**Dynamic Routing using EIGRP**



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| --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** |
| **HQ** | **Eth1/0** | 192.168.1.10 | 255.255.255.252 |
| **Eth1/1** | 192.168.1.13 | 255.255.255.252 |
| **Branch 1** | **Eth1/0** | 192.168.1.1 | 255.255.255.252 |
| **Eth1/1** | 192.168.1.14 | 255.255.255.252 |
| **Eth1/2** | **172.16.0.1** | 255.255.255.0 |
| **Branch 2** | **Eth1/0** | 192.168.1.2 | 255.255.255.252 |
| **Eth1/1** | 192.168.1.5 | 255.255.255.252 |
| **Eth1/2** | **172.16.1.1** | 255.255.255.128 |
| **Branch 3** | **Eth1/0** | 192.168.1.9 | 255.255.255.252 |
| **Eth1/1** | 192.168.1.6 | 255.255.255.252 |
| **Eth1/2** | **172.16.1.129** | 255.255.255.128 |

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| --- | --- | --- | --- |
| **PC #** | **IP Address** | **Subnet Mask** | **Gateway** |
| **PC1** | **172.16.0.2** | **255.255.255.0** | **172.16.0.1** |
| **PC2** | **172.16.1.2** | **255.255.255.128** | **172.16.1.1** |
| **PC3** | **172.16.1.130** | **255.255.255.128** | **172.16.1.129** |

**Subnet the Address Space.**

**Examine the network requirements.**

The addressing for the network has the following requirements:

The 172.16.0.0 network must be subnetted to provide addresses for the three LANs. (A, B, C).

* The BRANCH1 LAN will require 200 addresses. (Network A)
* The BRANCH2 LAN will require 100 addresses. (Network B)
* The BRANCH3 LAN will require 75 addresses. (Network C)

The 192.168.1.0 address space must be subnetted to obtain the addresses for the WAN links between the three routers. (D, E, F and G).

* Cable a network that like the one in the Topology Diagram.

**1.) Configure ethernet interfaces on the routers.** If you do not remember how to do this, see how we did it in the Static Routing lab activity.

* Configure the interfaces on the HQ, Branch1, Branch2, and Branch3 routers with the IP addresses from the table under the Topology Diagram.
* 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. (copy run start)

**2.) Configure the IP address, slash notation, and gateway for PC1, PC2, and PC3.** If you do not remember how to do this, see how we did it in the previous lab activities.

* Configure the interfaces on the PC1, PC2, and PC3 with the IP addresses from the table under the Topology Diagram.

**3.) Configure EIGRP**

**Configure EIGRP Routing on the BRANCH1 Router.**

1. Enable EIGRP.

Use **router eigrp** command in global configuration mode to enable EIGRP on the BRANCH1 router. Enter a process ID of 1 for the ***autonomous-system***parameter.

**BRANCH1(config)#router eigrp 1**

**BRANCH1(config-router)#**

1. Once you are in the Router EIGRP configuration sub-mode, configure the connected networks to be included in the EIGRP updates that are sent out of BRANCH1 Router as explained below:
2. Use the *wildcard-mask* option with the **network** command to advertise only the subnet and not the entire 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**

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**0. 0. 0. 3 Wildcard mask**

**BRANCH1(config-router)# network 172.16.0.0 0.0.0.255**

(Network Address and wildcard mask of A)

**BRANCH1(config-router)# network 192.168.1.XXX 0.0.0.3**

(Network Address and wildcard mask of D)

**BRANCH1(config-router)# network 192.168.1.XXX 0.0.0.3**

(Network Address and wildcard mask of G)

**BRANCH1(config-router)# no auto-summary**

**Note: eigrp does both classful and classless. It defaults to classful. When you do *no auto-summary* it will go into classless mode and start sending the subnet mask alone with its updates. If you are going to have discontiguous networks then you should issue the *no auto-summary* command**

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

**Follow the same procedure explained above to configure EIGRP Routing on the HQ, BRANCH2 and BRANCH3 Routers.**

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

**(**%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 172.16.3.1 (Eth0/1) is up: new adjacency)

* Use **ping** to check the connectivity, if desired.

**Verify EIGRP Operation on HQ, BRANCH1, BRANCH2 and BRANCH3**

**View neighbors**

* Use the **show ip eigrp neighbors** command to view the neighbor table and verify that EIGRP has established an adjacency with the neighbor routers.

**View routing protocol information**

* Use the **show ip protocols** command to view information about the routing protocol operation of all the three routers.

**View the routing table**

* Use the **show ip route** command to see the routing table of three routers. 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.

**View the EIGRP topology table**

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

**Submission Criteria:**

**For each router:**

**show ip interface brief**

**show ip route**

**show ip protocols**

**show ip eigrp neighbors**

**For PCs:**

**From PC1 ping PC2, PC3**

**From PC2 ping PC1, PC3**

**From PC3 ping PC1, PC2**