Lab 9.6.1: Basic EIGRP Configuration Lab
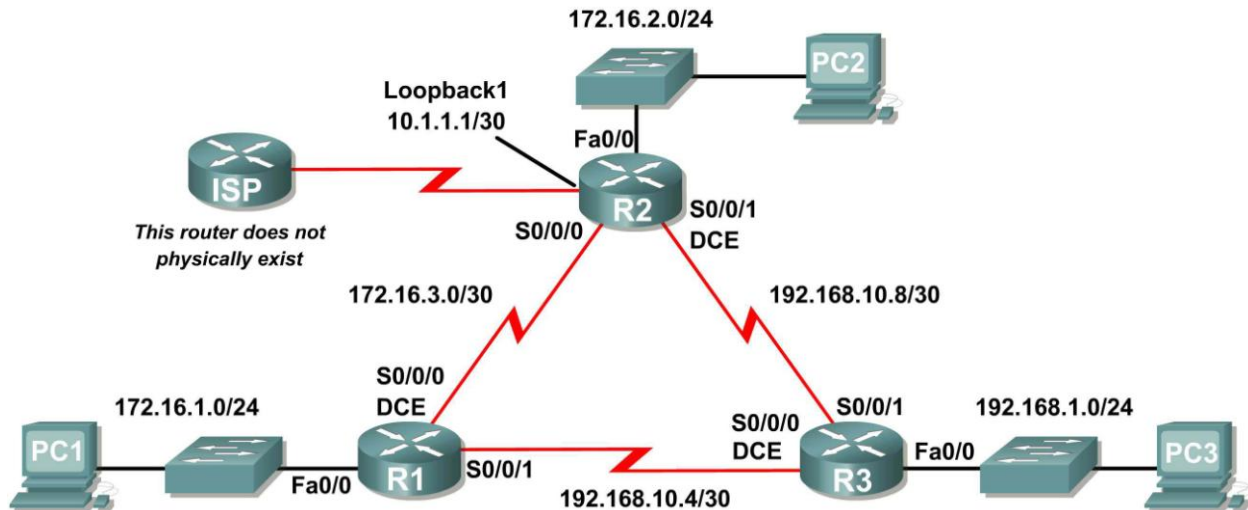
Topology Diagram

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.16.1.1	255.255.255.0	N/A
	S0/0/0	172.16.3.1	255.255.255.252	N/A
	S0/0/1	192.168.10.5	255.255.255.252	N/A
R2	Fa0/0	172.16.2.1	255.255.255.0	N/A
	S0/0/0	172.16.3.2	255.255.255.252	N/A
	S0/0/1	192.168.10.9	255.255.255.252	N/A
	Lo1	10.1.1.1	255.255.255.252	N/A
R3	Fa0/0	192.168.1.1	255.255.255.0	N/A
	S0/0/0	192.168.10.6	255.255.255.252	N/A
	S0/0/1	192.168.10.10	255.255.255.252	N/A
PC1	NIC	172.16.1.10	255.255.255.0	172.16.1.1
PC2	NIC	172.16.2.10	255.255.255.0	172.16.2.1
PC3	NIC	192.168.1.10	255.255.255.0	192.168.1.1

Learning Objectives

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

- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate interfaces.
- Configure EIGRP routing on all routers.
- Verify EIGRP routing using `show` commands.
- Disable automatic summarization.
- Configure manual summarization.
- Configure a static default route.
- Propagate default route to EIGRP neighbors.
- Document the EIGRP configuration.

Scenario

In this lab activity, you will learn how to configure the routing protocol EIGRP using the network shown in the Topology Diagram. A loopback address will be used on the R2 router to simulate a connection to an ISP, where all traffic that is not destined for the local network will be sent. Some segments of the network have been subnetted using VLSM. EIGRP is a classless routing protocol that can be used to provide subnet mask information in the routing updates. This will allow VLSM subnet information to be propagated throughout the network.

Task 1: 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 shown in the topology.

Step 2: Clear any existing configurations on the routers.

Task 2: Perform Basic Router Configurations,

Perform basic configuration of the R1, R2, and R3 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.

Task 3: Configure and Activate Serial and Ethernet Addresses.

Step 1: Configure the interfaces on the R1, R2, and R3 routers.

Configure the interfaces on the R1, R2, and R3 routers with the IP addresses from the table under the Topology Diagram.

Step 2: Verify IP addressing and interfaces.

Use the `show ip interface brief` command to verify that the IP addressing is correct and that the interfaces are active.

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

Step 3: Configure Ethernet interfaces of PC1, PC2, and PC3.

Configure the Ethernet interfaces of PC1, PC2, and PC3 with the IP addresses and default gateways from the table under the Topology Diagram.

Task 4: Configure EIGRP on the R1 Router.

Step 1: Enable EIGRP.

Use the `router eigrp` command in global configuration mode to enable EIGRP on the R1 router. Enter a process ID of 1 for the *autonomous-system* parameter.

```
R1(config)#router eigrp 1
R1(config-router)#
```

Step 2: Configure classful network 172.16.0.0.

Once you are in the Router EIGRP configuration sub-mode, configure the classful network 172.16.0.0 to be included in the EIGRP updates that are sent out of R1.

```
R1(config-router)#network 172.16.0.0
R1(config-router)#
```

The router will begin to send EIGRP update messages out each interface belonging to the 172.16.0.0 network. EIGRP updates will be sent out of the FastEthernet0/0 and Serial0/0/0 interfaces because they are both on subnets of the 172.16.0.0 network.

Step 3: Configure the router to advertise the 192.168.10.4/30 network attached to the Serial0/0/1 interface.

Use the *wildcard-mask* option with the `network` command to advertise only the subnet and not the entire 192.168.10.0 classful network.

Note: Think of a wildcard mask as the inverse of a subnet mask. The inverse of the subnet mask 255.255.255.252 is 0.0.0.3. To calculate the inverse of the subnet mask, subtract the subnet mask from 255.255.255.255:

```
    255.255.255.255
 -  255.255.255.252        Subtract the subnet mask
 -------------------
     0.  0.  0.  3         Wildcard mask

R1(config-router)# network 192.168.10.4 0.0.0.3
R1(config-router)#
```

When you are finished with the EIGRP configuration for R1, return to privileged EXEC mode and save the current configuration to NVRAM.

```
R1(config-router)#end
%SYS-5-CONFIG_I: Configured from console by console
R1#
```

Task 5: Configure EIGRP on the R2 and R3 Routers.

