

Project Name :-

EIGRP Dynamic Routing

Configuration Lab – CCNA

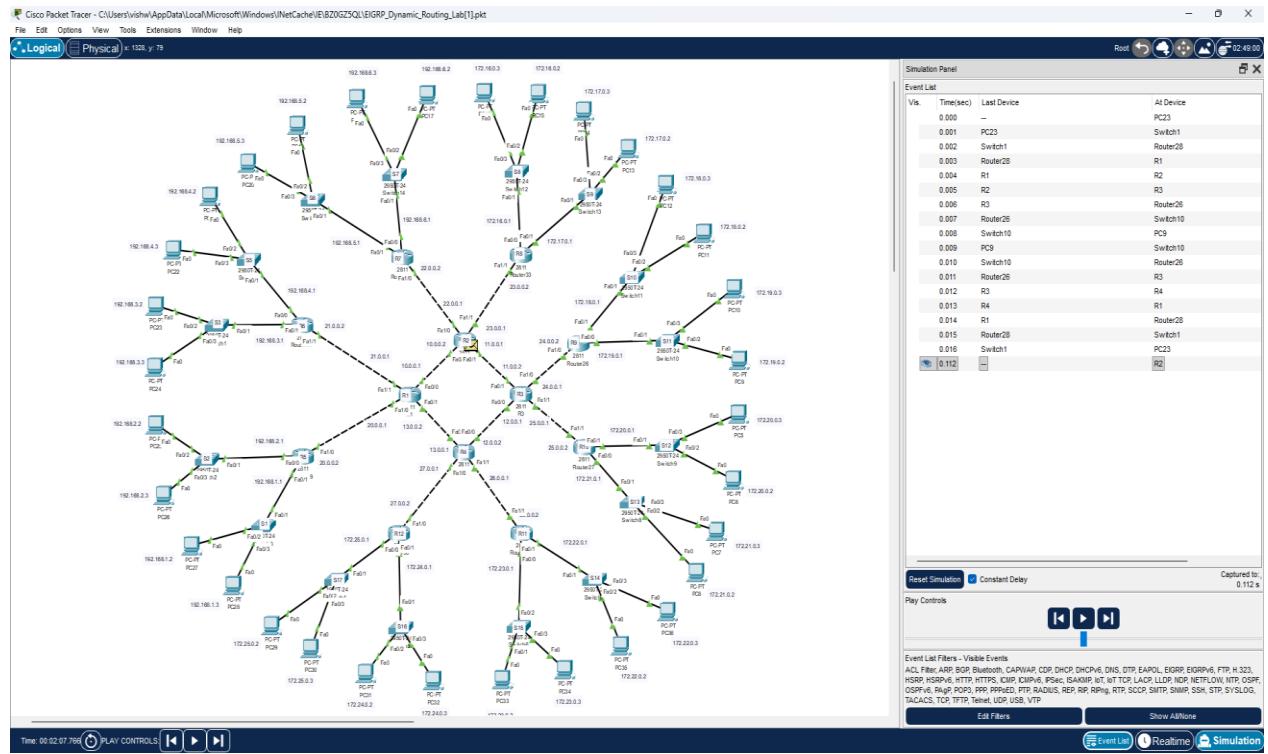
- **Name :-**

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- **Objective / Purpose :-**

The main purpose of this experiment is to study how EIGRP simplifies routing, maintains loop-free paths, and provides fast and efficient communication between different networks without using static routes.

