Dynamic Routing

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Course Code: Data Communication and Computer Networking

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Task : Dynamic Routing

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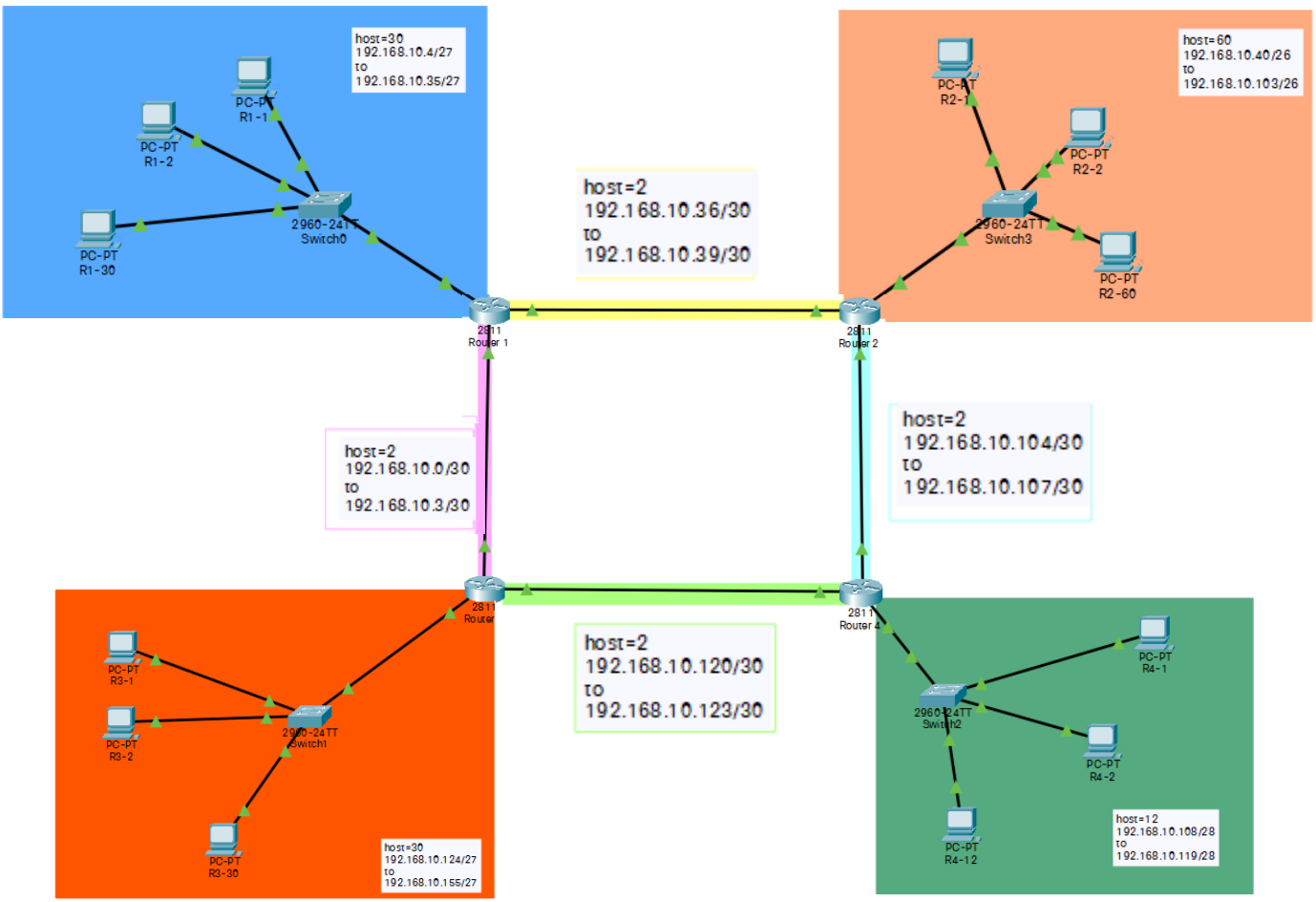
Implement RIPv2 and EIGRP in same topology/network