Step 1: Enable EIGRP routing on the R2 router using the `router eigrp` command.

Use a process ID of 1.

```
R2(config)#router eigrp 1
R2(config-router)#
```

Step 2: Use the classful address 172.16.0.0 to include the network for the FastEthernet0/0 interface.

```
R2(config-router)#network 172.16.0.0
R2(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 172.16.3.1 (Serial0/0/0) is up:
new adjacency
```

Notice that DUAL sends a notification message to the console stating that a neighbor relationship with another EIGRP router has been established.

What is the IP address of the EIGRP neighbor router?

_____

What interface on the R2 router is the neighbor adjacent to?

_____

Step 3: Configure the R2 router to advertise the 192.168.10.8/30 network attached to the Serial0/0/1 interface.

1. Use the *wildcard-mask* option with the **network** command to advertise only the subnet and not the entire 192.168.10.0 classful network.

2. When you are finished, return to privileged EXEC mode.

```
R2(config-router)#network 192.168.10.8 0.0.0.3
R2(config-router)#end
%SYS-5-CONFIG_I: Configured from console by console
R2#
```

Step 4: Configure EIGRP on the R3 router using the `router eigrp` and `network` commands.

1. Use a process ID of 1.

2. Use the classful network address for the network attached to the FastEthernet0/0 interface.

3. Include the wildcard masks for the subnets attached to the Serial0/0/0 and Serial 0/0/1 interfaces.

4. When you are finished, return to privileged EXEC mode.

```
R3(config)#router eigrp 1
R3(config-router)#network 192.168.1.0
R3(config-router)#network 192.168.10.4 0.0.0.3
R3(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.10.5 (Serial0/0/0) is up:
new adjacency
R3(config-router)#network 192.168.10.8 0.0.0.3
R3(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.10.9 (Serial0/0/1) is up:
new adjacency
R3(config-router)#end
%SYS-5-CONFIG_I: Configured from console by console
```

```
R3#
```

Notice that when the networks for the serial links from R3 to R1 and R3 to R2 are added to the EIGRP configuration, DUAL sends a notification message to the console stating that a neighbor relationship with another EIGRP router has been established.

Task 6: Verify EIGRP Operation.

Step 1: View neighbors.

On the R1 router, use the **show ip eigrp neighbors** command to view the neighbor table and verify that EIGRP has established an adjacency with the R2 and R3 routers. You should be able to see the IP address of each adjacent router and the interface that R1 uses to reach that EIGRP neighbor.

```
R1#show ip eigrp neighbors
IP-EIGRP neighbors for process 1
H   Address          Interface      Hold Uptime   SRTT   RTO   Q    Seq
                                    (sec)         (ms)         Cnt  Num
0   172.16.3.2       Ser0/0/0       10   00:36:51  40     500   0    13
1   192.168.10.6     Ser0/0/1       11   00:26:51  40     500   0    4
R1#
```

Step 2: View routing protocol information.

On the R1 router, use **the show ip protocols** command to view information about the routing protocol operation. Notice that the information that was configured in Task 5, such as protocol, process ID, and networks, is shown in the output. The IP addresses of the adjacent neighbors are also shown.

```
R1#show ip protocols

Routing Protocol is "eigrp  1 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
  Redistributing: eigrp 1
  Automatic network summarization is in effect
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
     172.16.0.0
     192.168.10.4/30
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.16.3.2      90            4811399
    192.168.10.6    90            5411677
  Distance: internal 90 external 170
```

Notice that the output specifies the process ID used by EIGRP. Remember, the process ID must be the same on all routers for EIGRP to establish neighbor adjacencies and share routing information.

Task7: Examine EIGRP Routes in the Routing Tables.

Step1: View the routing table on the R1 router.

EIGRP routes are denoted in the routing table with a **D**, which stands for DUAL (Diffusing Update Algorithm), which is the routing algorithm used by EIGRP.

```
R1#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

     172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D        172.16.0.0/16 is a summary, 01:16:19, Null0
C        172.16.1.0/24 is directly connected, FastEthernet0/0
D        172.16.2.0/24 [90/2172416] via 172.16.3.2, 01:16:20, Serial0/0/0
C        172.16.3.0/30 is directly connected, Serial0/0/0
D     192.168.1.0/24 [90/2172416] via 192.168.10.6, 01:06:18, Serial0/0/1
      192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D        192.168.10.0/24 is a summary, 01:06:07, Null0
C        192.168.10.4/30 is directly connected, Serial0/0/1
D        192.168.10.8/30 [90/2681856] via 192.168.10.6, 01:06:07, Serial0/0/1
R1#
```

Notice that the 172.16.0.0/16 parent network is variably subnetted with three child routes using either a /24 or /30 mask. Also notice that EIGRP has automatically included a summary route to Null0 for the 172.16.0.0/16 network. The 172.16.0.0/16 route does not actually represent a path to reach the parent network, 172.16.0.0/16. If a packet destined for 172.16.0.0/16 does not match one of the level 2 child routes, it is sent to the Null0 interface.

```
     172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D        172.16.0.0/16 is a summary, 01:16:19, Null0
C        172.16.1.0/24 is directly connected, FastEthernet0/0
D        172.16.2.0/24 [90/2172416] via 172.16.3.2, 01:16:20, Serial0/0/0
C        172.16.3.0/30 is directly connected, Serial0/0/0
```

The 192.168.10.0/24 Network is also variably subnetted and includes a Null0 route.

```
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D        192.168.10.0/24 is a summary, 01:06:07, Null0
C        192.168.10.4/30 is directly connected, Serial0/0/1
D        192.168.10.8/30 [90/2681856] via 192.168.10.6, 01:06:07, Serial0/0/1
```

Step 2: View the routing table on the R3 router.

The routing table for R3 shows that both R1 and R2 are automatically summarizing the 172.16.0.0/16 network and sending it as a single routing update. Because of automatic summarization, R1 and R2 are not propagating the individual subnets. Because R3 is getting two equal cost routes for 172.16.0.0/16 from both R1 and R2, both routes are included in the routing table.

```
R3#show ip route

<output omitted>

D    172.16.0.0/16 [90/2172416] via 192.168.10.5, 01:15:35, Serial0/0/0
                   [90/2172416] via 192.168.10.9, 01:15:22, Serial0/0/1
C    192.168.1.0/24 is directly connected, FastEthernet0/0
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D       192.168.10.0/24 is a summary, 01:15:22, Null0
C       192.168.10.4/30 is directly connected, Serial0/0/0
C       192.168.10.8/30 is directly connected, Serial0/0/1
R3#
```

Task 8: Configure EIGRP Metrics.

Step 1: View the EIGRP metric information.

Use the **show interface serial0/0/0** command to view the EIGRP metric information for the
Serial0/0/0 interface on the R1 router. Notice the values that are shown for the bandwidth, delay,
reliability, and load.

```
R1#show interface serial0/0/0
Serial0/0/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.16.3.1/30
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)

<output omitted>
```

Step 2: Modify the bandwidth of the Serial interfaces.

On most serial links, the bandwidth metric will default to 1544 Kbits. If this is not the actual bandwidth of
the serial link, the bandwidth will need to be changed so that the EIGRP metric can be calculated
correctly.

For this lab, the link between R1 and R2 will be configured with a bandwidth of 64 kbps, and the link
between R2 and R3 will be configured with a bandwidth of 1024 kbps. Use the **bandwidth** command to
modify the bandwidth of the Serial interfaces of each router.

```
R1 router:
R1(config)#interface serial0/0/0
R1(config-if)#bandwidth 64

R2 router:
R2(config)#interface serial0/0/0
R2(config-if)#bandwidth 64
R2(config)#interface serial0/0/1
R2(config-if)#bandwidth 1024

R3 router:
R3(config)#interface serial0/0/1
R3(config-if)#bandwidth 1024
```

Note: The **bandwidth** command only modifies the bandwidth metric used by routing protocols, not the
physical bandwidth of the link.

Step 3: Verify the bandwidth modifications.

Use the `show ip interface` command to verify that the bandwidth value of each link has been changed.

```
R1#show interface serial0/0/0
Serial0/0/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.16.3.1/30
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)

<output omitted>

R2#show interface serial0/0/0
Serial0/0/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.16.3.2/30
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)

<output omitted>

R3#show interface serial0/0/1
Serial0/0/1 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 192.168.10.10/30
  MTU 1500 bytes, BW 1024 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)

<output omitted>
```

Note: Use the interface configuration command `no bandwidth` to return the bandwidth to its default value.

Task 9: Examine Successors and Feasible Distances.

Step 1: Examine the successors and feasible distances in the routing table on R2.

```
R2#show ip route

<output omitted>

     10.0.0.0/30 is subnetted, 1 subnets
C       10.1.1.0 is directly connected, Loopback1
     172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D       172.16.0.0/16 is a summary, 00:00:52, Null0
D       172.16.1.0/24 [90/40514560] via 172.16.3.1, 00:00:52, Serial0/0/0
C       172.16.2.0/24 is directly connected, FastEthernet0/0
C       172.16.3.0/30 is directly connected, Serial0/0/0
D    192.168.1.0/24 [90/3014400] via 192.168.10.10, 00:00:11, Serial0/0/1
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D       192.168.10.0/24 is a summary, 00:00:11, Null0
D       192.168.10.4/30 [90/3523840] via 192.168.10.10, 00:00:11,
Serial0/0/1
C       192.168.10.8/30 is directly connected, Serial0/0/1
R2#
```

Step 2: Answer the following questions:

What is the best path to PC1?

_____

A successor is a neighboring router that is currently being used for packet forwarding. A successor is the least-cost route to the destination network. The IP address of a successor is shown in a routing table entry right after the word "via".

What is the IP address and name of the successor router in this route?

_____

Feasible distance (FD) is the lowest calculated metric to reach that destination. FD is the metric listed in the routing table entry as the second number inside the brackets.

What is the feasible distance to the network that PC1 is on?

_____

Task 10: Determine if R1 is a Feasible Successor for the Route from R2 to the 192.168.1.0 Network.

A feasible successor is a neighbor who has a viable backup path to the same network as the successor. In order to be a feasible successor, R1 must satisfy the feasibility condition. The feasibility condition (FC) is met when a neighbor's reported distance (RD) to a network is less than the local router's feasible distance to the same destination network.

Step 1: Examine the routing table on R1.

```
R1#show ip route

<output omitted>

     172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D       172.16.0.0/16 is a summary, 00:42:59, Null0
C       172.16.1.0/24 is directly connected, FastEthernet0/0
D       172.16.2.0/24 [90/40514560] via 172.16.3.2, 00:43:00, Serial0/0/0
C       172.16.3.0/30 is directly connected, Serial0/0/0
D    192.168.1.0/24 [90/2172416] via 192.168.10.6, 00:42:26, Serial0/0/1
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D       192.168.10.0/24 is a summary, 00:42:20, Null0
C       192.168.10.4/30 is directly connected, Serial0/0/1
D       192.168.10.8/30 [90/3523840] via 192.168.10.6, 00:42:20,
Serial0/0/1
R1#
```

What is the reported distance to the 192.168.1.0 network?

_____

Step 2: Examine the routing table on R2.

```
R2#show ip route

<output omitted>
```

```
        10.0.0.0/30 is subnetted, 1 subnets
C          10.1.1.0 is directly connected, Loopback1
        172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D          172.16.0.0/16 is a summary, 00:00:52, Null0
D          172.16.1.0/24 [90/40514560] via 172.16.3.1, 00:00:52, Serial0/0/0
C          172.16.2.0/24 is directly connected, FastEthernet0/0
C          172.16.3.0/30 is directly connected, Serial0/0/0
D      192.168.1.0/24 [90/3014400] via 192.168.10.10, 00:00:11, Serial0/0/1
        192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D          192.168.10.0/24 is a summary, 00:00:11, Null0
D          192.168.10.4/30 [90/3523840] via 192.168.10.10, 00:00:11, Serial0/0/1
C          192.168.10.8/30 is directly connected, Serial0/0/1
R2#
```

What is the feasible distance to the 192.168.1.0 network?

_____

Would R2 consider R1 to be a feasible successor to the 192.168.1.0 network? _____

Task 11: Examine the EIGRP Topology Table.

