Name : Archita Gahoi

Enrollment_No. : 23162171002

SEM : 5

Class : A

Batch : 52 (CS)
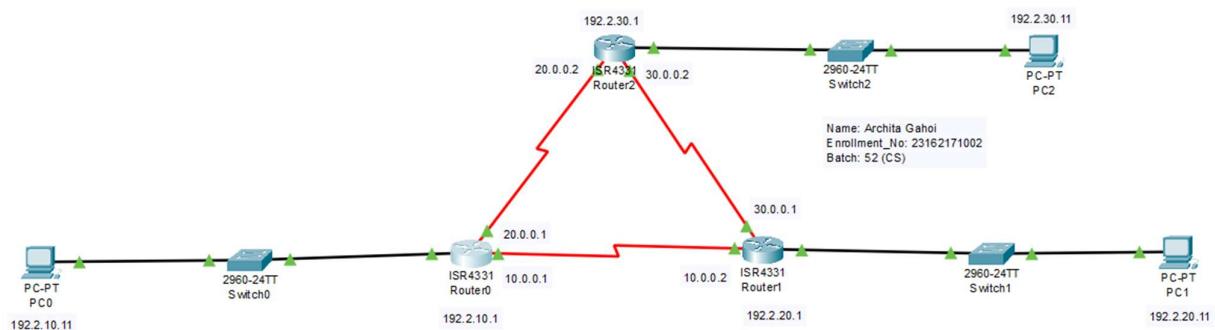
Practical 10

Aim: To design a network using Enhanced Interior Gateway Routing Protocol (EIGRP).

Scenario:

Consider that organization has three departments and as routing protocol Enhanced Interior Gateway Routing Protocol (EIGRP) is to be implemented. Configure network as shown in figure below and implement Enhanced Interior Gateway Routing Protocol (EIGRP).

⇨ <u>Main Circuit</u>
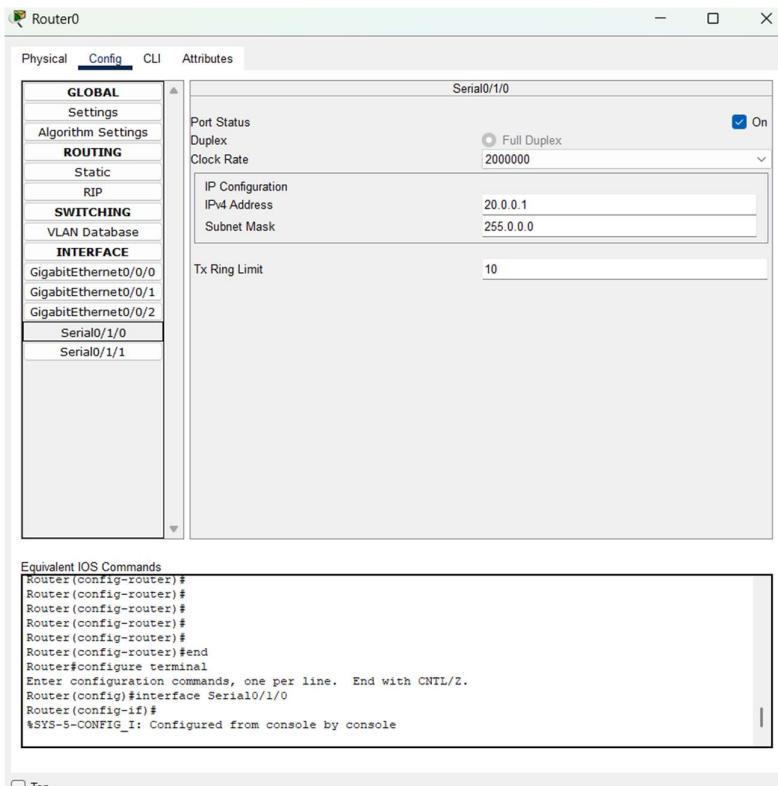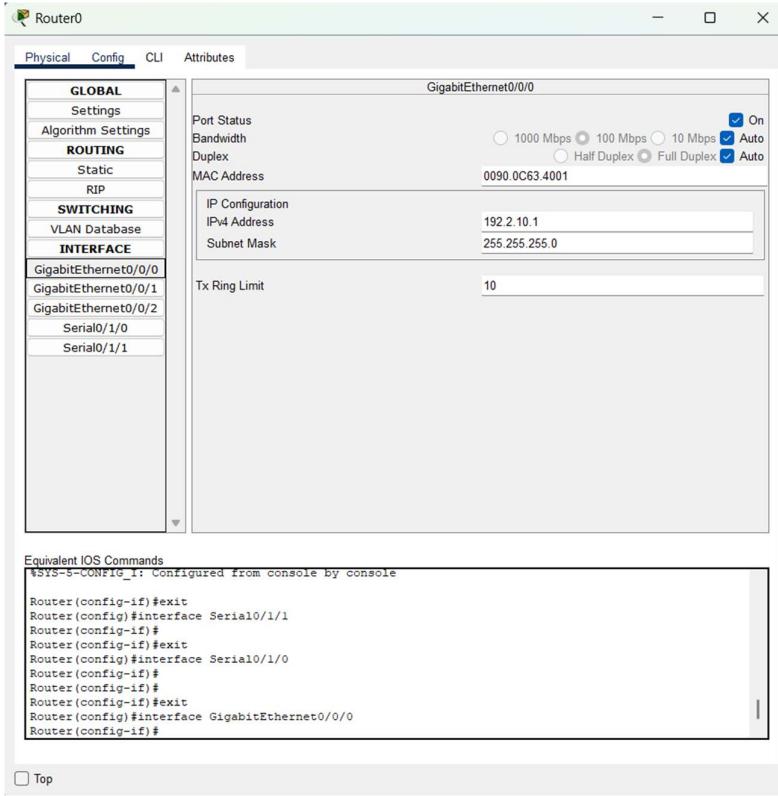
Configuration:

IP Address:

⇨ <u>Routers</u>

<u>Router 0</u>

Router0

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1

Serial0/1/1

Port Status	☑ On
Duplex	◉ Full Duplex
Clock Rate	2000000 ∨

IP Configuration
IPv4 Address | 10.0.0.1
Subnet Mask | 255.0.0.0

Tx Ring Limit | 10

Equivalent IOS Commands

```
Router(config-router)#
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
```

☐ Top

Router 1

Router1 — GigabitEthernet0/0/0

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0
- Serial0/1/1

GigabitEthernet0/0/0

Port Status		☑ On
Bandwidth	○ 1000 Mbps ◉ 100 Mbps ○ 10 Mbps	☑ Auto
Duplex	○ Half Duplex ◉ Full Duplex	☑ Auto
MAC Address	0002.4AC5.1D01	

IP Configuration
IPv4 Address	192.2.20.1
Subnet Mask	255.255.255.0

Tx Ring Limit: 10

Equivalent IOS Commands
```
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
```

☐ Top

Router1 — Serial0/1/0

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0
- Serial0/1/1

Serial0/1/0

Port Status		☑ On
Duplex	◉ Full Duplex	
Clock Rate	2000000	⌄

IP Configuration
IPv4 Address	30.0.0.1
Subnet Mask	255.0.0.0

Tx Ring Limit: 10

Equivalent IOS Commands
```
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
```

☐ Top

Router1

Physical   Config   CLI   Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1

Serial0/1/1

Port Status   ☑ On
Duplex   ◉ Full Duplex
Clock Rate   2000000   ⌄

IP Configuration
IPv4 Address   30.0.0.1
Subnet Mask   255.0.0.0

Tx Ring Limit   10

Equivalent IOS Commands

```
Router(config-router)#
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
```

☐ Top

Router 2

Router2 — Config — GigabitEthernet0/0/0

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0
- Serial0/1/1

GigabitEthernet0/0/0

Port Status .... ☑ On
Bandwidth ... ○ 1000 Mbps ◉ 100 Mbps ○ 10 Mbps ☑ Auto
Duplex .... ○ Half Duplex ◉ Full Duplex ☑ Auto
MAC Address 0009.7C65.B301

IP Configuration
IPv4 Address 192.2.30.1
Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Press RETURN to get started!


Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
```

☐ Top

Router2 — Config — Serial0/1/0

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0
- Serial0/1/1

Serial0/1/0

Port Status .... ☑ On
Duplex .... ○ Full Duplex
Clock Rate 2000000

IP Configuration
IPv4 Address 20.0.0.2
Subnet Mask 255.0.0.0

Tx Ring Limit 10

Equivalent IOS Commands

```
%SYS-5-CONFIG_I: Configured from console by console

Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/2
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
```

☐ Top

Router2

Physical   Config   CLI   Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1

Serial0/1/1

Port Status   ☑ On
Duplex   ○ Full Duplex
Clock Rate   2000000   ⌄

IP Configuration
IPv4 Address   30.0.0.2
Subnet Mask   255.0.0.0
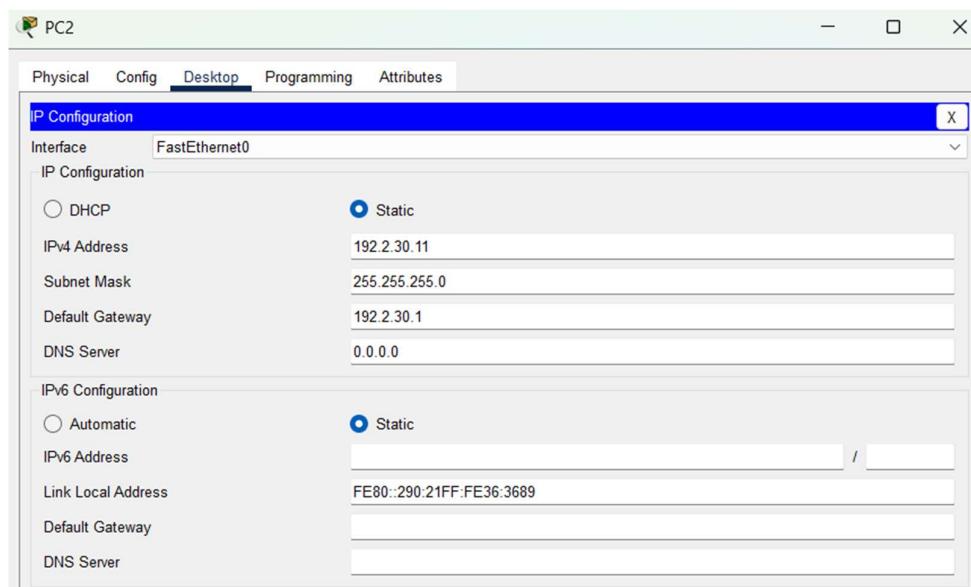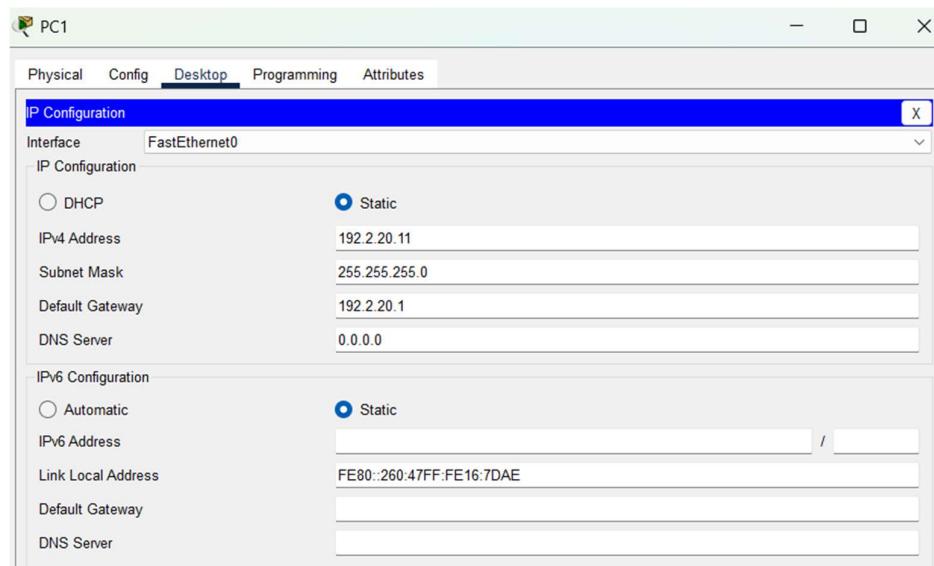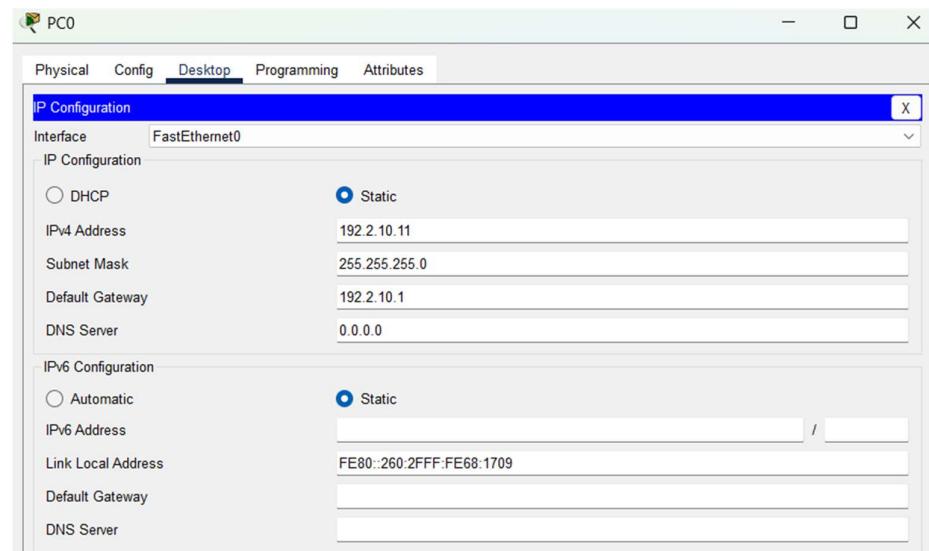
Tx Ring Limit   10

Equivalent IOS Commands

