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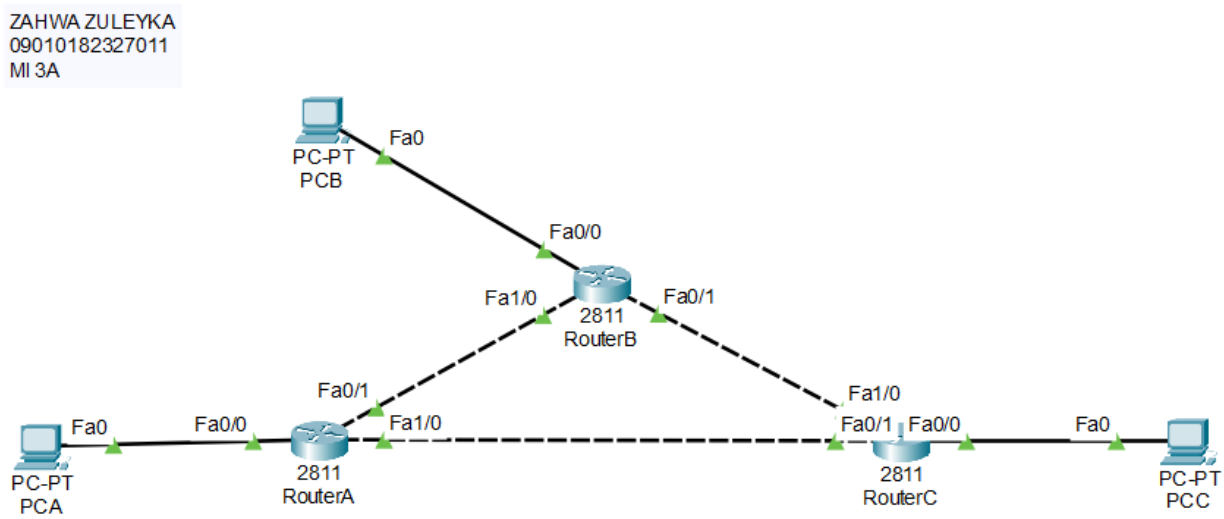
Nim : 09010182327011
Kelas : MI 3A

LAPORAN PRAKTIKUM EIGRP DYNAMIC ROUTING



- **Buatlah IP Address di PC**

No	Nama Device	Alamat	Netmask	Gateway
1	PCA	192.168.1.10	255.255.255.0	192.168.1.1
2	PCB	192.168.2.10	255.255.255.0	192.168.2.1
3	PCC	192.168.3.10	255.255.255.0	192.168.3.1

- **Setelah selesai menambahkan konfigurasi IP Address di PC, selanjutnya melakukan konfigurasi EIGRP pada Router, sebagai berikut:**

ROUTER A

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RouterA_09010182327011
RouterA_09010182327011(config)#int fa0/0
RouterA_09010182327011(config-if)#ip address 192.168.1.1 255.255.255.0
RouterA_09010182327011(config-if)#no shutdown

RouterA_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
```

```
RouterA_09010182327011(config)#int fa1/0
RouterA_09010182327011(config-if)#ip address 100.100.100.1 255.255.255.252
RouterA_09010182327011(config-if)#no shutdown

RouterA_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up
exit
RouterA_09010182327011(config)#int fa0/1
RouterA_09010182327011(config-if)#ip address 100.100.100.5 255.255.255.252
RouterA_09010182327011(config-if)#no shutdown

