

     10.0.0.0/30 is subnetted, 1 subnets
C       10.10.10.252 is directly connected, Serial0/0/0
     172.16.0.0/30 is subnetted, 1 subnets
C       172.16.100.0 is directly connected, Serial0/0/1
R    192.168.1.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
R    192.168.2.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
R    192.168.3.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
C    192.168.4.0/24 is directly connected, Loopback0
C    192.168.5.0/24 is directly connected, Loopback1
C    192.168.6.0/24 is directly connected, Loopback2
R    192.168.7.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1
R    192.168.8.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1
R    192.168.9.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1
```

Step 2: Examine the output from the BRANCH1 router.

```
BRANCH1#show ip route

Codes: C - connected, S - static, I - IGRP, 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, E – EGP
       i - IS-IS, 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

     10.0.0.0/30 is subnetted, 1 subnets
C       10.10.10.252 is directly connected, Serial0/0/0
R    172.16.0.0/16 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
C    192.168.1.0/24 is directly connected, Loopback0
C    192.168.2.0/24 is directly connected, Loopback1
C    192.168.3.0/24 is directly connected, Loopback2
R    192.168.4.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R    192.168.5.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R    192.168.6.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R    192.168.7.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0
R    192.168.8.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0
R    192.168.9.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0
```

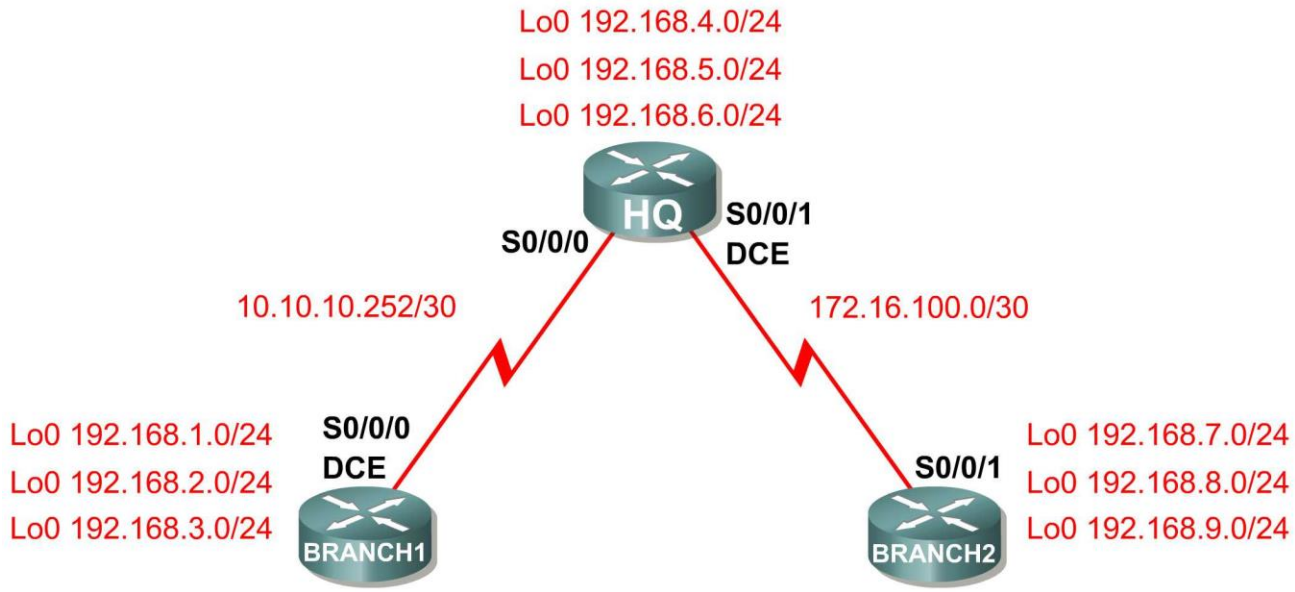

Step 3: Examine the output from the BRANCH2 router.

```
BRANCH2#show ip route

Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

R    10.0.0.0/8 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
     172.16.0.0/30 is subnetted, 1 subnets
C       172.16.100.0 is directly connected, Serial0/0/1
R    192.168.1.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R    192.168.2.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R    192.168.3.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R    192.168.4.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
R    192.168.5.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
R    192.168.6.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
C    192.168.7.0/24 is directly connected, Loopback0
C    192.168.8.0/24 is directly connected, Loopback1
C    192.168.9.0/24 is directly connected, Loopback2
```

Task 2: Create a diagram of the network based on the router outputs.

Step 1: Draw a diagram of the network based on your interpretation of the router outputs in the space provided below.

Topology Diagram



Step 2: Document the interface addresses in the Addressing Table.

Task 3: Create 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 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.

Step 3: Configure the HQ, BRANCH1, and BRANCH2 routers.

Configure the interfaces on the HQ, BRANCH1, and BRANCH2 routers with the IP addresses from the Addressing Table. The clock rate, DTE assignment, and DCE assignment of the Serial interfaces are at your discretion.

Task 4: Configure the routing protocol for each router.

Step 1: Enable the RIP routing protocol on the BRANCH1 router.

The RIP routing protocol will be used to advertise directly connected networks to the other routers in the topology. RIP configuration will be covered in greater detail in a later lab activity. The basic configuration steps necessary for this lab activity are provided below.

To enable RIP, enter global configuration mode and use the **router rip** command.

```
BRANCH1(config)#router rip
BRANCH1(config-router)#
```

Step 2: Enter the classful network addresses for each directly connected network.

Once you are in routing configuration mode, enter the classful network address for each directly connected network, using the **network** command. An example of the use of the **network** command is provided below.

```
BRANCH1(config-router)#network 192.168.1.0
BRANCH1(config-router)#
```

Be sure to configure a **network** statement for each network that is attached to a Serial or Loopback interface of the router.

When you are finished with the RIP configuration, return to privileged EXEC mode and save the current configuration to NVRAM.

```
BRANCH1(config-router)#end
%SYS-5-CONFIG_I: Configured from console by console
BRANCH1#copy run start
```


Step 3: Configure RIP on the HQ and BRANCH2 routers.

Use the **router rip** and **network** commands to configure the HQ and BRANCH2 routers to advertise directly connected networks to the other routers in the topology.

When you are finished with the RIP configuration, return to privileged EXEC mode and save the current configuration to NVRAM.

Step 4: Test and verify connectivity.

Use the **ping** command to verify that the router interfaces can communicate with each other. If you discover that two interfaces cannot ping each other, troubleshoot your IP addressing and router configuration.

Task 5: Document the Router Configurations

On each router, capture the following command output to a text file and save for future reference:

- Running configuration
- Routing table – The output of the **show ip route** command for each of the routers should be exactly the same as the provided outputs
- Interface summarization