1. Take 4 routers in the topology

2. Network ID for the whole topology is: 192.168.10.0

3. It means subnetting(VLSM) would be required

Create variable subnets of Class C IP 192.168.10.0 for given topology



In above topology, we have to create 8 subnets of different length:

A: number of hosts=2

B: number of hosts=30

C: number of hosts=2

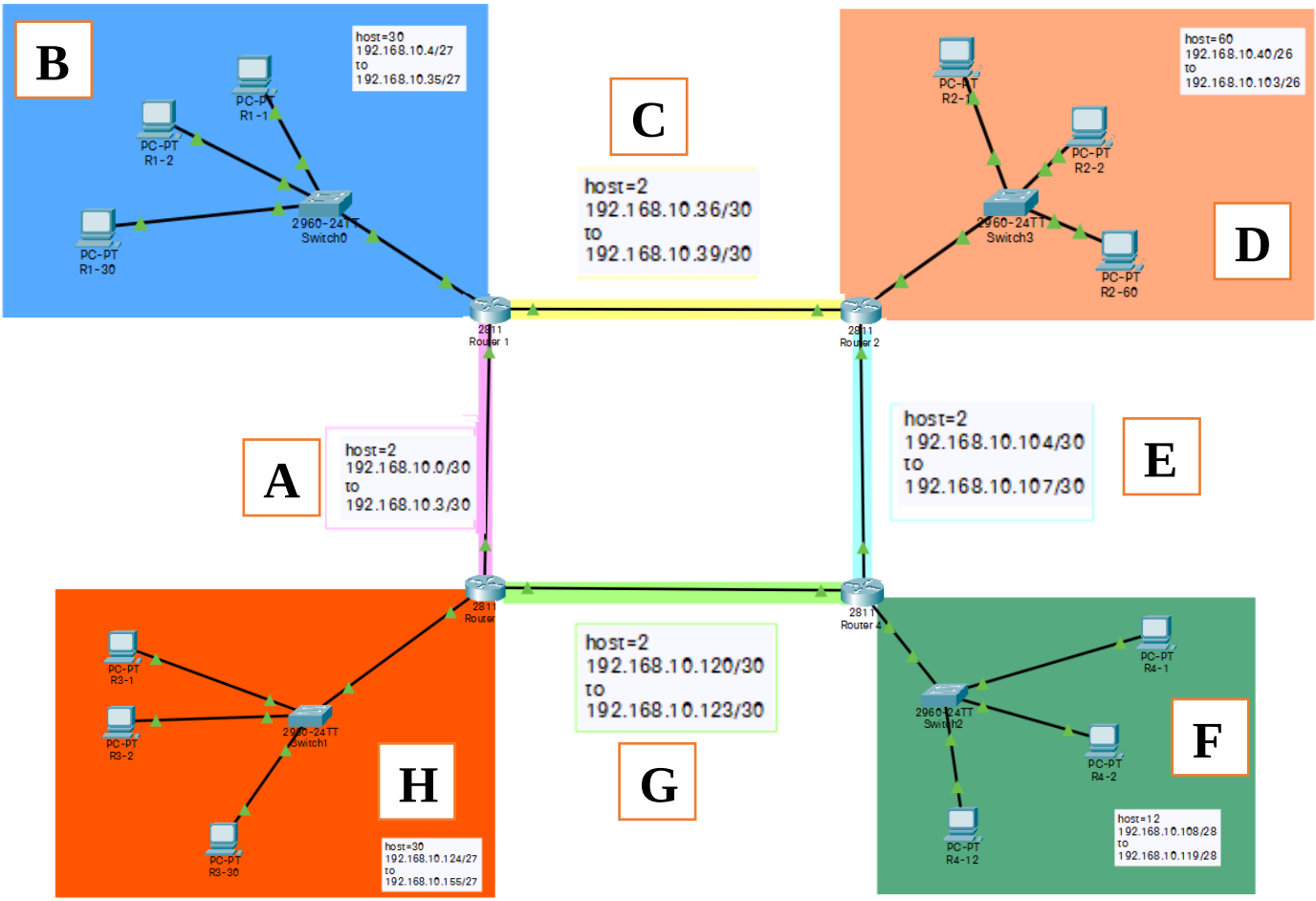
D: number of hosts=60

E: number of hosts=2

F: number of hosts=12

G: number of hosts=2

H: number of hosts=30



Variable Subnet Mask
IP: 192.168.11.0

Subnet: 255.255.255.0

For A:

We need IPs for 2 hosts. We will turn on 6 bits in host part of IP.

11111111	11111111	11111111	11111100	IP (Binary)
255	255	255	252	Subnet Mask
8	8	8	6	Bits = 30

Now we will find the range of IP for A

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 252

Range= 4

So network A will consist of 4 IPs.

A
- 192.168.10.0 /30
- 192.168.10.3 /30

For B:

We need IPs for 30 hosts. We will turn on 3 bits in host part of IP.

11111111	11111111	11111111	11100000	IP (Binary)
255	255	255	224	Subnet Mask
8	8	8	3	Bits = 27

Now we will find the range of IP for B

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 224

Range= 32

So network B will consist of 32 IPs.

B
- 192.168.10.4 /27
- 192.168.10.35 /27

For C:

We need IPs for 2 hosts. We will turn on 6 bits in host part of IP.

11111111	11111111	11111111	11111100	IP (Binary)
255	255	255	252	Subnet Mask
8	8	8	6	Bits = 30

Now we will find the range of IP for C

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 252

Range= 4

So network C will consist of 4 IPs.

C
- 192.168.10.36 /30
- 192.168.10.39 /30

For D:

We need IPs for 60 hosts. We will turn on 2 bits in host part of IP.

11111111	11111111	11111111	11000000	IP (Binary)
255	255	255	192	Subnet Mask
8	8	8	2	Bits = 26

Now we will find the range of IP for D

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 192

Range= 64

So network D will consist of 64 IPs.

D

- 192.168.10.40 /26
- 192.168.10.103 /26

For E:

We need IPs for 2 hosts. We will turn on 6 bits in host part of IP.

11111111	11111111	11111111	11111100	IP (Binary)
255	255	255	252	Subnet Mask
8	8	8	6	Bits = 30

Now we will find the range of IP for E

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 252

Range= 4

So network E will consist of 4 IPs.

E

- 192.168.10.104 /30
- 192.168.10.107 /30

For F:

We need IPs for 12 hosts. We will turn on 4 bits in host part of IP.

11111111	11111111	11111111	11110000	IP (Binary)
255	255	255	240	Subnet Mask
8	8	8	4	Bits = 28

Now we will find the range of IP for F

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 240

Range= 16

So network F will consist of 12 IPs.

F
- 192.168.10.108 /28
- 192.168.10.119 /28

For G:

We need IPs for 2 hosts. We will turn on 6 bits in host part of IP.

11111111	11111111	11111111	11111100	IP (Binary)
255	255	255	252	Subnet Mask
8	8	8	6	Bits = 30

Now we will find the range of IP for G

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 252

Range= 4

So network G will consist of 4 IPs.

G
- 192.168.10.120/30
- 192.168.10.121 /30

For H:

We need IPs for 30 hosts. We will turn on 3 bits in host part of IP.

11111111	11111111	11111111	11100000	IP (Binary)
255	255	255	224	Subnet Mask
8	8	8	3	Bits = 27

Now we will find the range of IP for H

Range= Total number of hosts in class C – number of hosts in updated subnet

Range= 256 – 224

Range= 32

So network H will consist of 32 IPs.