RouterA_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
exit
RouterA_09010182327011(config)#router eigrp 1
RouterA_09010182327011(config-router)#network 192.168.1.0 0.0.0.255
RouterA_09010182327011(config-router)#network 100.100.100.0 0.0.0.3
RouterA_09010182327011(config-router)#network 100.100.100.4 0.0.0.3
RouterA_09010182327011(config-router)#no auto-summary
RouterA_09010182327011(config-router)#exit
RouterA_09010182327011(config)#exit
```

ROUTER B

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RouterB_09010182327011
RouterB_09010182327011(config)#int fa0/0
RouterB_09010182327011(config-if)#ip address 192.168.2.1 255.255.255.0
RouterB_09010182327011(config-if)#no shutdown

RouterB_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
RouterB_09010182327011(config)#int fa1/0
RouterB_09010182327011(config-if)#ip address 100.100.100.6 255.255.255.252
RouterB_09010182327011(config-if)#no shutdown

RouterB_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
exit
RouterB_09010182327011(config)#int fa0/1
RouterB_09010182327011(config-if)#ip address 100.100.100.9 255.255.255.252
RouterB_09010182327011(config-if)#no shutdown

RouterB_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
exit
RouterB_09010182327011(config)#router eigrp 1
RouterB_09010182327011(config-router)#network 192.168.2.0 0.0.0.255
RouterB_09010182327011(config-router)#network 100.100.100.4 0.0.0.3
RouterB_09010182327011(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 100.100.100.5 (FastEthernet1/0) is up: new adjacency

RouterB_09010182327011(config-router)#network 100.100.100.8 0.0.0.3
RouterB_09010182327011(config-router)#no auto-summary\
                                      ^
% Invalid input detected at '^' marker.

RouterB_09010182327011(config-router)#no auto-summary
RouterB_09010182327011(config-router)#exit
RouterB_09010182327011(config)#exit
```

ROUTER C

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RouterC_09010182327011
RouterC_09010182327011(config)#int fa0/0
RouterC_09010182327011(config-if)#ip address 192.168.3.1 255.255.255.0
RouterC_09010182327011(config-if)#no shutdown

RouterC_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
RouterC_09010182327011(config)#int fa1/0
RouterC_09010182327011(config-if)#ip address 100.100.100.10 255.255.255.252
RouterC_09010182327011(config-if)#no shutdown

RouterC_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
exit
RouterC_09010182327011(config)#int fa0/1
RouterC_09010182327011(config-if)#ip address 100.100.100.2 255.255.255.252
RouterC_09010182327011(config-if)#no shutdown

RouterC_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
exit
RouterC_09010182327011(config)#router eigrp 1
RouterC_09010182327011(config-router)#network 192.168.3.0 0.0.0.255
RouterC_09010182327011(config-router)#network 100.100.100.0 0.0.0.3
RouterC_09010182327011(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 100.100.100.1 (FastEthernet0/1) is up: new adjacency

RouterC_09010182327011(config-router)#network 100.100.100.8 0.0.0.3
RouterC_09010182327011(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 100.100.100.9 (FastEthernet1/0) is up: new adjacency
no auto-summary
RouterC_09010182327011(config-router)#end
```

Hasil ‘show ip route eigrp’

- RouterA

```
RouterA_09010182327011#show ip route eigrp
     100.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
D       100.100.100.8/30 [90/30720] via 100.100.100.6, 00:06:22, FastEthernet0/1
                         [90/30720] via 100.100.100.2, 00:04:33, FastEthernet1/0
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
D    192.168.2.0/24 [90/30720] via 100.100.100.6, 00:08:44, FastEthernet0/1
D    192.168.3.0/24 [90/30720] via 100.100.100.2, 00:04:43, FastEthernet1/0
```

- RouterB