```
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial0/1/1
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
```

☐ Top

⇨ PCS

PC0, PC1, PC2

PC0 — Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration
- DHCP / ● Static
- IPv4 Address: 192.2.10.11
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.2.10.1
- DNS Server: 0.0.0.0

IPv6 Configuration
- Automatic / ● Static
- IPv6 Address: /
- Link Local Address: FE80::260:2FFF:FE68:1709
- Default Gateway:
- DNS Server:

PC1 — Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration
- DHCP / ● Static
- IPv4 Address: 192.2.20.11
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.2.20.1
- DNS Server: 0.0.0.0

IPv6 Configuration
- Automatic / ● Static
- IPv6 Address: /
- Link Local Address: FE80::260:47FF:FE16:7DAE
- Default Gateway:
- DNS Server:

PC2 — Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration
- DHCP / ● Static
- IPv4 Address: 192.2.30.11
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.2.30.1
- DNS Server: 0.0.0.0

IPv6 Configuration
- Automatic / ● Static
- IPv6 Address: /
- Link Local Address: FE80::290:21FF:FE36:3689
- Default Gateway:
- DNS Server:

⇨ Configuring Enhanced Interior Gateway Routing Protocol (EIGRP) in Router0.


```
Router0                                                    —    □    ✕

Physical   Config   CLI   Attributes
                        IOS Command Line Interface

Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 10002
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/0
L       10.0.0.1/32 is directly connected, Serial0/1/0
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial0/1/1
L       20.0.0.1/32 is directly connected, Serial0/1/1
     192.2.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.2.10.0/24 is directly connected, GigabitEthernet0/0/0
L       192.2.10.1/32 is directly connected, GigabitEthernet0/0/0

Routernetwork 20.0.0.0network 192.02.10.0
Routerdo show ip routedo show ip route
Codes: L - local, C - connected, S - static, 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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/0
L       10.0.0.1/32 is directly connected, Serial0/1/0

                                              Copy        Paste

□ Top
```



```
Router0                                                    —    □    ✕

Physical   Config   CLI   Attributes
                        IOS Command Line Interface

Router(config)#router eigrp 10002
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/1
L       10.0.0.1/32 is directly connected, Serial0/1/1
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial0/1/0
L       20.0.0.1/32 is directly connected, Serial0/1/0
D    30.0.0.0/8 [90/2681856] via 20.0.0.2, 00:01:58, Serial0/1/0
                [90/2681856] via 10.0.0.2, 00:01:14, Serial0/1/1
     192.2.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.2.10.0/24 is directly connected, GigabitEthernet0/0/0
L       192.2.10.1/32 is directly connected, GigabitEthernet0/0/0
D    192.2.20.0/24 [90/2172416] via 10.0.0.2, 00:01:14, Serial0/1/1
D    192.2.30.0/24 [90/2172416] via 20.0.0.2, 00:01:58, Serial0/1/0

Router(config-router)#
```

Router0 — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface
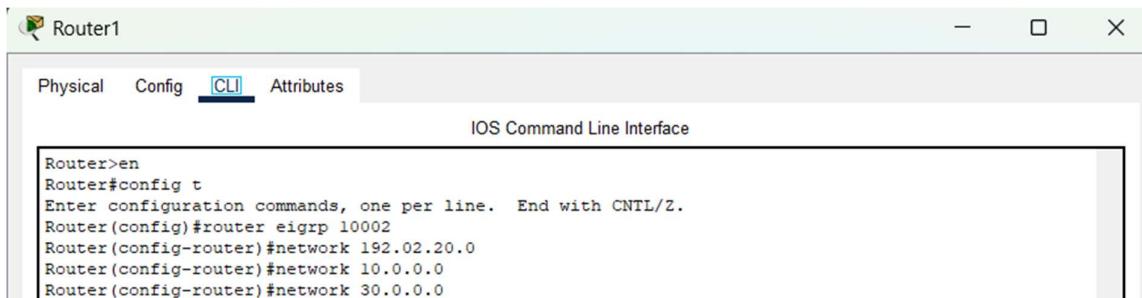
```
Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 10002/ID(192.2.10.1)

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

P 10.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/1
P 20.0.0.0/8, 1 successors, FD is 2169856
         via Connected, Serial0/1/0
P 30.0.0.0/8, 2 successors, FD is 2681856
         via 20.0.0.2 (2681856/2169856), Serial0/1/0
         via 10.0.0.2 (2681856/2169856), Serial0/1/1
P 192.2.10.0/24, 1 successors, FD is 5120
         via Connected, GigabitEthernet0/0/0
P 192.2.20.0/24, 1 successors, FD is 2172416
         via 10.0.0.2 (2172416/5120), Serial0/1/1
P 192.2.30.0/24, 1 successors, FD is 2172416
         via 20.0.0.2 (2172416/5120), Serial0/1/0
Router(config-router)#
```

⇨ Configuring Enhanced Interior Gateway Routing Protocol (EIGRP) in Router1.
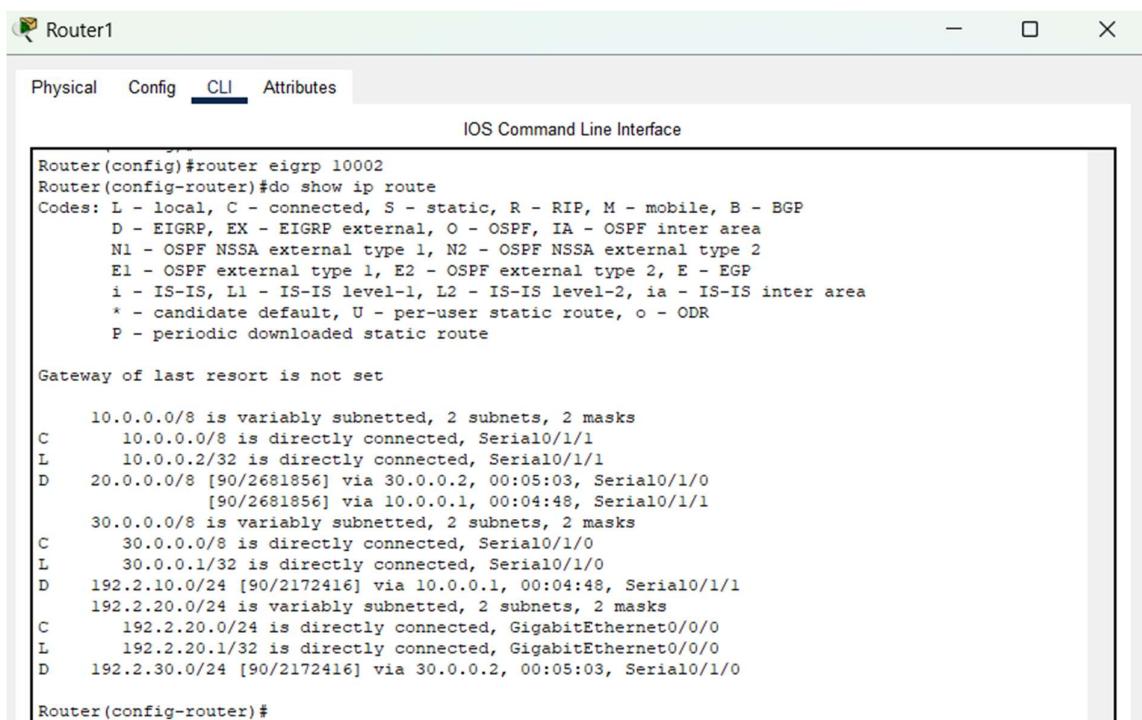
Router1 — □ ×

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 10002
Router(config-router)#network 192.02.20.0
Router(config-router)#network 10.0.0.0
Router(config-router)#network 30.0.0.0
```