Step 1: View the EIGRP topology table.

Use the **show ip eigrp topology** command to view the EIGRP topology table on R2.

```
R2#show ip eigrp topology
IP-EIGRP Topology Table for AS 1

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 172.16.2.0/24, 1 successors, FD is 28160
         via Connected, FastEthernet0/0
P 172.16.3.0/30, 1 successors, FD is 40512000
         via Connected, Serial0/0/0
P 192.168.10.8/30, 1 successors, FD is 3011840
         via Connected, Serial0/0/1
P 172.16.0.0/16, 1 successors, FD is 28160
         via Summary (28160/0), Null0
P 192.168.10.0/24, 1 successors, FD is 3011840
         via Summary (3011840/0), Null0
P 172.16.1.0/24, 1 successors, FD is 40514560
         via 172.16.3.1 (40514560/28160), Serial0/0/0
P 192.168.1.0/24, 1 successors, FD is 3014400
         via 192.168.10.10 (3014400/28160), Serial0/0/1
         via 172.16.3.1 (41026560/2172416), Serial0/0/0
P 192.168.10.4/30, 1 successors, FD is 3523840
         via 192.168.10.10 (3523840/2169856), Serial0/0/1
R2#
```

Step 2: View detailed EIGRP topology information.

Use the [*network*] parameter of the **show ip eigrp topology** command to view detailed EIGRP topology information for the 192.16.0.0 network.

```
R2#show ip eigrp topology 192.168.1.0
IP-EIGRP (AS 1): Topology entry for 192.168.1.0/24
  State is Passive, Query origin flag is 1, 1 Successor(s), FD is 3014400
  Routing Descriptor Blocks:
  192.168.10.10 (Serial0/0/1), from 192.168.10.10, Send flag is 0x0
      Composite metric is (3014400/28160), Route is Internal
      Vector metric:
        Minimum bandwidth is 1024 Kbit
        Total delay is 20100 microseconds
        Reliability is 255/255
        Load is 1/255
        Minimum MTU is 1500
        Hop count is 1
  172.16.3.1 (Serial0/0/0), from 172.16.3.1, Send flag is 0x0
      Composite metric is (41026560/2172416), Route is Internal
      Vector metric:
        Minimum bandwidth is 64 Kbit
        Total delay is 40100 microseconds
        Reliability is 255/255
        Load is 1/255
        Minimum MTU is 1500
        Hop count is 2
R2#
```

How many successors are there for this network?

_____

What is the feasible distance to this network?

_____

What is the IP address of the feasible successor?

_____

What is the reported distance for 192.168.1.0 from the feasible successor?

_____

What would be the feasible distance to 192.168.1.0 if R1 became the successor?

_____

Task 12: Disable EIGRP Automatic Summarization.

Step 1: Examine the routing table of the R3 router.

Notice that R3 is not receiving individual routes for the 172.16.1.0/24, 172.16.2.0/24, and 172.16.3.0/24 subnets. Instead, the routing table only has a summary route to the classful network address of 172.16.0.0/16 through the R1 router. This will cause packets that are destined for the 172.16.2.0/24 network to be sent through the R1 router instead of being sent straight to the R2 router.

```
R3#show ip route

<output omitted>
```

```
D    172.16.0.0/16 [90/2172416] via 192.168.10.5, 01:21:54, Serial0/0/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D       192.168.10.0/24 is a summary, 01:21:47, Null0
C       192.168.10.4/30 is directly connected, Serial0/0/0
C       192.168.10.8/30 is directly connected, Serial0/0/1
R3#
```

Why is the R1 router (192.168.10.5) the only successor for the route to the 172.16.0.0/16 network?

_____

_____

_____

Notice that the reported distance from R2 is higher than the feasible distance from R1.

```
R3#show ip eigrp topology
IP-EIGRP Topology Table for AS 1

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 192.168.1.0/24, 1 successors, FD is 28160
        via Connected, FastEthernet0/0
P 192.168.10.4/30, 1 successors, FD is 2169856
        via Connected, Serial0/0/0
P 192.168.10.0/24, 1 successors, FD is 2169856
        via Summary (2169856/0), Null0
P 172.16.0.0/16, 1 successors, FD is 2172416
        via 192.168.10.5 (2172416/28160), Serial0/0/0
        via 192.168.10.9 (3014400/28160), Serial0/0/1
P 192.168.10.8/30, 1 successors, FD is 3011840
        via Connected, Serial0/0/1
```


Step 3: Disable automatic summarization on all three routers with the `no auto-summary` command.

```
R1(config)#router eigrp 1
R1(config-router)#no auto-summary

R2(config)#router eigrp 1
R2(config-router)#no auto-summary

R3(config)#router eigrp 1
R3(config-router)#no auto-summary
```


Step 4: View the routing table on R1 again.

Notice that individual routes for the 172.16.1.0/24, 172.16.2.0/24, and 172.16.3.0/24 subnets are now present and the summary Null route is no longer listed.

```
R3#show ip route

<output omitted>
```

```
      172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D        172.16.1.0/24 [90/2172416] via 192.168.10.5, 00:02:37, Serial0/0/0
D        172.16.2.0/24 [90/3014400] via 192.168.10.9, 00:02:39, Serial0/0/1
D        172.16.3.0/30 [90/41024000] via 192.168.10.9, 00:02:39, Serial0/0/1
                       [90/41024000] via 192.168.10.5, 00:02:37, Serial0/0/0
C     192.168.1.0/24 is directly connected, FastEthernet0/0
      192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
C        192.168.10.4/30 is directly connected, Serial0/0/0
C        192.168.10.8/30 is directly connected, Serial0/0/1
R3#
```

Task 13: Configure Manual Summarization.

Step 1: Add loopback addresses to R3 router.

Add two loopback addresses, 192.168.2.1/24 and 192.168.3.1/24, to the R3 router. These virtual interfaces will be used to represent networks to be manually summarized along with the 192.168.1.0/24 LAN.

```
R3(config)#interface loopback1

%LINK-5-CHANGED: Interface Loopback1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state
to upR3(config-if)#ip address 192.168.2.1 255.255.255.0
R3(config-if)#interface loopback2

%LINK-5-CHANGED: Interface Loopback2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state
to up
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#
```

Step 2: Add the 192.168.2.0 and 192.168.3.0 networks to the EIGRP configuration on R3.

```
R3(config)#router eigrp 1
R3(config-router)#network 192.168.2.0
R3(config-router)#network 192.168.3.0
```

Step 3: Verify new routes.

View the routing table on the R1 router to verify that the new routes are being sent out in the EIGRP updates sent by R3.

```
R1#show ip route

<output omitted>

      172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
C        172.16.1.0/24 is directly connected, FastEthernet0/0
D        172.16.2.0/24 [90/3526400] via 192.168.10.6, 00:15:07, Serial0/0/1
C        172.16.3.0/30 is directly connected, Serial0/0/0
D     192.168.1.0/24 [90/2172416] via 192.168.10.6, 00:15:07, Serial0/0/1
D     192.168.2.0/24 [90/2297856] via 192.168.10.6, 00:01:07, Serial0/0/1
D     192.168.3.0/24 [90/2297856] via 192.168.10.6, 00:00:57, Serial0/0/1
      192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
C        192.168.10.4/30 is directly connected, Serial0/0/1
D        192.168.10.8/30 [90/3523840] via 192.168.10.6, 00:15:07, Serial0/0/1
R1#
```

Step 4: Apply manual summarization to outbound interfaces.

The routes to the 192.168.1.0/24, 192.168.2.0/24, and 192.168.3.0/24 networks can be summarized in the single network 192.168.0.0/22. Use the `ip summary-address eigrp` *as-number network-address subnet-mask* command to configure manual summarization on each of the outbound interfaces connected to EIGRP neighbors.

```
R3(config)#interface serial0/0/0
R3(config-if)#ip summary-address eigrp 1 192.168.0.0 255.255.252.0
R3(config-if)#interface serial0/0/1
R3(config-if)#ip summary-address eigrp 1 192.168.0.0 255.255.252.0
R3(config-if)#
```

Step 5: Verify the summary route.

View the routing table on the R1 router to verify that the summary route is being sent out in the EIGRP updates sent by R3.

```
R1#show ip route

<output omitted>

     172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
C       172.16.1.0/24 is directly connected, FastEthernet0/0
D       172.16.2.0/24 [90/3526400] via 192.168.10.6, 00:15:07, Serial0/0/1
C       172.16.3.0/30 is directly connected, Serial0/0/0
D    192.168.0.0/22 [90/2172416] via 192.168.10.6, 00:01:11, Serial0/0/1
     192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
C       192.168.10.4/30 is directly connected, Serial0/0/1
D       192.168.10.8/30 [90/3523840] via 192.168.10.6, 00:15:07, Serial0/0/1
R1#
```

Task 14: Configure and Distribute a Static Default Route.

Step 1: Configure a static default route on the R2 router.

Use the loopback address that has been configured to simulate a link to an ISP as the exit interface.

```
R2(config)#ip route 0.0.0.0 0.0.0.0 loopback1
R2(config)#
```

Step 2: Include the static route in EIGRP updates.

Use the `redistribute static` command to include the static route in the EIGRP updates that are sent from the R2 router.

```
R2(config)#router eigrp 1
R2(config-router)#redistribute static
R2(config-router)#
```

Step 3: Verify the static default route.

View the routing table on the R1 router to verify that the static default route is being redistributed via EIGRP.

```
R1#show ip route

<output omitted>
```

```
Gateway of last resort is 192.168.10.6 to network 0.0.0.0

     192.168.10.0/30 is subnetted, 2 subnets
C       192.168.10.4 is directly connected, Serial0/0/1
D       192.168.10.8 [90/3523840] via 192.168.10.6, 01:06:01, Serial0/0/1
     172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       172.16.1.0/24 is directly connected, FastEthernet0/0
D       172.16.2.0/24 [90/3526400] via 192.168.10.6, 01:05:39, Serial0/0/1
C       172.16.3.0/30 is directly connected, Serial0/0/0
D*EX 0.0.0.0/0 [170/3651840] via 192.168.10.6, 00:02:14, Serial0/0/1
D       192.168.0.0/22 [90/2172416] via 192.168.10.6, 01:05:38, Serial0/0/1
```

Task 15: Documentation

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

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

Task 16: 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.

Lab 9.6.2: Challenge EIGRP Configuration Lab

Topology Diagram
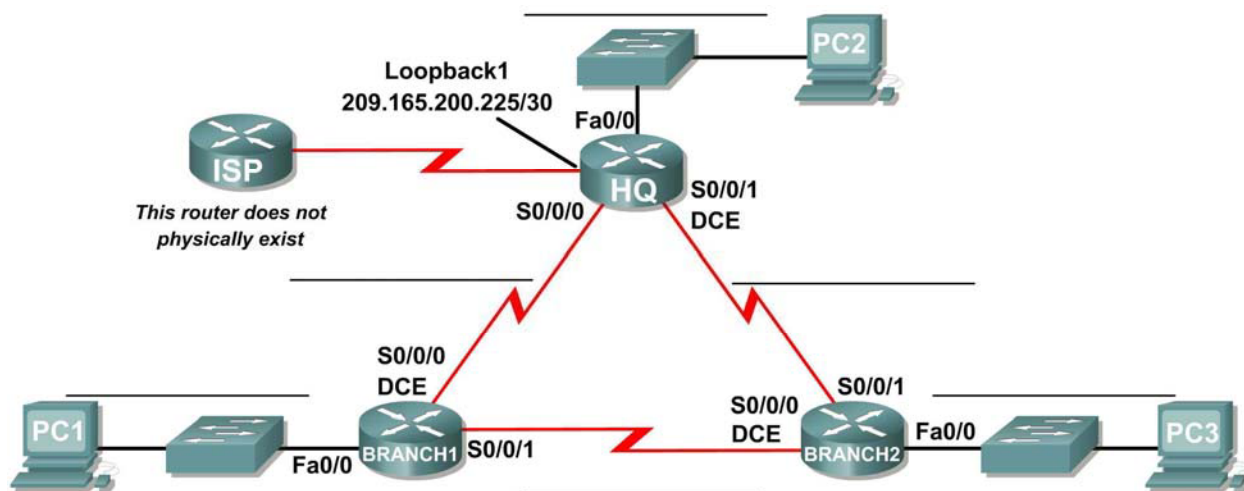
Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ	Fa0/0			N/A
	S0/0/0			N/A
	S0/0/1			N/A
	Lo1			N/A
BRANCH1	Fa0/0			N/A
	S0/0/0			N/A
	S0/0/1			N/A
BRANCH2	Fa0/0			N/A
	S0/0/0			N/A
	S0/0/1			N/A
PC1	NIC			
PC2	NIC			
PC3	NIC			

Learning Objectives

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

- Create an efficient VLSM design given requirements.
- Assign appropriate addresses to interfaces and document.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Configure routers including EIGRP.
- Configure and propagate a static default route.
- Verify EIGRP 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 EIGRP routing and static routing will be required so that hosts on networks that are not directly connected will be able to communicate with each other. EIGRP must be configured so that all IP traffic takes the shortest path to the destination address.