• Network Topology Diagram :-



- **Lab Setup :-**

Router	Interfaces	IP Address	Subnet Mask	Description
R1	Fa 0/0	10.0.0.1	255.0.0.0	Connected to R2
	Fa 1/0	20.0.0.1	255.0.0.0	Connected to R5
	Fa 1/1	21.0.0.1	255.0.0.0	Connected to R6
	Fa 0/1	13.0.0.2	255.0.0.0	Connected to R4
R2	Fa 0/0	10.0.0.2	255.0.0.0	Connected to R1
	Fa 0/1	11.0.0.1	255.0.0.0	Connected to R3
	Fa 1/0	22.0.0.1	255.0.0.0	Connected to R7
	Fa 1/1	23.0.0.1	255.0.0.0	Connected to R8
R3	Fa 0/0	12.0.0.1	255.0.0.0	Connected to R4
	Fa 0/1	11.0.0.2	255.0.0.0	Connected to R3
	Fa 1/0	24.0.0.1	255.0.0.0	Connected to R9
	Fa 1/1	25.0.0.1	255.0.0.0	Connected to R10
R4	Fa 0/0	12.0.0.2	255.0.0.0	Connected to R3
	Fa 0/1	13.0.0.1	255.0.0.0	Connected to R1
	Fa 1/0	27.0.0.1	255.0.0.0	Connected to R12
	Fa 1/1	26.0.0.1	255.0.0.0	Connected to R11
R5	Fa 0/0	192.168.2.1	255.255.255.0	Connected to S2
	Fa 0/1	192.168.1.1	255.255.255.0	Connected to S1
	Fa 1/0	20.0.0.2	255.0.0.0	Connected to R1
R6	Fa 0/0	192.168.4.1	255.255.255.0	Connected to S5
	Fa 0/1	192.168.3.1	255.255.255.0	Connected to S3
	Fa 1/1	21.0.0.2	255.0.0.0	Connected to R1
R7	Fa 0/0	192.168.6.1	255.255.255.0	Connected to S7
	Fa 0/1	192.168.5.1	255.255.255.0	Connected to S6
	Fa 1/0	22.0.0.2	255.0.0.0	Connected to R2

R8	Fa 0/0	172.16.0.1	255.255.0.0	Connected to S8
	Fa 0/1	172.17.0.1	255.255.0.0	Connected to S9
	Fa 1/1	23.0.0.2	255.0.0.0	Connected to R2
R9	Fa 0/0	172.19.0.1	255.255.0.0	Connected to S11
	Fa 0/1	172.18.0.1	255.255.0.0	Connected to S10
	Fa 1/0	24.0.0.2	255.0.0.0	Connected to R3
R10	Fa 0/0	172.21.0.1	255.255.0.0	Connected to S13
	Fa 0/1	172.20.0.1	255.255.0.0	Connected to S12
	Fa 1/1	25.0.0.2	255.0.0.0	Connected to R3
R11	Fa 0/0	172.23.0.1	255.255.0.0	Connected to S15
	Fa 0/1	172.22.0.1	255.255.0.0	Connected to S14
	Fa 1/1	26.0.0.2	255.0.0.0	Connected to R4
R12	Fa 0/0	172.25.0.1	255.255.0.0	Connected to S17
	Fa 0/1	172.24.0.1	255.255.0.0	Connected to S16
	Fa 1/0	27.0.0.2	255.0.0.0	Connected to R4

- **Configuration Steps :-**

- Configured IP addresses directly on router interfaces for each connected network.
- Implemented RIP Dynamic routes using the – “router eigrp 1 network [ip address]” Commands.

Router 1 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R1  
R1(config)#router eigrp 1  
R1(config-router)#network 10.0.0.0  
R1(config-router)#network 13.0.0.0  
R1(config-router)#network 21.0.0.0  
R1(config-router)#network 20.0.0.0  
R1(config-router)#exit  
R1(config)#do write
```

Router 2 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R2  
R2(config)#router eigrp 1  
R2(config-router)#network 10.0.0.0  
R2(config-router)#network 11.0.0.0  
R2(config-router)#network 22.0.0.0  
R2(config-router)#network 23.0.0.0  
R2(config-router)#exit  
R2(config)#do write
```

Router 3 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R3  
R3(config)#router eigrp 1  
R3(config-router)#network 11.0.0.0  
R3(config-router)#network 12.0.0.0  
R3(config-router)#network 24.0.0.0  
R3(config-router)#network 25.0.0.0
```

