

Experiment No.: 03

Experiment Name: Configuring a Network Topology Using EIGRP Protocol.

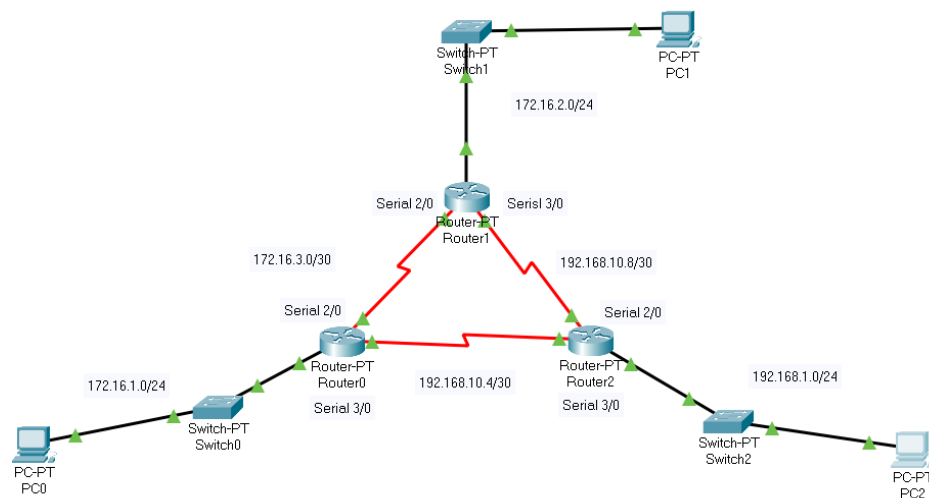
Objective:

- To learn computer networking protocols
- To learn basics of EIGRP protocol
- To configure a network using EIGRP protocol

Introduction:

EIGRP is a Cisco-developed advanced distance-vector routing protocol. Routers using this protocol automatically distribute route information to all neighbors. The Diffusing Update Algorithm (DUA) is used for routing optimization, fast convergence, as well as to avoid routing loops. Full routing information is only exchanged once upon neighbor establishment, after which only partial updates are sent. When a router is unable to find a path through the network, it sends out a query to its neighbors, which propagates until a suitable route is found. This need-based update is an advantage over other protocols as it reduces traffic between routers and therefore saves bandwidth. The metric that is used to find an optimal path is calculated with variables bandwidth, load, delay and reliability. By incorporating many such variables, the protocol ensures that the best path is found. Also, compared to other distance-vector algorithms, EIGRP has a larger maximum hop limitation, which makes it compatible with large networks. The disadvantage of EIGRP is that it is a Cisco proprietary protocol, meaning it is only compatible with Cisco technology.

Topology:



Command:

1. PC Configuration:

PC-PT PC0:

IP Address: 172. 16. 1. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 172. 16. 1. 1

PC-PT PC1:

IP Address: 172. 16. 2. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 172. 16. 2. 1

PC-PT PC2:

IP Address: 192. 168. 1. 2

Subnet Mask: 255. 255. 255. 0

Default Gateway: 192. 168. 1. 1

2. Interface Configuring:

Router-PT Router0:

Router > no

Router# conf terminal

Router(config)# interface fastEthernet 0/0

Router(config-if)# ip address 172. 16. 1. 1 255. 255. 255. 0

Router(config-if)# no shutdown

Router(config-if)# exit

```
Router(config)# interface serial 2/0
Router(config-if)# ip address 172. 16. 3. 1 255. 255. 255. 252
Router(config-if)# clock rate 64000
Router(config-if)# no shutdown
Router(config-if)# exit
```

```
Router(config)# interface serial 3/0
Router(config-if)# ip address 192. 168. 10. 5 255. 255. 255. 252
Router(config-if)# clock rate 64000
Router(config-if)# no shutdown
Router(config-if)# exit
```

Router-PT Router1:

```
Router > no
Router# conf terminal
Router(config)# interface fastEthernet 0/0
Router(config-if)# ip address 172. 16. 2. 1 255. 255. 255. 0
Router(config-if)# no shutdown
Router(config-if)# exit

Router(config)# interface serial 2/0
Router(config-if)# ip address 172. 16. 3. 2 255. 255. 255. 252
Router(config-if)# no shutdown
Router(config-if)# exit
```

```
Router(config)# interface serial 3/0
Router(config-if)# ip address 192. 168. 10. 9 255. 255. 255. 252
Router(config-if)# no shutdown
Router(config-if)# exit
```

Router-PT Router2:

```
Router > no
Router# conf terminal
Router(config)# interface fastEthernet 0/0
Router(config-if)# ip address 192. 168. 1. 1 255. 255. 255. 0
Router(config-if)# no shutdown
Router(config-if)# exit

Router(config)# interface serial 2/0
Router(config-if)# ip address 192.168.10.10 255. 255. 255. 252
Router(config-if)# no shutdown
Router(config-if)# exit

Router(config)# interface serial 3/0
Router(config-if)# ip address 192. 168. 10. 6 255. 255. 255. 252
Router(config-if)# no shutdown
Router(config-if)# exit
```