```
RouterB_09010182327011#show ip route eigrp
     100.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
D       100.100.100.0/30 [90/30720] via 100.100.100.5, 00:04:08, FastEthernet1/0
                         [90/30720] via 100.100.100.10, 00:02:46, FastEthernet0/1
D    192.168.1.0/24 [90/30720] via 100.100.100.5, 00:06:58, FastEthernet1/0
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
D    192.168.3.0/24 [90/30720] via 100.100.100.10, 00:02:46, FastEthernet0/1
```

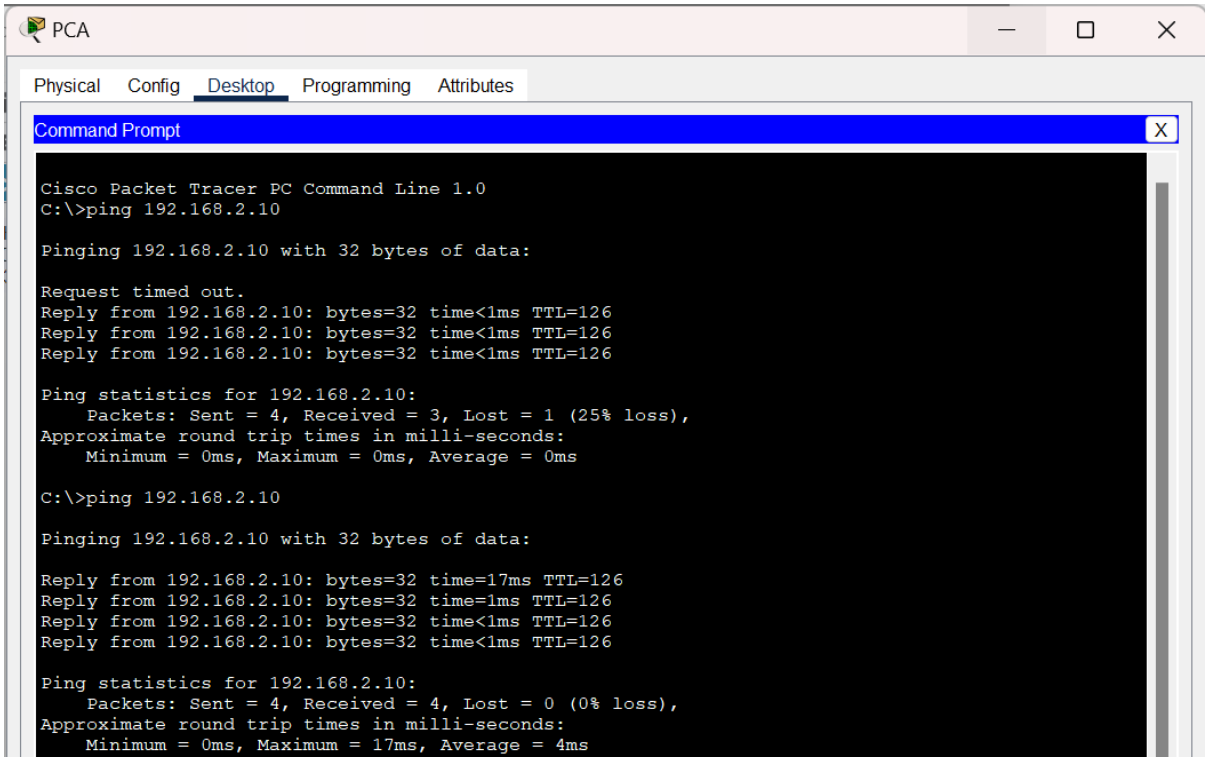
- RouterC