H
- 192.168.10.122 /27
- 192.168.10.153 /27

Subnet	Number of hosts required	IP Range Start	IP Range End
A	2	192.168.10. 0 /31	192.168.10.2 /31
B	30	192.168.10. 2 /27	192.168.10.33 /27
C	2	192.168.10.34 /31	192.168.10. 35 /31
D	60	192.168.10.36 /26	192.168.10.99 /26
E	2	192.168.10.100 /31	192.168.10.101 /31
F	12	192.168.10.102 /28	192.168.10.117 /28
G	2	192.168.10.118 /31	192.168.10.119 /31
H	30	192.168.10.120 /27	192.168.10.151 /27

Router Configuration

Router-1

Interface Configuration

Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.

Interface FastEthernet0/1

Router(config)#int fa0/1
Router(config-if)#ip address 192.168.10.2 255.255.255.252
Router(config-if)#no shutdown
Router(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
Router(config-if)#exit

Interface FastEthernet0/0

Router(config)#int fa0/0

Router(config-if)#ip address 192.168.10.37 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
Router(config-if)#exit

Interface Ethernet1/0

Router(config)#int Eth1/0
Router(config-if)#ip address 192.168.10.5 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
Router(config-if)#exit

RIPv2 Configuration

outer>en
Router#conf
Configuring from terminal, memory, or network [terminal]? ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.10.0
Router(config-router)#network 192.168.10.36
Router(config-router)#network 192.168.10.4
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#

Router-2

Interface Configuration

Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.

Interface FastEthernet0/0

Router(config)#int fa0/0
Router(config-if)#ip address 192.168.10.37 255.255.255.252
Router(config-if)#no shutdown

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

Interface FastEthernet0/1

Router(config)#int fa0/1
Router(config-if)#ip address 192.168.10.105 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit

Interface Ethernet1/0

Router(config)#int Eth1/0
Router(config-if)#ip address 192.168.10.41 255.255.255.192
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
Router(config-if)#exit

RIPv2 Configuration

Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.10.36
Router(config-router)#network 192.168.10.40
Router(config-router)#network 192.168.10.104
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#

Router-3

Interface Configuration

Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.

Interface FastEthernet0/1

```
Router(config)#int fa0/1
Router(config-if)#ip address 192.168.10.1 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#
```

Interface FastEthernet0/0

```
Router(config)#int fa0/0
Router(config-if)#ip address 192.168.10.122 255.255.255.252
Router(config-if)#no shutdown
Router(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
Router(config-if)#exit
```

Interface Ethernet1/0

```
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int Eth1/0
Router(config-if)#ip address 192.168.10.124 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
Router(config-if)#exit
```

EIGRP Configuration

```
Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router eigrp 10
Router(config-router)#network 192.168.10.104
Router(config-router)#network 192.168.10.108
Router(config-router)#network 192.168.10.120
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
```

Router-4

Interface Configuration

Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.

Interface FastEthernet0/0

Router(config)#int fa0/0
Router(config-if)#ip address 192.168.10.105 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit

Interface FastEthernet0/1

Router(config)#int fa0/1
Router(config-if)#ip address 192.168.10.121 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#

Interface Ethernet1/0

Router(config)#int Eth1/0
Router(config-if)#ip address 192.168.10.109 255.255.255.240
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Ethernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
Router(config-if)#exit