Task 1: Subnet the Address Space.

Step 1: Examine the network requirements.

The addressing for the network has the following requirements:

- The 172.16.0.0/16 network must be subnetted to provide addresses for the three LANs.
    - The HQ LAN will require 500 addresses.
    - The BRANCH1 LAN will require 200 addresses.
    - The Branch 2 LAN will require 100 addresses.
- The loopback address representing the link between the HQ router and the ISP will use the 209.165.200.224/30 network.
- The 192.168.1.16/28 address space must be subnetted to obtain the addresses for the links between the three routers.

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

How many subnets need to be created from the 172.16.0.0/16 network? _____

How many total IP addresses are required from the 172.16.0.0/16 network? _____

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

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

What subnet mask will be used for the BRANCH1 LAN subnet?
_____

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

What subnet mask will be used for the BRANCH2 LAN subnet?
_____

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

What subnet mask will be used for the links between the three routers? _____

What is the maximum number of host addresses that could be used on each of these subnets? _____

Step 3: Assign subnetwork addresses to the Topology Diagram.

1. Assign subnet 0 of the 172.16.0.0/16 network to the HQ LAN subnet.
    What is the network address of this subnet? _____

2. Assign subnet 1 of the 172.16.0.0/16 network to the BRANCH1 LAN subnet.
    What is the network address of this subnet? _____

3. Assign subnet 2 of the 172.16.0.0/16 network to the BRANCH2 LAN subnet.
    What is the network address of this subnet? _____

4. Assign subnet 0 of the 192.168.1.16/28 network to the link between the HQ and BRANCH1 routers.
    What is the network address of this subnet? _____

5. Assign subnet 1 of the 192.168.1.16/28 network to the link between the HQ and BRANCH2 routers.
    What is the network address of this subnet? _____

6. Assign subnet 2 of the 192.168.1.16/28 network to the link between the BRANCH1 and BRANCH2 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 of the 209.165.200.224/30 network to the Loopback interface on the HQ router.

2. Assign the first valid IP address of the HQ LAN network to the LAN interface of the HQ router.

3. Assign the last valid IP address of the HQ LAN network to PC2.

4. Assign the first valid IP address of the BRANCH1 LAN network to the LAN interface of the BRANCH1 router.

5. Assign the last valid IP address of the BRANCH1 LAN network to PC1.

6. Assign the first valid IP address of the BRANCH2 LAN network to the LAN interface of the BRANCH2 router.

7. Assign the last valid IP address of the BRANCH2 LAN network to PC3.

8. Assign the first valid IP address of the HQ to BRANCH1 link network to the Serial 0/0/0 interface of the HQ router.

9. Assign the last valid IP address of the HQ to BRANCH1 link network to the Serial0/0/0 interface of the Branch router.

10. Assign the first valid IP address of the HQ to BRANCH2 link network to the Serial 0/0/1 interface of the HQ router.

11. Assign the last valid IP address of the HQ to BRANCH2 link network to the Serial0/0/1 interface of the Branch router.

12. Assign the first valid IP address of the BRANCH1 to BRANCH2 link network to the Serial 0/0/1 interface of the BRANCH1 router.

13. Assign the last valid IP address of the BRANCH1 to BRANCH2 link network to the Serial0/0/0 interface of the BRANCH2 router.

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 shown in the topology.

Step 2 Clear any existing configurations on the routers.

Task 4: Perform Basic Router Configurations.

Perform basic configuration of the BRANCH1, BRANCH2, 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 interfaces on the HQ, BRANCH1, and BRANCH2 routers.

Configure the interfaces on the HQ, BRANCH1, and BRANCH2 routers with the IP addresses from the 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.

Configure the Ethernet interfaces of PC1, PC2, and PC3 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 connectivity of routers.

Verify that the HQ, BRANCH1, and BRANCH2 routers can ping each of the neighboring routers across the WAN links.

Step 2: Verify connectivity of PCs.

Verify that PC1, PC2, and PC3 can ping their respective default gateways.

Task 7: Configure EIGRP Routing on the BRANCH1 Router.

Consider the networks that need to be included in the EIGRP updates that are sent out by the BRANCH1 router.

What directly connected networks are present in the BRANCH1 routing table?

_____

_____

_____

Will these networks need to have the subnet mask information included in the network statements?
_____

What commands are required to enable EGIRP and include the connected networks in the routing updates?

_____

_____

_____

_____

What command is required to enable EGIRP to include the VLSM information instead of summarizing routes at the classful boundary?

_____

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

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

_____

Task 8: Configure EIGRP and Static Routing on the HQ Router.

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

A static default route will need to be configured to send all packets with destination addresses that are not in the routing table to the loopback address representing the link between the HQ router and the ISP. What command is needed to accomplish this?

_____

What directly connected networks are present in the HQ routing table?

_____

_____

_____

_____

Will the networks of the HQ LAN and the links between the BRANCH1 and BRANCH2 routers need to have the subnet mask information included in the network statements? _____

What commands are required to enable EGIRP and include the appropriate networks in the routing updates?

_____

_____

_____

_____

What command is required to enable EGIRP to include the VLSM information instead of summarizing routes at the classful boundary?

_____

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

What command is used to disable EIGRP updates on this interface?

_____

The HQ router needs to send the default route information to the BRANCH1 and BRANCH2 routers in the EIGRP updates. What command is used to configure this?

_____

Task 9: Configure EIGRP Routing on the BRANCH2 Router.

Consider the networks that need to be included in the EIGRP updates that are sent out by the BRANCH2 router.