```
RouterC_09010182327011#show ip route eigrp
     100.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
D       100.100.100.4/30 [90/30720] via 100.100.100.1, 00:00:50, FastEthernet0/1
                         [90/30720] via 100.100.100.9, 00:00:39, FastEthernet1/0
D    192.168.1.0/24 [90/30720] via 100.100.100.1, 00:00:50, FastEthernet0/1
D    192.168.2.0/24 [90/30720] via 100.100.100.9, 00:00:39, FastEthernet1/0
```

Lakukan PING dan Traceroute dari PC A ke PC B dan PC C, PC B ke PC A dan PC C, serta PC C ke PC A dan PC B.

No	Sumber	Tujuan	Hasil	
			Ya	Tidak
1	PC A	PC B	Ya	-
		PC C	Ya	-
2	PC B	PC A	Ya	-
		PC C	Ya	-
3	PC C	PC A	Ya	-
		PC B	Ya	-

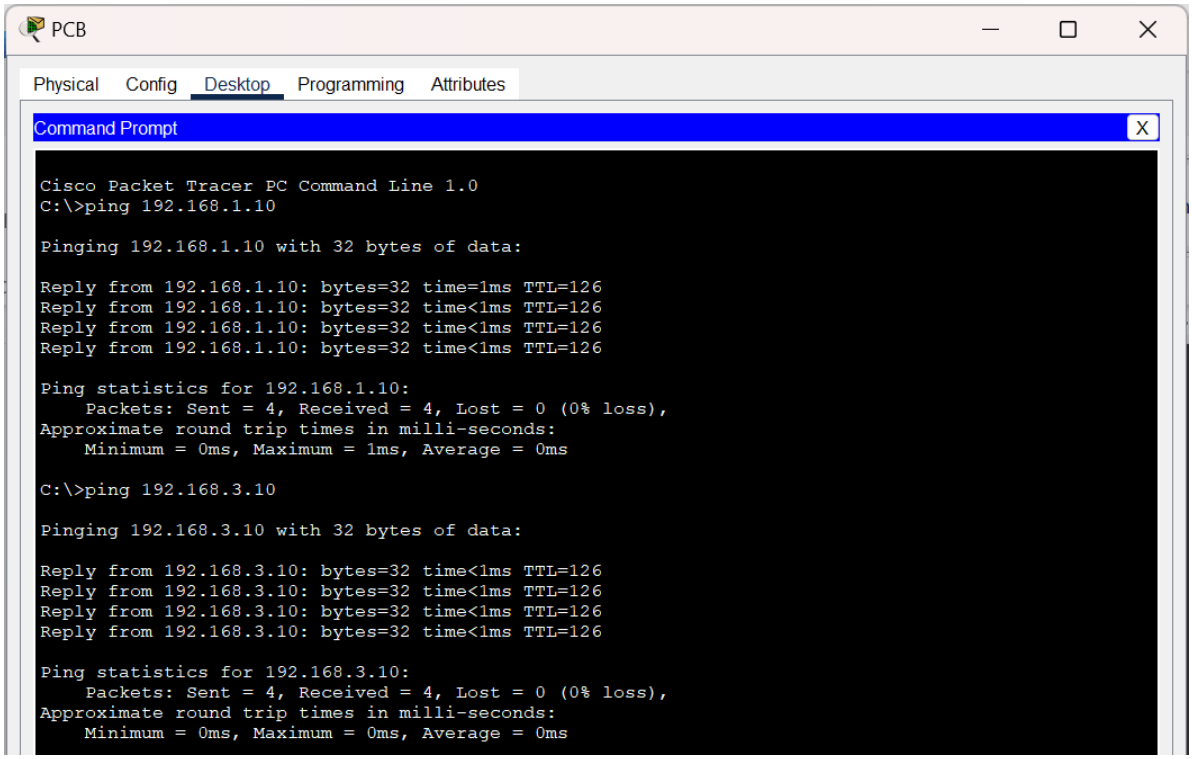
PC A ->PC B, PC C



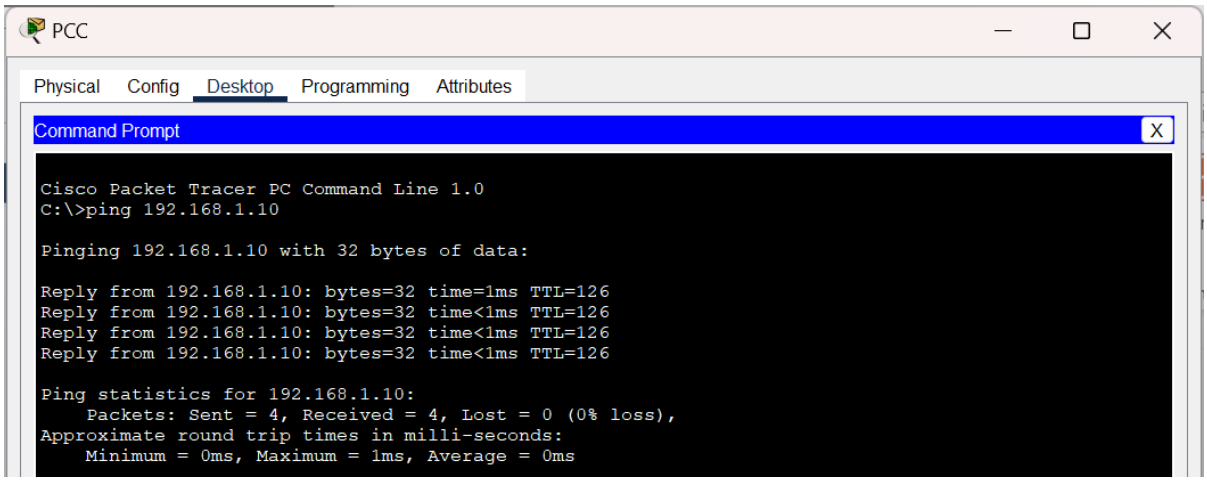
```
C:\>ping 192.168.3.10

Pinging 192.168.3.10 with 32 bytes of data:

Reply from 192.168.3.10: bytes=32 time=1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.3.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Top