Router1 — □ ×

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Router(config)#router eigrp 10002
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        10.0.0.0/8 is directly connected, Serial0/1/1
L        10.0.0.2/32 is directly connected, Serial0/1/1
D     20.0.0.0/8 [90/2681856] via 30.0.0.2, 00:05:03, Serial0/1/0
                 [90/2681856] via 10.0.0.1, 00:04:48, Serial0/1/1
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        30.0.0.0/8 is directly connected, Serial0/1/0
L        30.0.0.1/32 is directly connected, Serial0/1/0
D     192.2.10.0/24 [90/2172416] via 10.0.0.1, 00:04:48, Serial0/1/1
     192.2.20.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.2.20.0/24 is directly connected, GigabitEthernet0/0/0
L        192.2.20.1/32 is directly connected, GigabitEthernet0/0/0
D     192.2.30.0/24 [90/2172416] via 30.0.0.2, 00:05:03, Serial0/1/0

Router(config-router)#
```

Router1 — □ ×

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 1002/ID(192.2.20.1)

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

P 192.2.20.0/24, 1 successors, FD is 5120
        via Connected, GigabitEthernet0/0/0
IP-EIGRP Topology Table for AS 10002/ID(192.2.20.1)

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

P 10.0.0.0/8, 1 successors, FD is 2169856
        via Connected, Serial0/1/1
P 20.0.0.0/8, 2 successors, FD is 2681856
        via 30.0.0.2 (2681856/2169856), Serial0/1/0
        via 10.0.0.1 (2681856/2169856), Serial0/1/1
P 30.0.0.0/8, 1 successors, FD is 2169856
        via Connected, Serial0/1/0
P 192.2.10.0/24, 1 successors, FD is 2172416
        via 10.0.0.1 (2172416/5120), Serial0/1/1
P 192.2.20.0/24, 1 successors, FD is 5120
        via Connected, GigabitEthernet0/0/0
P 192.2.30.0/24, 1 successors, FD is 2172416
        via 30.0.0.2 (2172416/5120), Serial0/1/0
Router(config-router)#
```
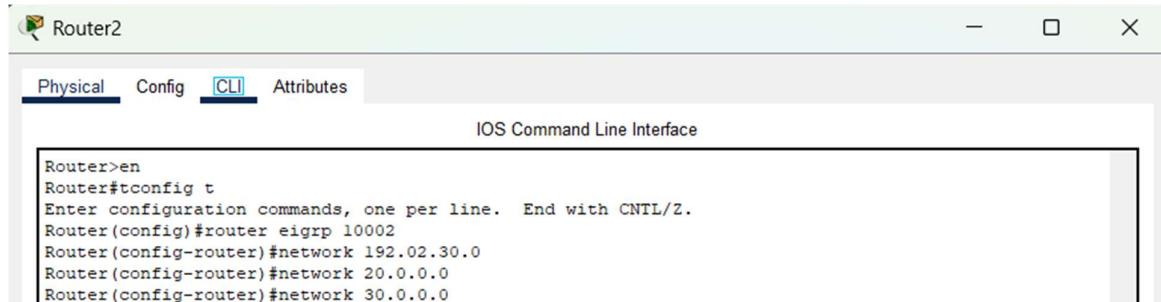
⇨ Configuring Enhanced Interior Gateway Routing Protocol (EIGRP) in Router2.
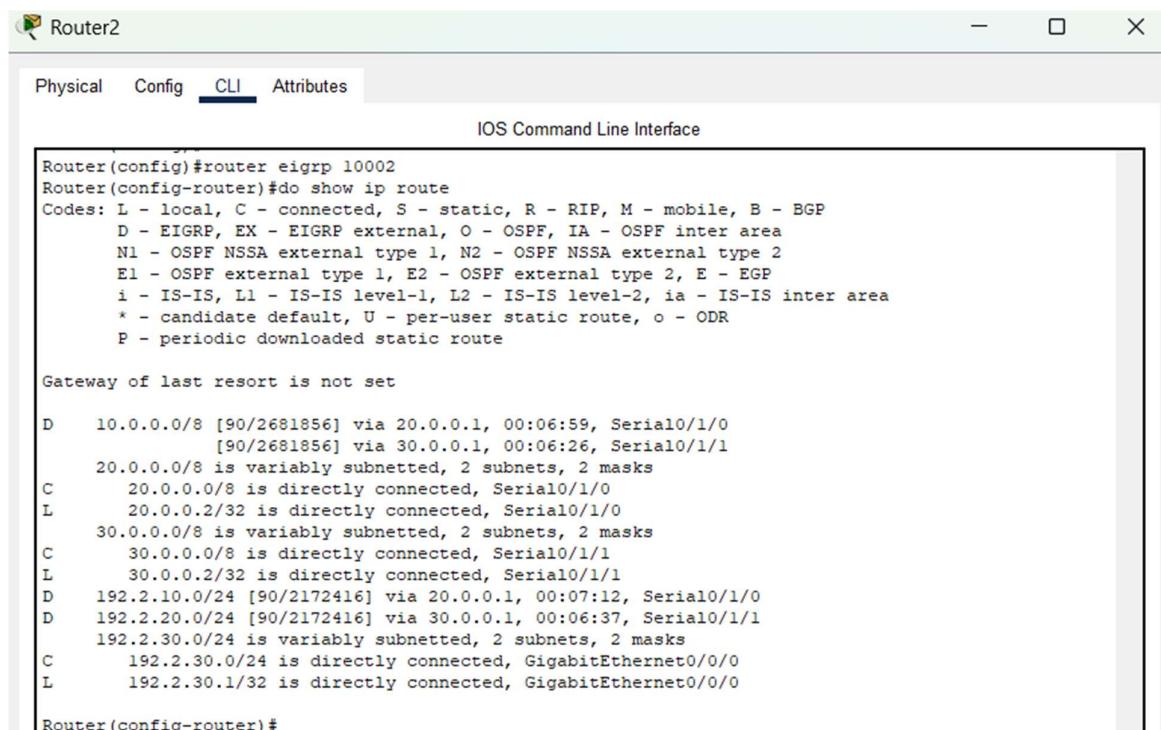
Router2 — □ ✕

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>en
Router#tconfig t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 10002
Router(config-router)#network 192.02.30.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 30.0.0.0
```

Router2 — □ ✕

Physical Config CLI Attributes
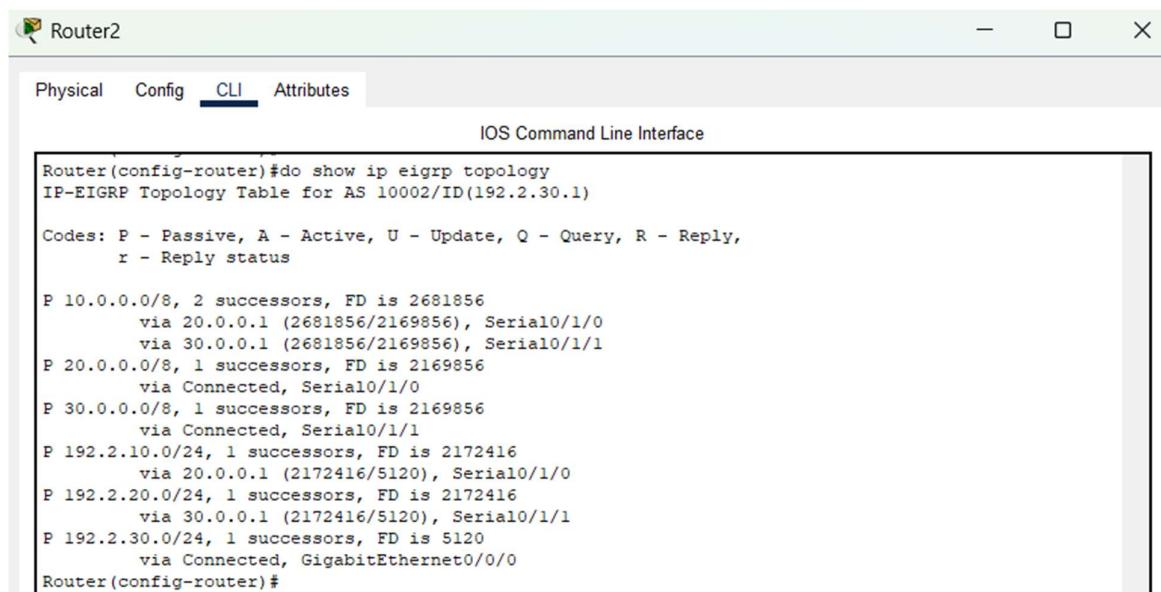
IOS Command Line Interface