```
R3(config-router)#exit
```

```
R3(config)#do write
```

Router 4 :-

```
Router>enable
```

```
Router#configure terminal
```

```
Router(config)#hostname R4
```

```
R4(config)#router eigrp 1
```

```
R4(config-router)#network 12.0.0.0
```

```
R4(config-router)#network 13.0.0.0
```

```
R4(config-router)#network 26.0.0.0
```

```
R4(config-router)#network 27.0.0.0
```

```
R4(config-router)#exit
```

```
R4(config)#do write
```

Router 5 :-

```
Router>enable
```

```
Router#configure terminal
```

```
Router(config)#hostname R5
```

```
R5(config)#router eigrp 1
```

```
R5(config-router)#network 20.0.0.0
```

```
R5(config-router)#network 192.168.2.0
```

```
R5(config-router)#network 192.168.1.0
```

```
R5(config-router)#exit
```

```
R5(config)#do write
```

Router 6 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R6  
R6(config)#router eigrp 1  
R6(config-router)#network 21.0.0.0  
R6(config-router)#network 192.168.3.0  
R6(config-router)#network 192.168.4.0  
R6(config-router)#exit  
R6(config)#do write
```

Router 7 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R7  
R7(config)#router eigrp 1  
R7(config-router)#network 192.168.5.0  
R7(config-router)#network 192.168.6.0  
R7(config-router)#network 22.0.0.0  
R7(config-router)#exit  
R7(config)#do write
```

Router 8 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R8  
R8(config)#router eigrp 1  
R8(config-router)#network 23.0.0.0  
R8(config-router)#network 172.16.0.0  
R8(config-router)#network 172.17.0.0  
R8(config-router)#exit  
R8(config)#do write
```

Router 9 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R9  
R9(config)#router eigrp 1  
R9(config-router)#network 24.0.0.0  
R9(config-router)#network 172.18.0.0  
R9(config-router)#network 172.19.0.0  
R9(config-router)#exit  
R9(config)#do write
```

Router 10 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R10  
R10(config)#router eigrp 1  
R10(config-router)#network 25.0.0.0  
R10(config-router)#network 172.20.0.0  
R10(config-router)#network 172.21.0.0  
R10(config-router)#exit  
R10(config)#do write
```