PC B -> PC A, PC C

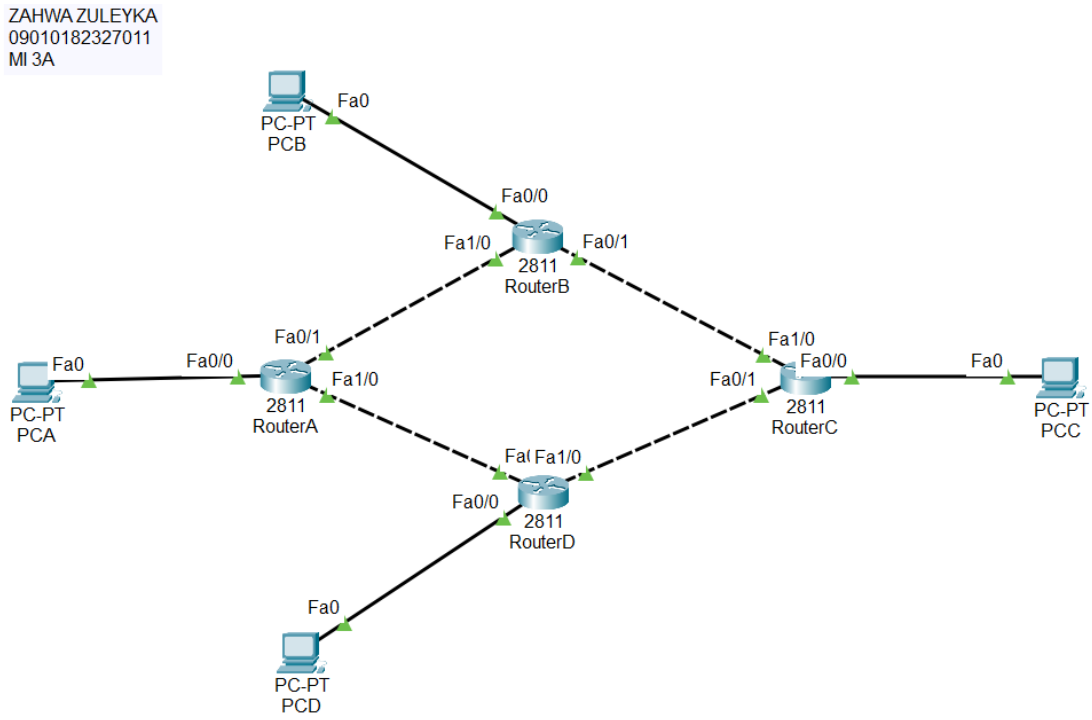


PC C -> PC A, PC B



```
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- Putuskan koneksi pada RouterA ke RouterC, lalu tambahkan satu Router (RouterD) dan PC (PCD), dimana RouterD terhubung ke RouterA dan RouterC.



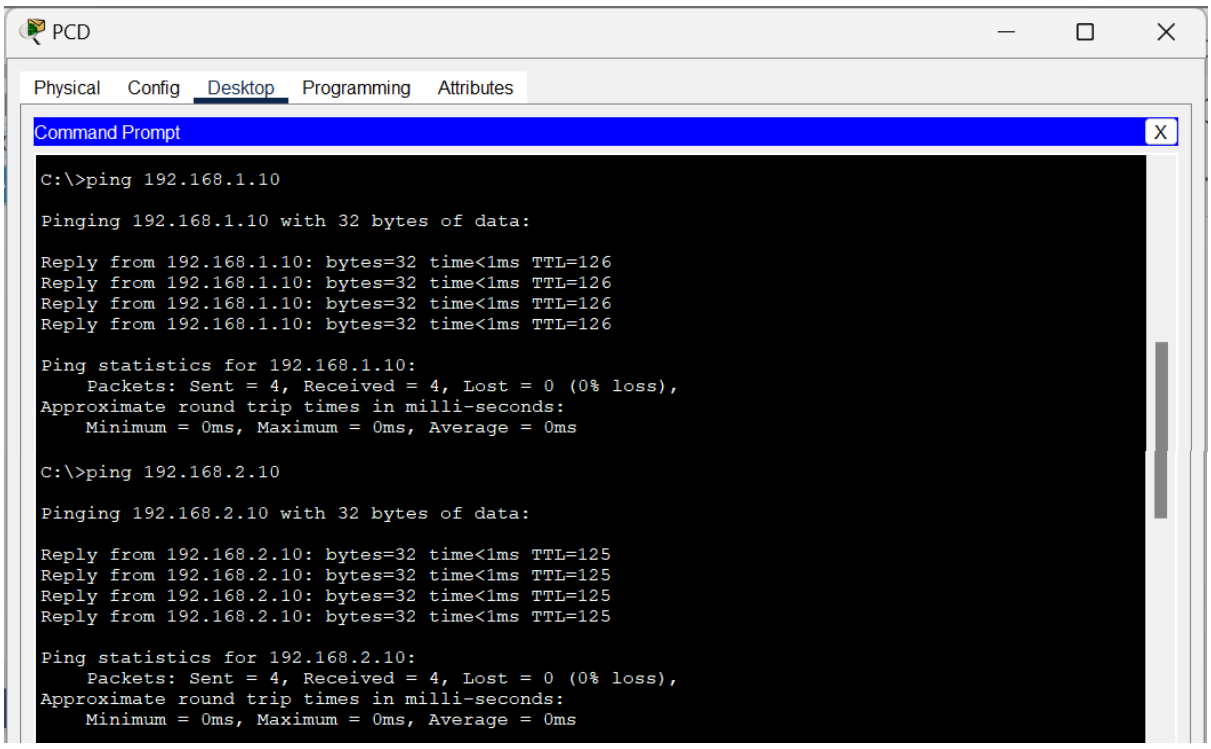
- Konfigurasi Router dengan protokol EIGRP pada RouterD, dan konfigurasi IP pada PCD. Lakukanlah konfigurasi seperti tahap 3, buktikan jika PCD dapat melakukan PING dan traceroute ke PC lainnya.

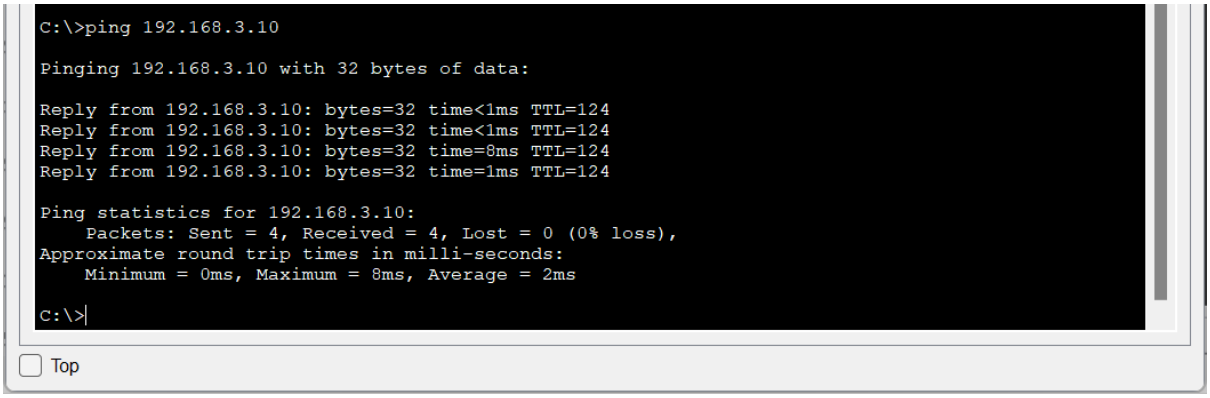
ROUTER D

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RouterD_09010182327011
RouterD_09010182327011(config)#int fa0/0
RouterD_09010182327011(config-if)#ip address 192.168.4.1 255.255.255.0
RouterD_09010182327011(config-if)#no shutdown

RouterD_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
exit
```

```
RouterD_09010182327011(config)#int fa1/0
RouterD_09010182327011(config-if)#ip address 100.100.100.14 255.255.255.252
RouterD_09010182327011(config-if)#no shutdown

RouterD_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
exit
RouterD_09010182327011(config)#int fa0/1