Router(config)#

EIGRP Configuration

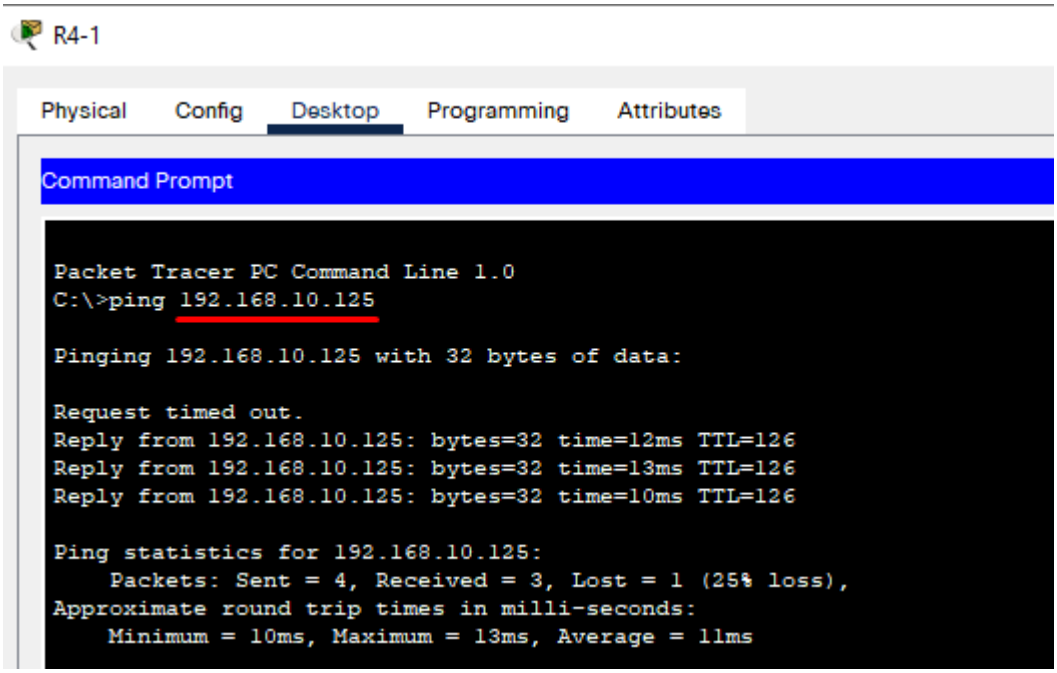
Router>en
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router eigrp 10
Router(config-router)#network 192.168.10.0
Router(config-router)#network 192.168.10.124
Router(config-router)#network 192.168.10.120
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#

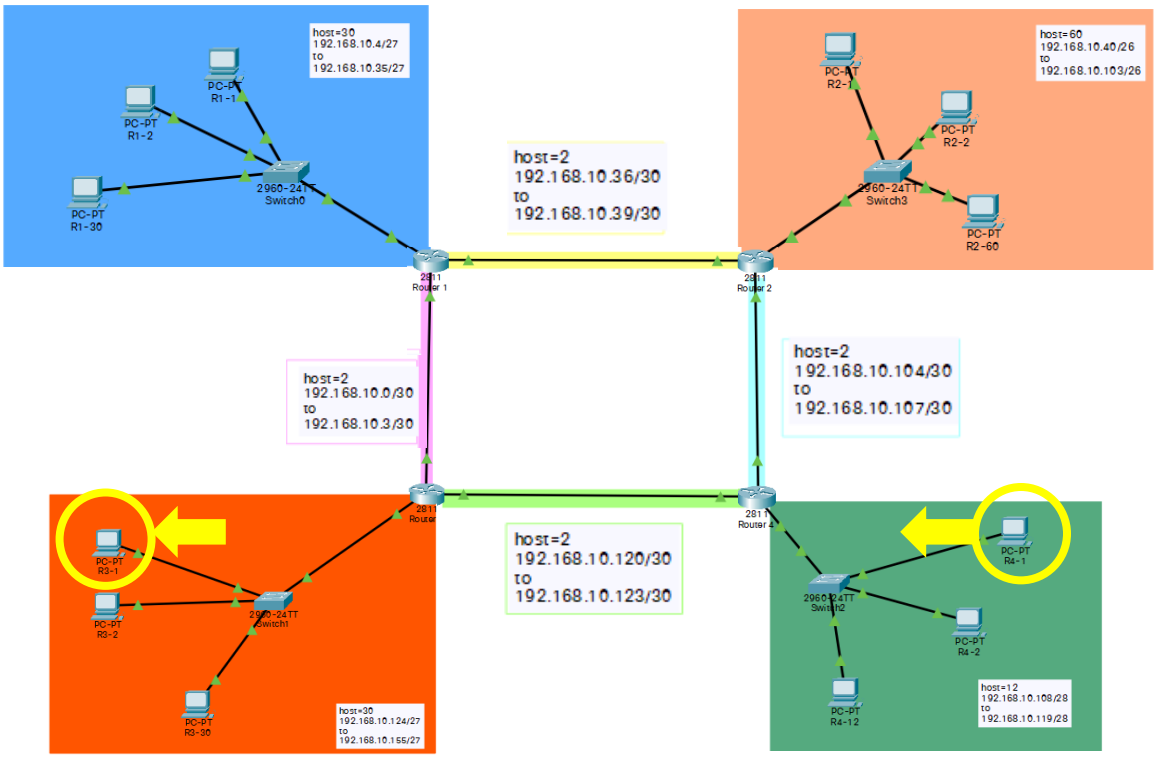
Dynamic Routing:

- Ripv2 is implemented in Router 1 and Router 2.
- EIGRP is implemented in Router 3 and Router 4.

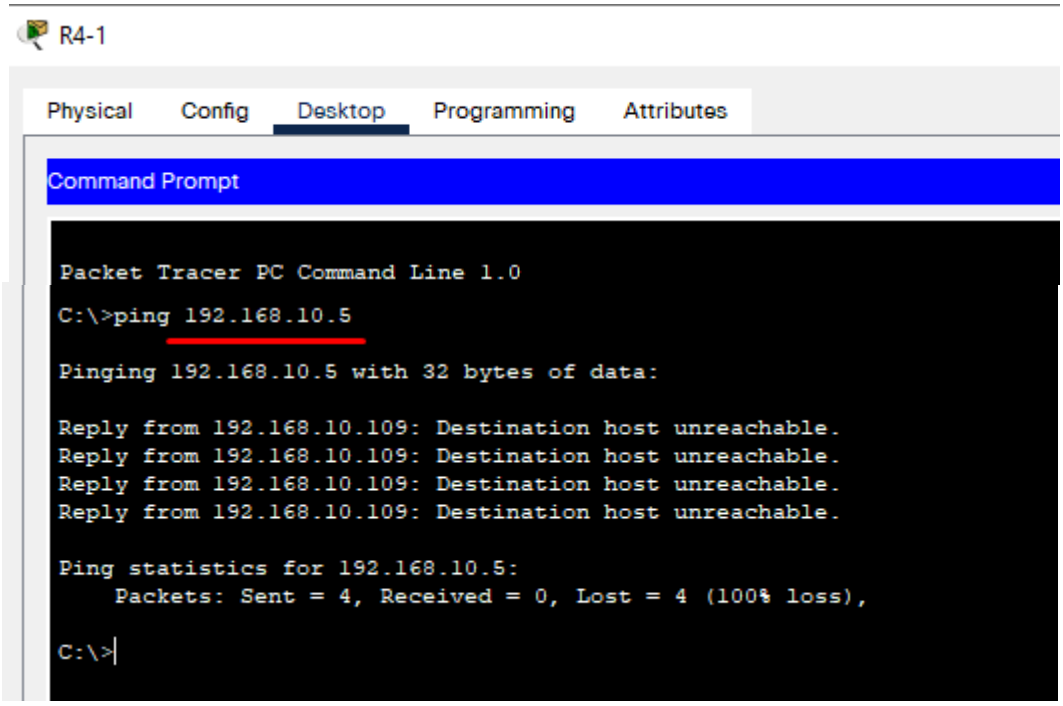
Ping

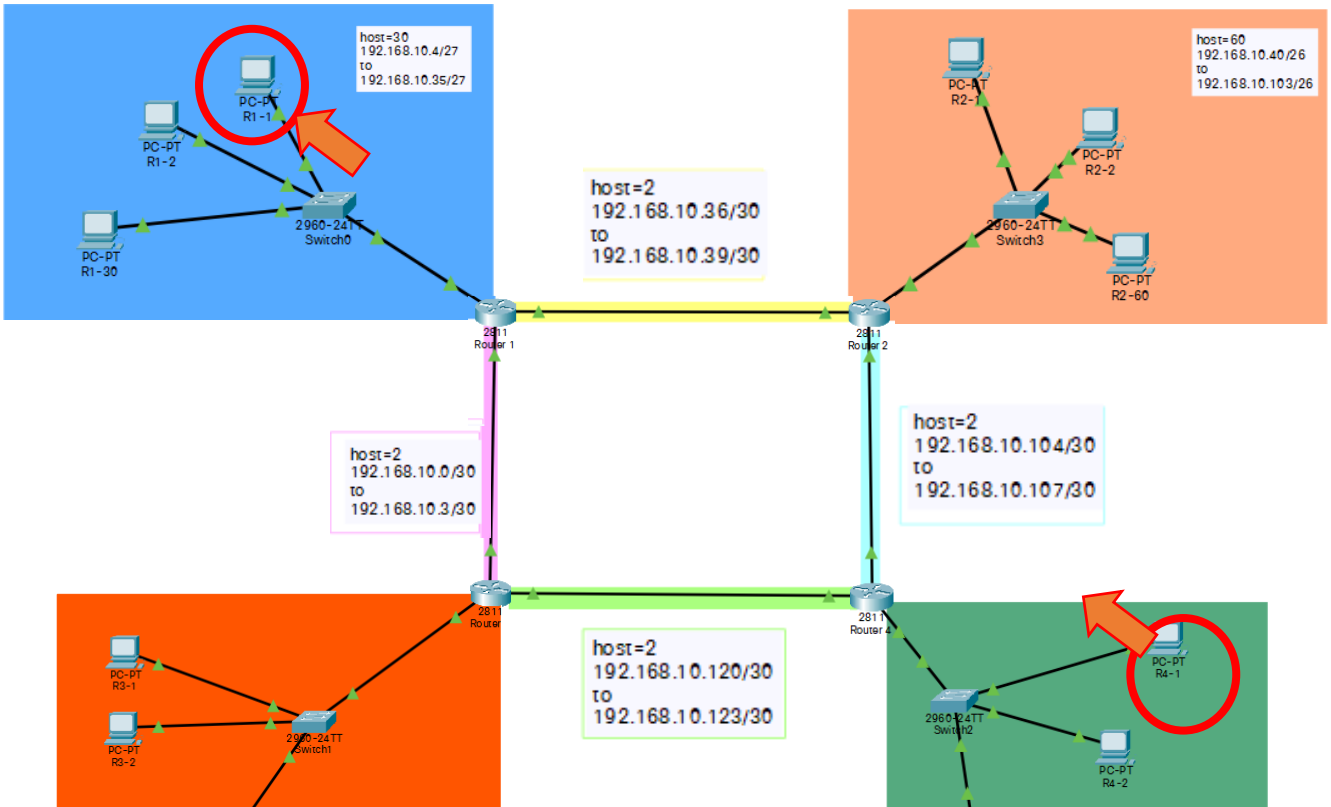
- If we ping **from** Pc “R4-1” connected to Router 4 **to** PC “ R3-1“ connected to Router 3 (EIGRP is implemented in both routers)





- If we ping **from** Pc “R4-1” connected to Router 4 **to** PC “ R1-1“ connected to Router 3 (EIGRP is implemented in both routers)





Note:

We can't ping if two different routing protocols are implement in topology. That's why, I changed the dynamic routing of Router-1 and Router-2 to EIGRP protocol.

Router-1

EIGRP Configuration

```
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no router rip
Router(config)#router eigrp 10
Router(config-router)#network 192.168.10.0
Router(config-router)#network 192.168.10.4
Router(config-router)#network 192.168.10.36
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
```

Router-2

EIGRP Configuration

```
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router eigrp 10
Router(config-router)#network 192.168.10.36
Router(config-router)#network 192.168.10.40
Router(config-router)#network 192.168.10.104
Router(config-router)#no auto-summary
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Ping

- Now if we ping **from** Pc “R4-1” connected to Router 4 **to** PC “ R1-1“ connected to Router 3 (EIGRP is implemented in both routers)