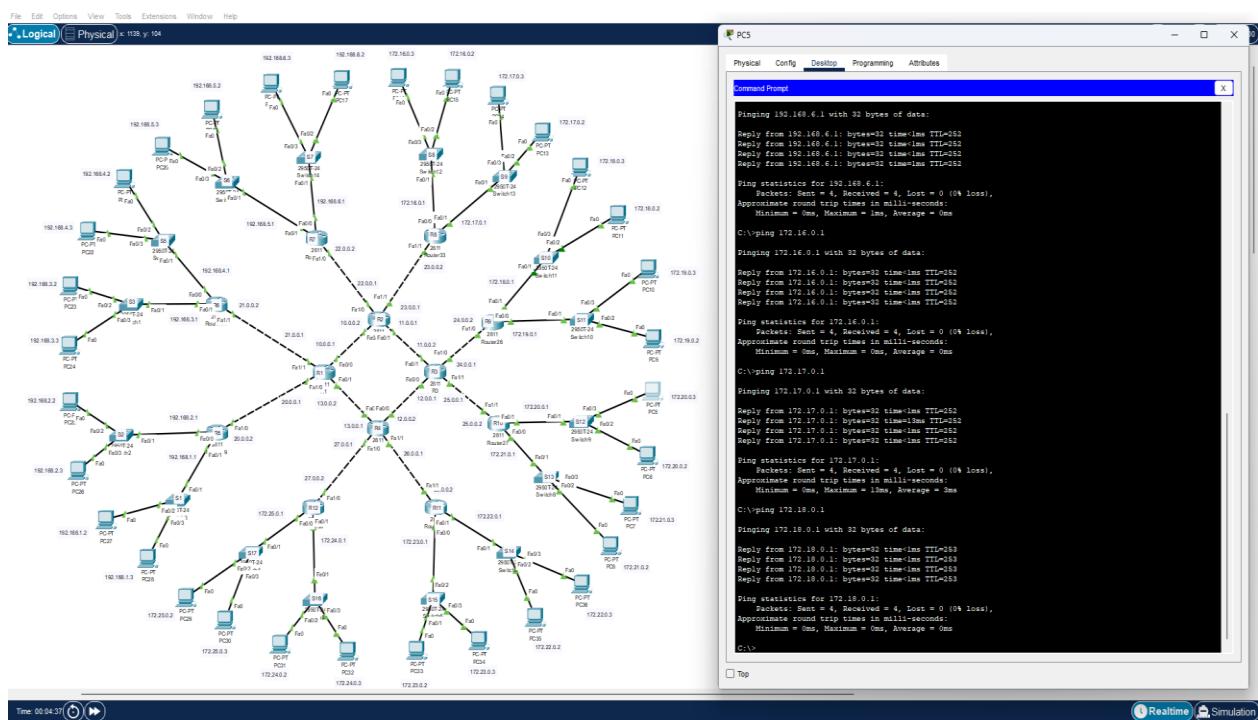
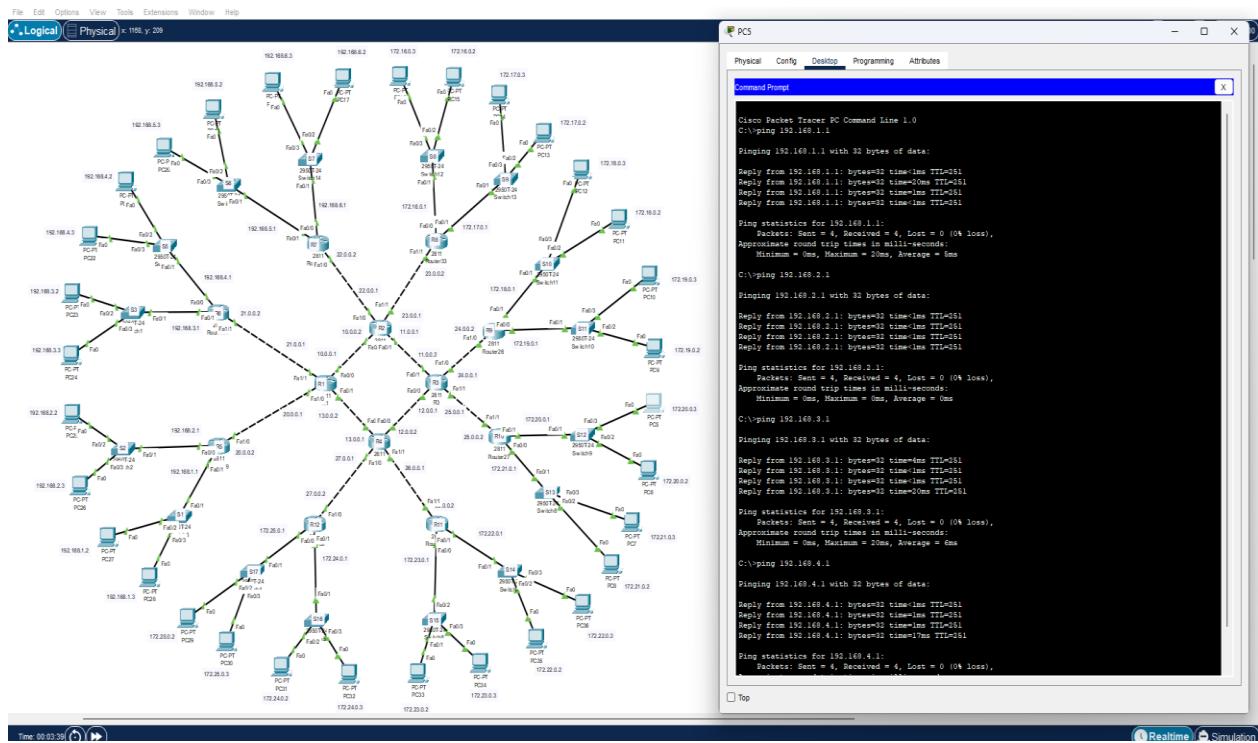
Router 11 :-