What directly connected networks are present in the BRANCH2 routing table?

_____

_____

_____

Will these networks need to have the subnet mask information included in the network statements? _____

What commands are required to enable EGIRP and include the connected networks in the routing updates?

_____

_____

_____

_____

What command is required to enable EGIRP to include the VLSM information instead of summarizing routes at the classful boundary?

_____

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

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

_____

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 PC2? _____

From PC1, is it possible to ping the PC3? _____

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 EIGRP routes are present in the routing table of the BRANCH1 router?

_____

_____

_____

_____

_____

_____

What is the gateway of last resort in the routing table of the BRANCH1 router?

_____

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

_____

_____

_____

_____

_____

What is the gateway of last resort in the routing table of the HQ router?

_____

What EIGRP routes are present in the routing table of the BRANCH2 router?

_____

_____

_____

_____

_____

_____

What is the gateway of last resort in the routing table of the BRANCH2 router?

_____

Task 11: Reflection

Why is it necessary to use disable automatic summarization with this network design?

_____

_____

_____

If the routes in the routing table are summarized at the classful network boundary 17.16.0.0, the paths between the three routers will all have an equal cost and packets may not be sent using the route with the least hops.

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.

Lab 9.6.3: EIGRP Troubleshooting Lab

Topology Diagram
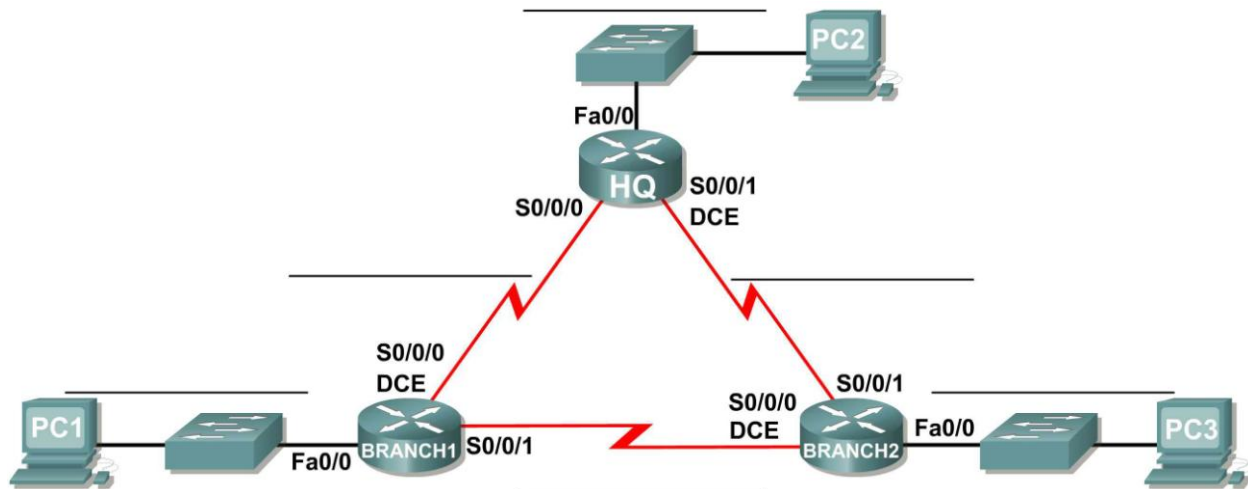
Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ	Fa0/0	172.18.64.1	255.255.192.0	N/A
	S0/0/0	209.165.202.129	255.255.255.252	N/A
	S0/0/1	209.165.202.133	255.255.255.252	N/A
BRANCH1	Fa0/0	172.18.129.1	255.255.255.240	N/A
	S0/0/0	209.165.202.130	255.255.255.252	N/A
	S0/0/1	209.165.202.137	255.255.255.252	N/A
BRANCH2	Fa0/0	172.18.128.1	255.255.255.0	N/A
	S0/0/0	209.165.202.138	255.255.255.252	N/A
	S0/0/1	209.165.202.134	255.255.255.252	N/A
PC1	NIC	172.18.129.14	255.255.255.240	172.18.129.1
PC2	NIC	172.18.100.100	255.255.192.0	172.18.64.1
PC3	NIC	172.18.128.10	255.255.255.0	172.18.128.1

Learning Objectives

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

- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Load the routers with supplied scripts.
- Discover where communication is not possible.
- Gather information about the misconfigured portion of the network along with any other errors.
- Analyze information to determine why communication is not possible.
- Propose solutions to network errors.
- Implement solutions to network errors.
- Document the corrected network.

Scenario

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

The network should also have the following requirements met:

- EIGRP routing is configured on the BRANCH1 router.
- EIGRP routing is configured on the BRANCH2 router.
- EIGRP routing is configured on the HQ router.
- EIGRP updates must be disabled on the BRANCH1, BRANCH2, and HQ LAN interfaces.
- All EIGRP routers must use a process ID of 1.

Task 1: Cable, Erase, and Reload the Routers.

Step 1: Cable a network.

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

Step 2: Clear the configuration on each router.

Clear the configuration on each of the routers using the `erase startup-config` command and then `reload` the routers. Answer `no` if asked to save changes.

Task 2: Load Routers with the Supplied Scripts.

Step 1: Load the following script onto the BRANCH1 router:

```
hostname BRANCH1
!
no ip domain-lookup
!
interface FastEthernet0/0
 ip address 172.18.129.1 255.255.255.240
 duplex auto
 speed auto
 !
```

```
interface Serial0/0/0
 ip address 209.165.202.130 255.255.255.252
 clock rate 64000
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.202.137 255.255.255.252
 no shutdown
!
router eigrp 2
  passive-interface FastEthernet0/0
 network 209.165.202.128 0.0.0.3
 network 209.165.202.136 0.0.0.3
 network 172.18.129.0 0.0.0.7
 no auto-summary
!
ip classless
!
line con 0
line vty 0 4
 login
!
end
```

Step 2: Load the following script onto the BRANCH2 router:

```
hostname BRANCH2
!
no ip domain-lookup
!
interface FastEthernet0/0
 ip address 172.18.128.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.202.138 255.255.255.252
 clock rate 64000
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.202.134 255.255.255.252
 no shutdown
!
router eigrp 1
 passive-interface FastEthernet0/0
 network 172.18.128.0 0.0.0.255
 network 209.165.202.132 0.0.0.3
 network 209.165.202.136 0.0.0.3
 !
ip classless
!
line con 0
line vty 0 4
 login
```

```
!
end
```