3. EIGRP Configuring:

Router-PT Router0:

```
Router > no
Router# conf terminal
Router(config)# router eigrp 1
Router(config-router)# network 172. 16. 1. 0 0. 0. 0. 255
Router(config-router)# network 172. 16. 3. 0 0. 0. 0. 3
Router(config-router)# network 192. 168. 10. 4 0. 0. 0. 3
```

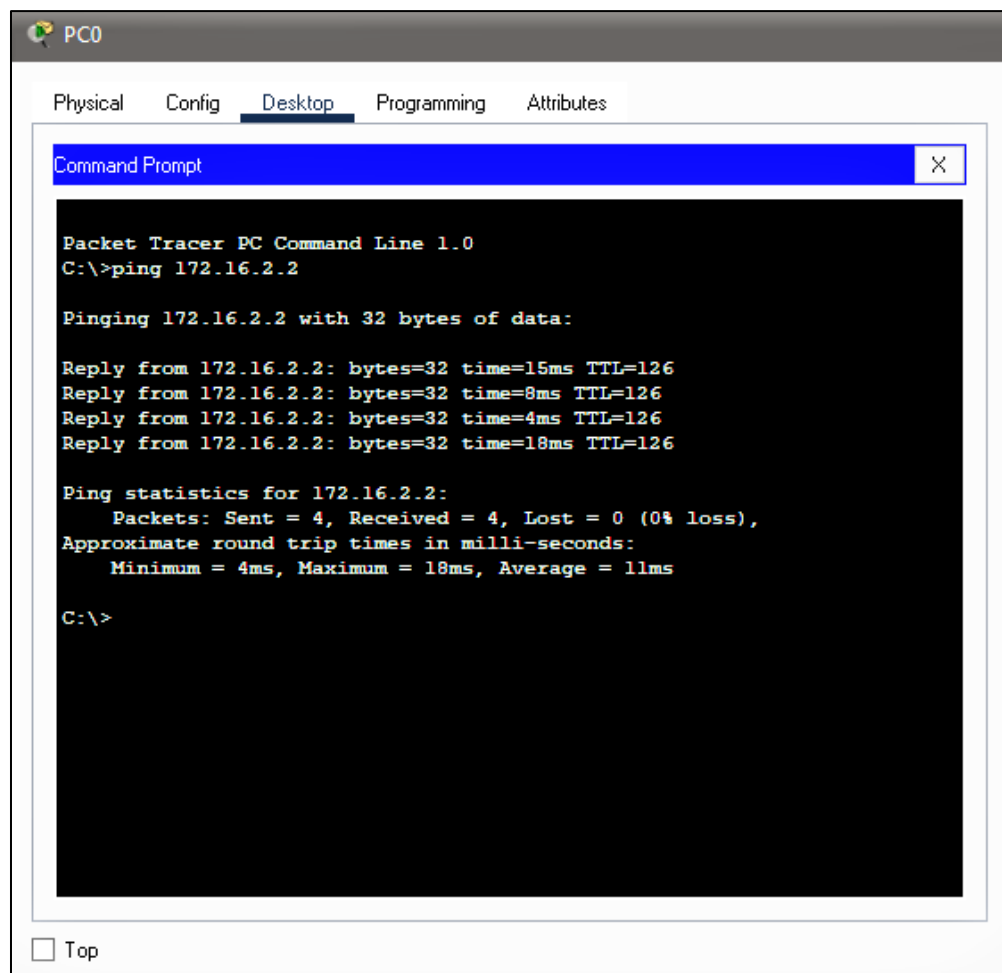
Router-PT Router1:

```
Router > no
Router# conf terminal
Router(config)# router eigrp 1
Router(config-router)# network 172. 16. 2. 0 0. 0. 0. 255
Router(config-router)# network 172. 16. 3. 0 0. 0. 0. 3
Router(config-router)# network 192. 168. 10. 8 0. 0. 0. 3
```

Router-PT Router2:

```
Router > no
Router# conf terminal
Router(config)# router eigrp 1
Router(config-router)# network 192. 168. 10. 8 0. 0. 0. 3
Router(config-router)# network 192. 168. 1. 0 0. 0. 0. 255
Router(config-router)# network 192. 168. 10. 4 0. 0. 0. 3
```

Result & Analysis:



The screenshot shows a Packet Tracer PC Command Line window for PC0. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt window displays the following text:

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.16.2.2

Pinging 172.16.2.2 with 32 bytes of data:

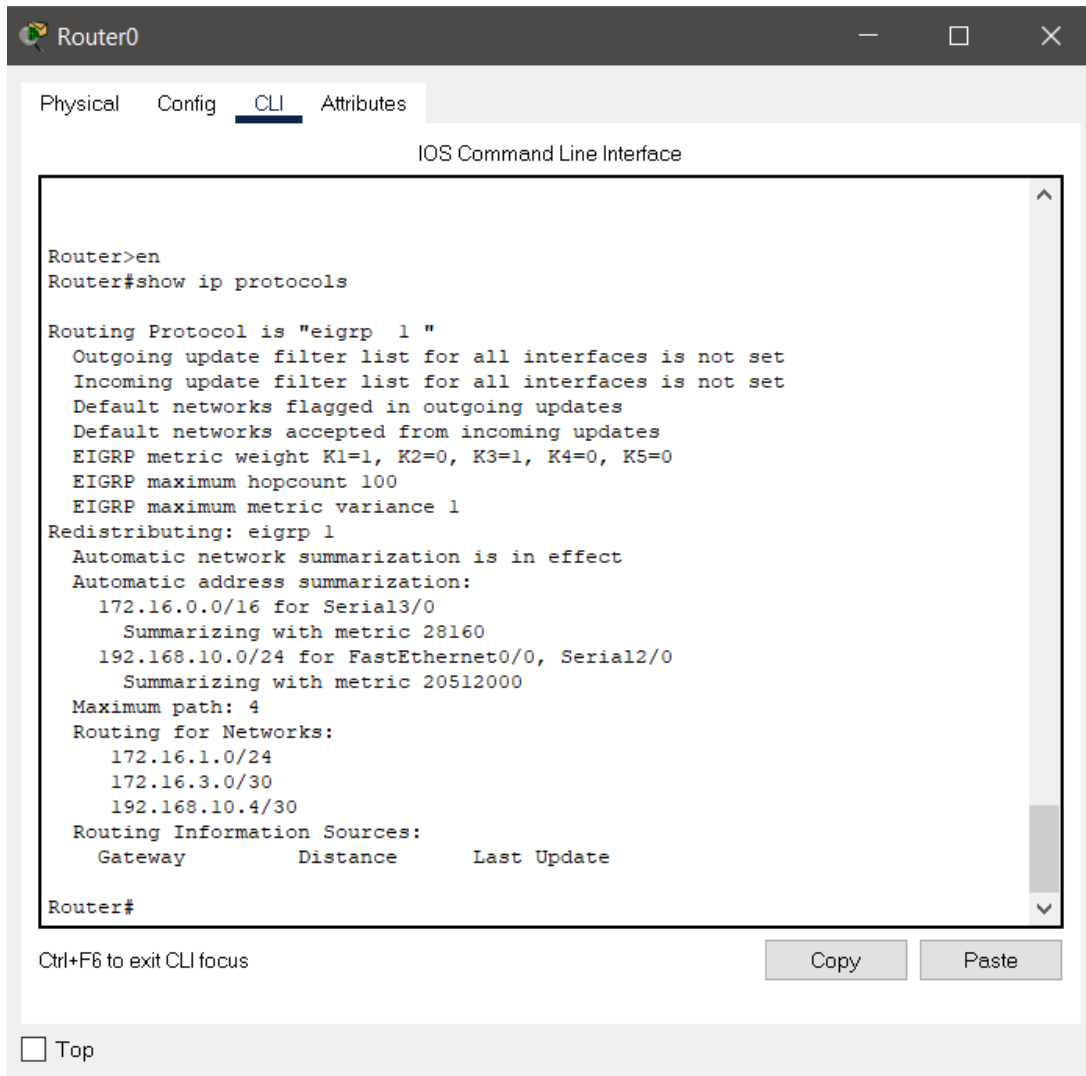
Reply from 172.16.2.2: bytes=32 time=15ms TTL=126
Reply from 172.16.2.2: bytes=32 time=8ms TTL=126
Reply from 172.16.2.2: bytes=32 time=4ms TTL=126
Reply from 172.16.2.2: bytes=32 time=18ms TTL=126

Ping statistics for 172.16.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 18ms, Average = 11ms

C:\>
```

Below the Command Prompt window, there is a checkbox labeled "Top" which is currently unchecked.

Figure 01: Ping from PC-PT PC0 to PC-PT PC1



The screenshot shows a window titled "Router0" with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the "IOS Command Line Interface". The command prompt is "Router>". The user has entered "en" to enter enable mode, resulting in "Router#". The user then enters "show ip protocols", which displays the following output:

```
Router>en
Router#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:
    172.16.0.0/16 for Serial3/0
      Summarizing with metric 28160
    192.168.10.0/24 for FastEthernet0/0, Serial2/0
      Summarizing with metric 20512000
  Maximum path: 4
  Routing for Networks:
    172.16.1.0/24
    172.16.3.0/30
    192.168.10.4/30
  Routing Information Sources:
    Gateway         Distance         Last Update
```

The command prompt is now "Router#". Below the CLI window, there is a "Ctrl+F6 to exit CLI focus" message and "Copy" and "Paste" buttons. At the bottom left, there is a "Top" button.

Figure 02: IP Protocols **Router-PT Router0**

Conclusion:

In this experiment, a network topology was configured using EIGRP protocol. The network was built properly and worked without any data loss. It can be concluded that EIGRP is the best choice for both large and small networks since it has the fastest convergence and EIGRP uses the bandwidth efficiently. But research shows that EIGRP had just been implemented to companies other than CISCO (2013), and the structure is complicated.