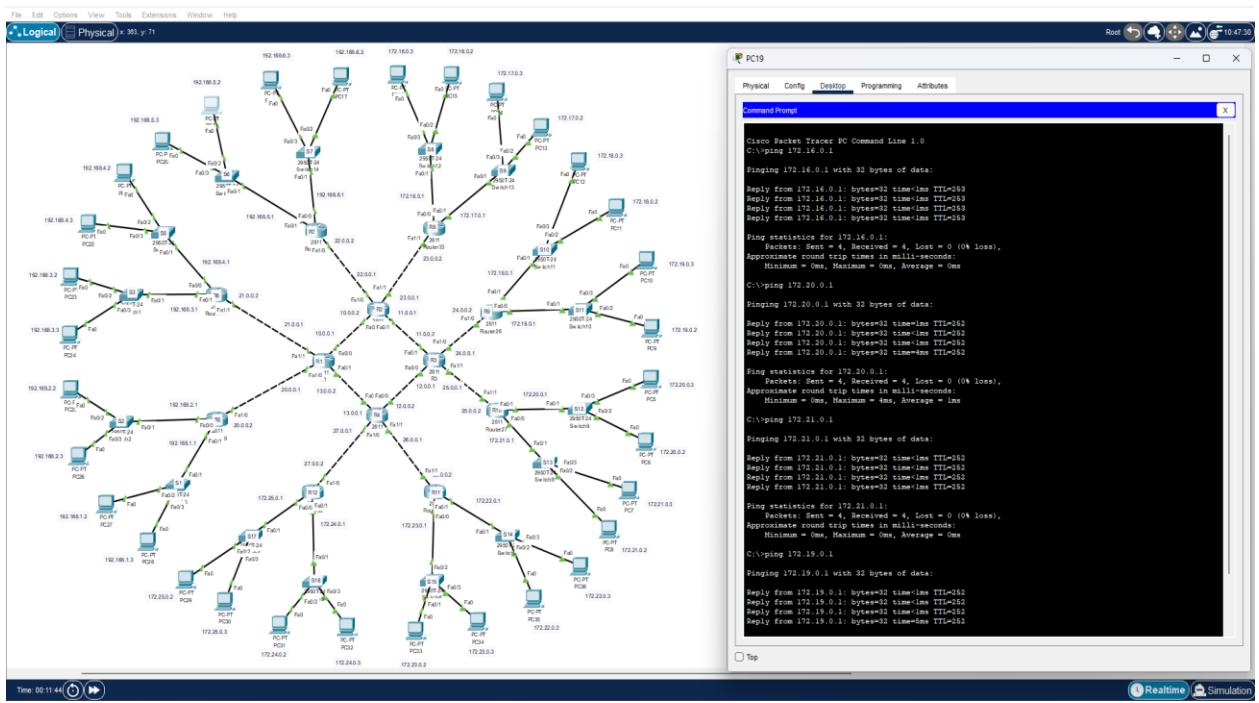
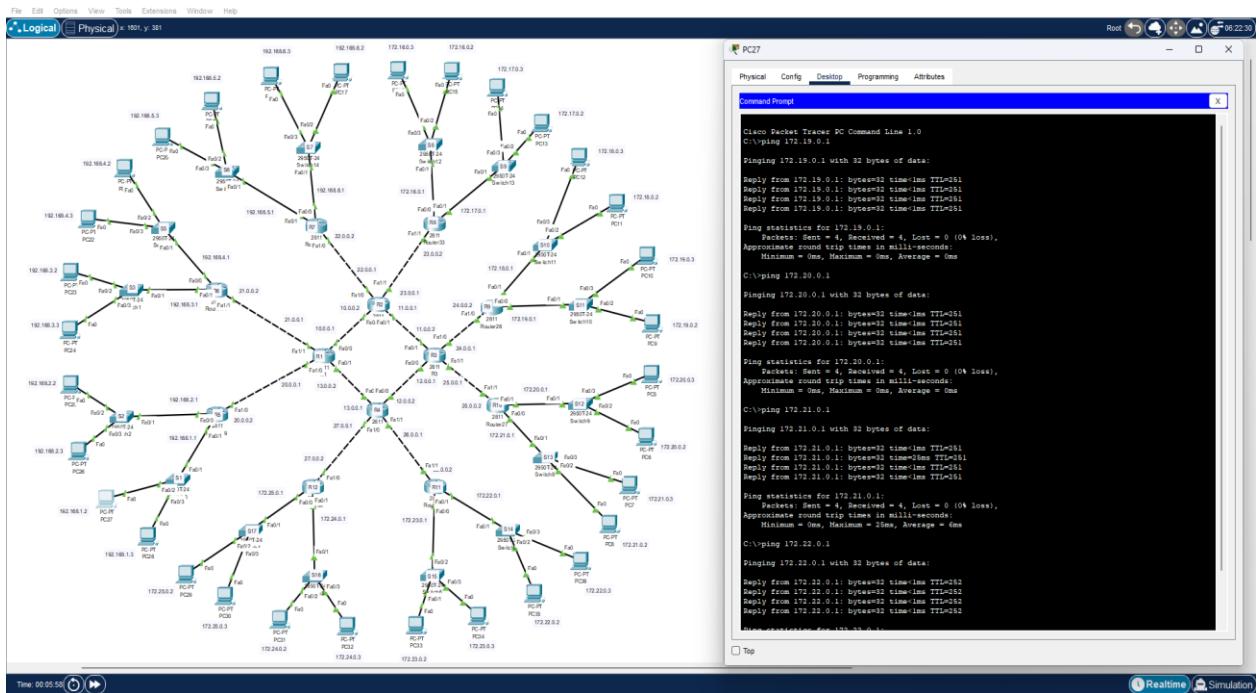
```
Router>enable  
Router#configure terminal  
Router(config)#hostname R11  
R11(config)#router eigrp 1  
R11(config-router)#network 26.0.0.0  
R11(config-router)#network 172.22.0.0  
R11(config-router)#network 172.23.0.0  
R11(config-router)#exit  
R11(config)#do write
```