RouterD_09010182327011(config-if)#ip address 100.100.100.2 255.255.255.252
RouterD_09010182327011(config-if)#no shutdown

RouterD_09010182327011(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
exit
RouterD_09010182327011(config)#router eigrp 1
RouterD_09010182327011(config-router)#network 192.168.4.0 0.0.0.255
RouterD_09010182327011(config-router)#network 100.100.100.0 0.0.0.3
RouterD_09010182327011(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 100.100.100.1 (FastEthernet0/1) is up: new adjacency

RouterD_09010182327011(config-router)#network 100.100.100.0 0.0.0.3
RouterD_09010182327011(config-router)#no auto-summary
RouterD_09010182327011(config-router)#exit
RouterD_09010182327011(config)#exit

RouterD_09010182327011#show ip route eigrp
     100.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D       100.100.100.4/30 [90/30720] via 100.100.100.1, 00:10:58, FastEthernet0/1
D       100.100.100.8/30 [90/33280] via 100.100.100.1, 00:10:58, FastEthernet0/1
D    192.168.1.0/24 [90/30720] via 100.100.100.1, 00:10:58, FastEthernet0/1
D    192.168.2.0/24 [90/33280] via 100.100.100.1, 00:10:58, FastEthernet0/1
D    192.168.3.0/24 [90/35840] via 100.100.100.1, 00:10:58, FastEthernet0/1
```