Step 3: Load the following script onto the HQ router:

```
hostname HQ
!
no ip domain-lookup
!
interface FastEthernet0/0
 ip address 172.18.64.1 255.255.192.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.202.129 255.255.255.252
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.202.133 255.255.255.252
 clock rate 64000
 no shutdown
!
router eigrp 1
 passive-interface Serial0/0/0
  network 172.18.64.0
 network 209.165.202.128 0.0.0.3
 network 209.165.202.132 0.0.0.3
 no auto-summary
!
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 the BRANCH1 router.

From the host PC1, is it possible to ping PC2? _____

From the host PC1, is it possible to ping PC3? _____

From the host PC1, is it possible to ping the default gateway? _____

Step 2: Examine the BRANCH1 router to find possible configuration errors.

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the configuration of the interfaces?

_____

_____

If there are any problems with the configuration of the interfaces, record any commands that will be necessary to correct the configuration errors.

_____

_____

_____

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the BRANCH1 router? _____

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the BRANCH1 router.

What routes are shown in the routing table?

_____

_____

Are there any problems with the routing table or the EIGRP configuration?

_____

_____

If there are any problems with the EIGRP configuration, record any commands that will be necessary to correct the configuration errors.

_____

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Are there any connectivity problems that could be due to errors on other parts of the network?

_____

_____

What connected networks are shown in the EIGRP topology table of the BRANCH1 router?

_____

_____

Are there any problems with the connected networks in the EIGRP topology table?

_____

_____

Step 6: If you have recorded any commands above, apply them to the router configuration now.

Step 7: View the routing information.

If any changes were made to the configuration in the previous steps, view the routing information again.

Does the information in routing table indicate any configuration errors on the BRANCH1 router? _____

Does the information in the EIGRP topology table indicate any configuration errors on the BRANCH1 router? _____

If the answer to either of these questions is **yes**, troubleshoot the routing configuration again.

What routes are shown in the routing table?

_____

_____

_____

_____

Step 8: Attempt to ping between the hosts again.

From the host PC1, is it possible to ping PC2? _____

From the host PC1, is it possible to ping PC3? _____

From the host PC1, is it possible to ping the Serial 0/0/0 interface of the HQ router? _____

From the host PC1, is it possible to ping the Serial 0/0/1 interface of the HQ router? _____

Task 4: Troubleshoot the HQ Router

Step 1: Begin troubleshooting at the host PC2.

From the host PC2, is it possible to ping PC1? _____

From the host PC2, is it possible to ping PC3? _____

From the host PC2, is it possible to ping the default gateway? _____

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

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the configuration of the interfaces?

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the configuration of the interfaces?

_____

_____

_____

If there are any problems with the configuration of the interfaces, record any commands that will be
necessary to correct the configuration errors.

_____

_____

_____

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status
information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the HQ router?
_____

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the HQ router.

What routes are shown in the routing table?

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Are there any problems with the routing table or the EIGRP configuration?

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If there are any problems with the EIGRP configuration, record any commands that will be necessary to correct the configuration errors.

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Are there any connectivity problems that could be due to errors on other parts of the network?

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What connected networks are shown in the EIGRP topology table of the HQ router?

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_____

Are there any problems with the connected networks in the EIGRP topology table?

_____

_____

Step 6: If you have recorded any commands above, apply them to the router configuration now.

Step 7: View the routing information.

If any changes were made to the configuration in the previous steps, view the routing information again.

Does the information in routing table indicate any configuration errors on the HQ router? _____

Does the information in the EIGRP topology table indicate any configuration errors on the HQ router? _____

If the answer to either of these questions is **yes**, troubleshoot the routing configuration again.

Step 8: Attempt to ping between the hosts again.

From the host PC2, is it possible to ping PC1? _____

From the host PC2, is it possible to ping PC3? _____

From the host PC2, is it possible to ping the Serial 0/0/0 interface of the BRANCH2 router? _____

From the host PC2, is it possible to ping the Serial 0/0/1 interface of the BRANCH2 router? _____

Task 5: Troubleshoot the BRANCH2 Router

Step 1: Begin troubleshooting at the Host PC3.

From the host PC3, is it possible to ping PC1? _____

From the host PC3, is it possible to ping PC2? _____

From the host PC3, is it possible to ping the default gateway? _____

Step 2: Examine the BRANCH2 router to find possible configuration errors.

Are there any problems with the configuration of the interfaces?

_____

_____

_____

If there are any problems with the configuration of the interfaces, record any commands that will be necessary to correct the configuration errors.

_____

_____

_____

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the BRANCH2 router? _____

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the BRANCH2 router.

What routes are shown in the routing table?

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Are there any problems with the routing table or the EIGRP configuration?

_____

_____

If there are any problems with the EIGRP configuration, record any commands that will be necessary to correct the configuration errors.

_____

_____

_____

Are there any connectivity problems that could be due to errors on other parts of the network?

_____

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_____

What connected networks are shown in the EIGRP topology table of the BRANCH2 router?

_____

_____

_____

Are there any problems with the connected networks in the EIGRP topology table?

_____

_____

Step 6: If you have recorded any commands above, apply them to the router configuration now.

Step 7: View the routing information.

If any changes were made to the configuration in the previous steps, view the routing information again.

Does the information in routing table indicate any configuration errors on the BRANCH2 router? _____

Does the information in the EIGRP topology table indicate any configuration errors on the BRANCH2 router? _____

If the answer to either of these questions is **yes**, troubleshoot the routing configuration again.

What routes are shown in the routing table?

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Step 8: Attempt to ping between the hosts again.

From the host PC3, is it possible to ping PC1? _____

From the host PC3, is it possible to ping PC2? _____

From the host PC3, is it possible to ping the Serial 0/0/0 interface of the BRANCH1 router? _____

From the host PC3, is it possible to ping the Serial 0/0/1 interface of the BRANCH1 router? _____

Task 6: 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.

_____

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Task 7: Documentation

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

- `show running-config`
- `show ip route`
- `show ip interface brief`
- `show ip protocols`

If you need to review the procedures for capturing command output, refer to Lab 1.5.1

Task 8: 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.