Router 12 :-

```
Router>enable  
Router#configure terminal  
Router(config)#hostname R12  
R12(config)#router eigrp 1  
R12(config-router)#network 27.0.0.0  
R12(config-router)#network 172.25.0.0  
R12(config-router)#network 172.24.0.0  
R12(config-router)#exit  
R12(config)#do write
```

• Ping Test Section :-





- **Observations :-**

1. EIGRP successfully configured on all routers using AS number 1.
2. Neighbor adjacency formed automatically between connected routers.
3. DUAL algorithm ensured fast convergence and loop-free routing.
4. End-to-end connectivity verified using ping and traceroute.

- **Challenges / Troubleshooting :-**

1. Partial connectivity – occurred when one router's network was not advertised in EIGRP.
✓ Solution: Added missing network with network <IP>.
2. Routing table not updating – caused by duplicate IP addressing between two routers.
✓ Solution: Changed conflicting IP addresses and re-established adjacency.

- **Conclusion :-**

1. The project successfully demonstrated the implementation of EIGRP dynamic routing in a large interconnected topology.
2. Routers efficiently exchanged route information and maintained loop-free, fault-tolerant communication.
3. The DUAL algorithm improved convergence time compared to distance vector protocols like RIP.
4. The final topology achieved 100% connectivity among all devices, verifying proper EIGRP configuration.
5. This project proves that EIGRP is a scalable, efficient, and reliable routing protocol suitable for mid-to-large enterprise networks.