PC D -> PC A, PC B, PC C





Hasil Praktikum:
Laporan ini menyajikan hasil praktikum mengenai penerapan protokol EIGRP (Enhanced Interior Gateway Routing Protocol) dalam jaringan komputer. Praktikum dilakukan dengan tujuan untuk memahami cara kerja EIGRP dalam mengelola routing dinamis serta menganalisis kinerja dan stabilitas konektivitas jaringan.

Topologi Jaringan
Jaringan yang digunakan terdiri dari empat router (Router A, B, C, dan D) dan empat PC (PC A, B, C, dan D). Berikut adalah deskripsi topologi jaringan:

- **Router A** terhubung ke **Router B** dan **Router D**.
- **Router B** terhubung ke **Router A** dan **Router C**.
- **Router C** terhubung ke **Router B** dan **Router D**.
- **Router D** berfungsi sebagai penghubung antara **Router A** dan **Router C**, serta terhubung ke **PC D**.

Pengujian Konektivitas
Pengujian konektivitas dilakukan dengan menggunakan perintah PING dan Traceroute dari masing-masing PC:
Hasil PING dan Traceroute

- **Dari PC A**:
  - PING ke PC B: Berhasil
  - PING ke PC C: Berhasil
- **Dari PC B**:
  - PING ke PC A: Berhasil
  - PING ke PC C: Berhasil
- **Dari PC C**:
  - PING ke PC A: Berhasil
  - PING ke PC B: Berhasil

Modifikasi Jaringan
Setelah pengujian awal, koneksi antara Router A dan Router C diputuskan untuk menguji kemampuan EIGRP dalam mengelola jalur alternatif.

- Router D ditambahkan untuk menghubungkan kembali Router A dan C.
- Konfigurasi EIGRP diterapkan pada Router D untuk memastikan semua router dapat saling berkomunikasi.

Pengujian Konektivitas Setelah Modifikasi
Setelah konfigurasi ulang, dilakukan pengujian konektivitas dari PC D:

- **Dari PC D**:
    - PING ke PC A: Berhasil
    - PING ke PC B: Berhasil
    - PING ke PC C: Berhasil

Analisis:
Salah satu keunggulan utama dari EIGRP adalah kemampuannya untuk melakukan konvergensi cepat ketika terjadi perubahan topologi jaringan. Dalam praktikum ini, ketika koneksi antara Router A dan C diputuskan, EIGRP secara otomatis mendeteksi perubahan tersebut dan segera mencari jalur alternatif melalui Router D tanpa memerlukan intervensi manual.
EIGRP menggunakan algoritma Diffusing Update Algorithm (DUAL) untuk menjaga konsistensi tabel routing di seluruh router dalam jaringan. Ketika jalur utama tidak tersedia, EIGRP dapat dengan cepat beralih ke jalur cadangan yang sudah dipelajari sebelumnya, sehingga meminimalkan downtime dan memastikan ketersediaan layanan.
Penambahan Router D tidak hanya meningkatkan redundansi tetapi juga memberikan fleksibilitas dalam manajemen lalu lintas data di jaringan. Dengan adanya beberapa jalur menuju tujuan yang sama, beban lalu lintas dapat didistribusikan secara lebih efisien.

Kesimpulan:

1. Protokol EIGRP terbukti efektif dalam mengelola routing dinamis dengan konvergensi cepat.
2. Penambahan router baru meningkatkan stabilitas dan redundansi jaringan secara signifikan.
3. Semua pengujian konektivitas berhasil dilakukan setelah konfigurasi ulang, menunjukkan bahwa semua perangkat dapat saling berkomunikasi dengan baik meskipun terjadi perubahan topologi.

Praktikum ini memberikan pemahaman mendalam tentang penerapan protokol routing dinamis dalam skenario nyata serta pentingnya perancangan topologi jaringan yang baik untuk memastikan konektivitas yang optimal di lingkungan jaringan yang kompleks.