```
Router(config)#router eigrp 10002
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

D    10.0.0.0/8 [90/2681856] via 20.0.0.1, 00:06:59, Serial0/1/0
                [90/2681856] via 30.0.0.1, 00:06:26, Serial0/1/1
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, Serial0/1/0
L       20.0.0.2/32 is directly connected, Serial0/1/0
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial0/1/1
L       30.0.0.2/32 is directly connected, Serial0/1/1
D    192.2.10.0/24 [90/2172416] via 20.0.0.1, 00:07:12, Serial0/1/0
D    192.2.20.0/24 [90/2172416] via 30.0.0.1, 00:06:37, Serial0/1/1
     192.2.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.2.30.0/24 is directly connected, GigabitEthernet0/0/0
L       192.2.30.1/32 is directly connected, GigabitEthernet0/0/0

Router(config-router)#
```

Router2 — □ ✕

Physical Config CLI Attributes

IOS Command Line Interface
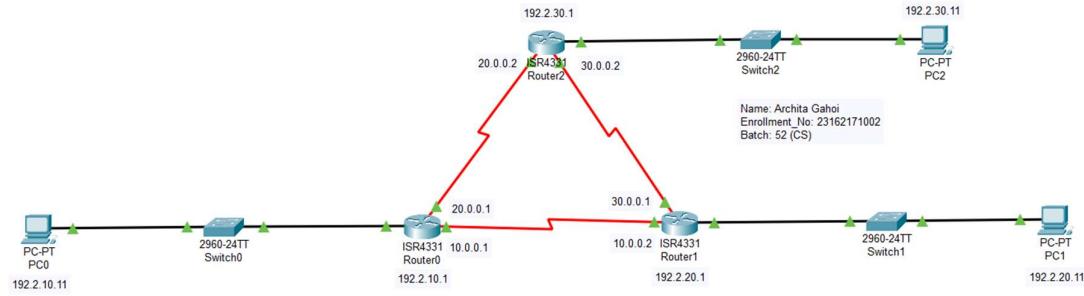
```
Router(config-router)#do show ip eigrp topology
IP-EIGRP Topology Table for AS 10002/ID(192.2.30.1)

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

P 10.0.0.0/8, 2 successors, FD is 2681856
        via 20.0.0.1 (2681856/2169856), Serial0/1/0
        via 30.0.0.1 (2681856/2169856), Serial0/1/1
P 20.0.0.0/8, 1 successors, FD is 2169856
        via Connected, Serial0/1/0
P 30.0.0.0/8, 1 successors, FD is 2169856
        via Connected, Serial0/1/1
P 192.2.10.0/24, 1 successors, FD is 2172416
        via 20.0.0.1 (2172416/5120), Serial0/1/0
P 192.2.20.0/24, 1 successors, FD is 2172416
        via 30.0.0.1 (2172416/5120), Serial0/1/1
P 192.2.30.0/24, 1 successors, FD is 5120
        via Connected, GigabitEthernet0/0/0
Router(config-router)#
```

Output:

Conclusion:

In this practical, EIGRP was successfully implemented to enable efficient and scalable routing between the organization's three departments. The protocol dynamically exchanged routes and ensured fast convergence with minimal bandwidth usage. The network demonstrated reliable communication, optimized path selection, and improved overall performance. This exercise provided hands-on understanding of configuring and verifying EIGRP in a real-world enterprise setup.