

Experiment: 10

AIM: Basic EIGRP configuration using GNS3 tool.

Objectives:

Part 1: Prepare the network.

Part 2: Configure Basic Network Device Settings.

Part 3: Configuring **EIGRP**.

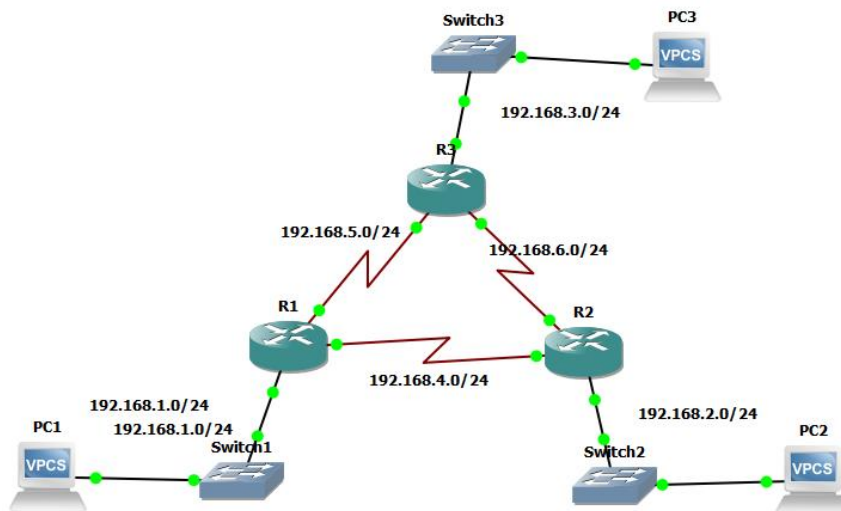
Part 4: Verify and Test Network Connectivity.

Description:

Enhanced Interior Gateway Routing Protocol is an interior gateway protocol suited for many different topologies and media. In a well-designed network, EIGRP scales well and provides extremely quick convergence times with minimal network traffic. It has very low usage of network resources during normal operations; only hello packets are transmitted on a stable network.

When a change occurs, only routing table changes are propagated, not the entire routing table; this reduces the load on the routing protocol itself places on the network. It has rapid convergence times for changes in the network topology (in some situations convergence can be almost instantaneous). It is an enhanced distance vector protocol, relying on the Diffused Update Algorithm (DUAL) to calculate the shortest path to a destination within a network.

Topology:



Addressing Table:

Device	Interface	IP Address	Subnet mask	Default gateway
PC1	NIC	192.168.1.2	255.255.255.0	192.168.1.1
PC2	NIC	192.168.2.2	255.255.255.0	192.168.2.1
PC3	NIC	192.168.3.2	255.255.255.0	192.168.3.1
R1	F0/0	192.168.1.1	255.255.255.0	-
	S1/0	192.168.4.1	255.255.255.0	-
	S1/1	192.168.5.1	255.255.255.0	-
R2	F0/0	192.168.2.1	255.255.255.0	-
	S1/0	192.168.4.2	255.255.255.0	-
	S1/1	192.168.6.1	255.255.255.0	-
R3	F0/0	192.168.3.1	255.255.255.0	-
	S1/0	192.168.5.2	255.255.255.0	-
	S1/1	192.168.6.2	255.255.255.0	-

Part 1: Prepare the Network.

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

Part 2: Configure Basic Network Device Settings.

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

```
R1#configure terminal
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface serial 1/0
R1(config-if)#ip address 192.168.4.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface serial 1/1
R1(config-if)#ip address 192.168.5.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
```

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

```
R1# show ip interface brief
```

Configuring interfaces on R2

```
R2#configure terminal
R2(config)#interface fastEthernet 0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface serial 1/0
R2(config-if)#ip address 192.168.4.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface serial 1/1
R2(config-if)#ip address 192.168.6.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#exit
```

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

```
R2# show ip interface brief
```

Configuring interfaces on R3

```
R3#configure terminal
R3(config)#interface fastEthernet 0/0
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#interface serial 1/0
R3(config-if)#ip address 192.168.5.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#interface serial 1/1
R3(config-if)#ip address 192.168.6.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#exit
```

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

```
R3# show ip interface brief
```

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

Refer to the Addressing Table for PC host address information.

```
PC1>ip 192.168.1.2/24 192.168.1.1
```

```
PC2>ip 192.168.2.2/24 192.168.2.1
```

Part 3: Configure EIGRP

Configure EIGRP on R1

Use the router eigrp command in global configuration mode to enable EIGRP on the R1 router. Enter 1 for the autonomous-system parameter.

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

Once you are in the Router EIGRP configuration sub-mode, configure the classful network 192.168.1.0 to be included in the EIGRP updates that are sent out of R1.

```
R1(config-router)# network 192.168.1.0
```

The router will begin to send EIGRP update messages out each interface belonging to the 192.168.1.0 network. EIGRP updates will be sent out of the FastEthernet0/0 and Serial1/0 interfaces because they are both on subnets of the 192.168.1.0 network.

```
R1(config-router)# network 192.168.4.0
```

```
R1(config-router)# network 192.168.5.0
```

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

Configuring EIGRP on R2

```
R2(config)#router EIGRP 1  
R2(config-router)# network 192.168.2.0
```

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

```
R2(config-router)# network 192.168.4.0  
R2(config-router)# network 192.168.6.0  
R2(config-router)#
```

Configuring EIGRP on R3

```
R3(config)#router EIGRP 1  
R3(config-router)# network 192.168.3.0  
R3(config-router)# network 192.168.5.0  
R3(config-router)# network 192.168.6.0  
R3(config-router)#
```

Part 4: Verify and Test Network Connectivity.

```
PC1> ping 192.168.2.2
```

Verify EIGRP Operation

```
R1#show ip eigrp neighbors
```

View routing protocol information.

```
R1#show ip protocols
```

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

View the routing table on the R1 router.

```
R1#show ip route
```

Conclusion: