

## Practical – 6

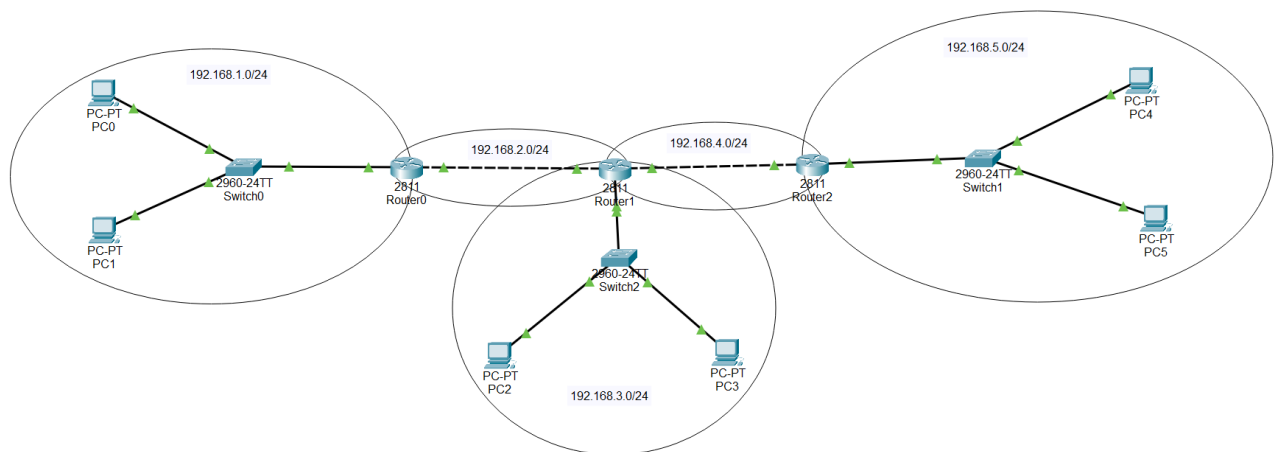
**Aim of the Practical :-** To configure and test static routing in Cisco

Packet Tracer among five interconnected networks

**Requirements :-** Cisco Packet Tracer, PC's, Switches, Ethernet cable and Router.

Practical:

### 1. Network Topology Diagram

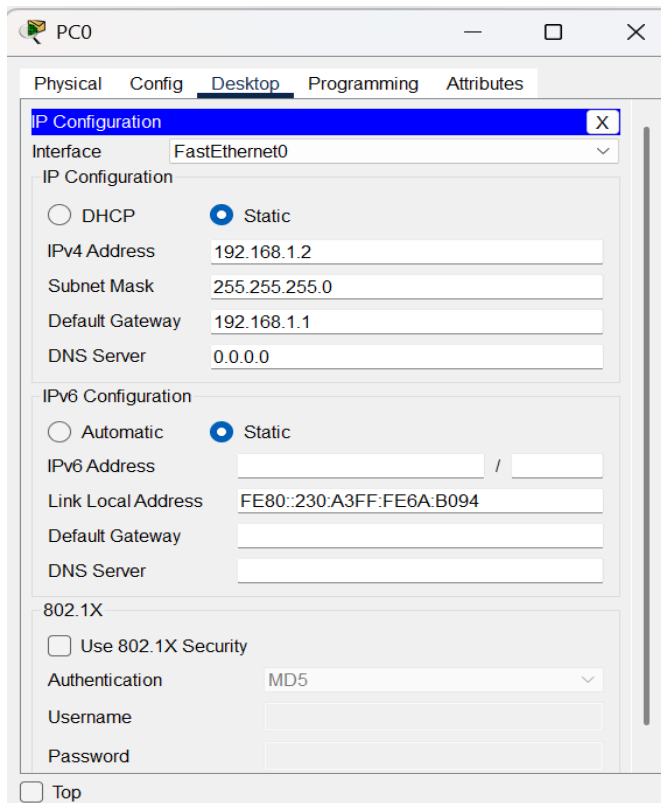


This image is a network topology diagram that shows three separate Local Area Networks (LANs) interconnected by three routers (Router0, Router1, and Router2).

- **LANs:** Each LAN contains a switch connecting two PCs (e.g., Switch0 connects PC0 and PC1).
- **IP Networks:** The setup uses five distinct IP networks. Three networks are for the LANs (192.168.1.0/24, 192.168.3.0/24, 192.168.5.0/24), and two networks (192.168.2.0/24 and 192.168.4.0/24) are used to link the routers together.
- **Function:** The primary purpose of this design is to allow computers on any of the three different LANs to communicate with each other by routing traffic through the interconnected routers.

## 2. Configuration of All Devices

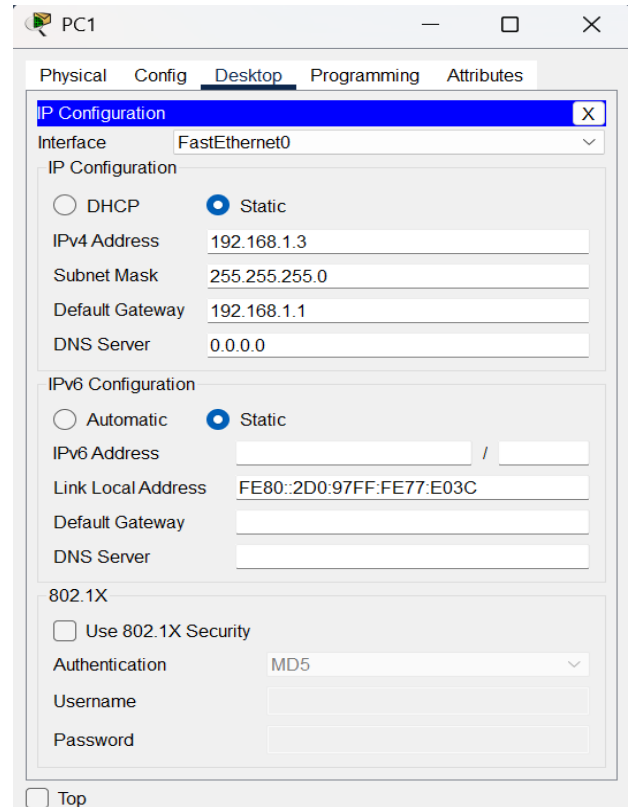
### • PC Configurations:



PC0 configuration window showing the Desktop tab. The IP Configuration section is expanded, showing Static IP settings for FastEthernet0. The IPv6 Configuration section is also expanded, showing Static settings. The 802.1X section is visible at the bottom.

Interface	FastEthernet0
<b>IP Configuration</b>	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
<b>IPv6 Configuration</b>	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::230:A3FF:FE6A:B094
Default Gateway	
DNS Server	
<b>802.1X</b>	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

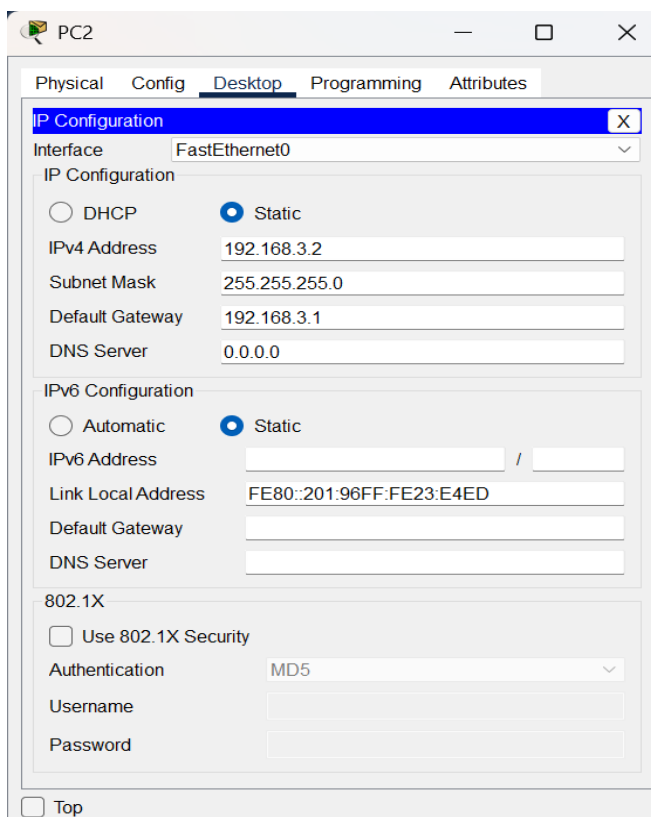
☐ Top



PC1 configuration window showing the Desktop tab. The IP Configuration section is expanded, showing Static IP settings for FastEthernet0. The IPv6 Configuration section is also expanded, showing Static settings. The 802.1X section is visible at the bottom.

Interface	FastEthernet0
<b>IP Configuration</b>	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.1.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
<b>IPv6 Configuration</b>	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::2D0:97FF:FE77:E03C
Default Gateway	
DNS Server	
<b>802.1X</b>	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

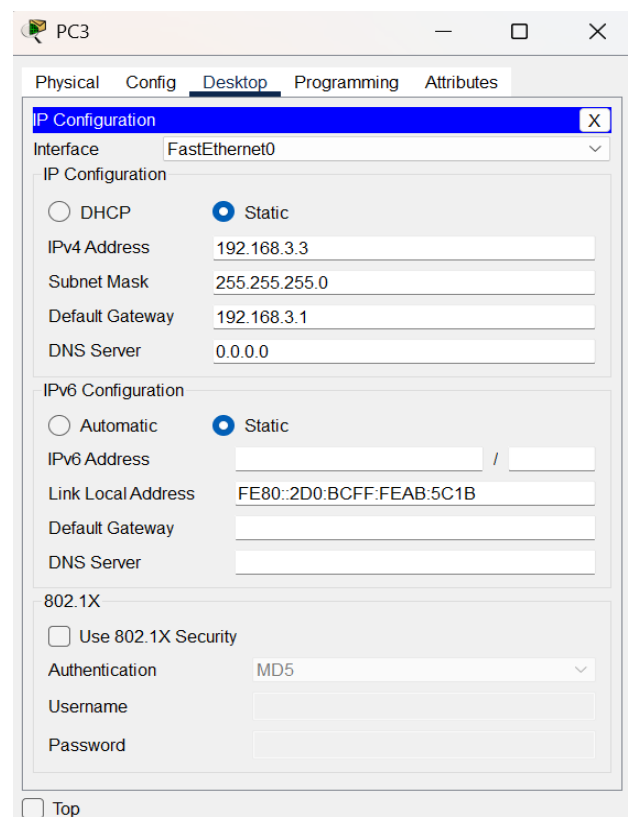
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PC2 configuration window showing the Desktop tab. The IP Configuration section is expanded, showing Static IP settings for FastEthernet0. The IPv6 Configuration section is also expanded, showing Static settings. The 802.1X section is visible at the bottom.

Interface	FastEthernet0
<b>IP Configuration</b>	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.3.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.3.1
DNS Server	0.0.0.0
<b>IPv6 Configuration</b>	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::201:96FF:FE23:E4ED
Default Gateway	
DNS Server	
<b>802.1X</b>	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

☐ Top



PC3 configuration window showing the Desktop tab. The IP Configuration section is expanded, showing Static IP settings for FastEthernet0. The IPv6 Configuration section is also expanded, showing Static settings. The 802.1X section is visible at the bottom.

Interface	FastEthernet0
<b>IP Configuration</b>	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.3.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.3.1
DNS Server	0.0.0.0
<b>IPv6 Configuration</b>	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::2D0:BCFF:FEAB:5C1B
Default Gateway	
DNS Server	
<b>802.1X</b>	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

☐ Top

PC4 configuration window showing IP Configuration for FastEthernet0. The interface is set to Static. IPv4 Address is 192.168.5.2, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.5.1, and DNS Server is 0.0.0.0. IPv6 Configuration is also set to Static, with Link Local Address FE80::201:63FF:FE55:AED8. 802.1X Security is disabled, and Authentication is set to MD5.

PC5 configuration window showing IP Configuration for FastEthernet0. The interface is set to Static. IPv4 Address is 192.168.5.3, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.5.1, and DNS Server is 0.0.0.0. IPv6 Configuration is also set to Static, with Link Local Address FE80::202:4AFF:FE47:9EE2. 802.1X Security is disabled, and Authentication is set to MD5.

## • Router Configurations:

### 1. Router 0

#### Interface Settings

Router#

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface FastEthernet0/0

Router(config-if)#ip address

% Incomplete command.

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

Router(config-if)#

Router(config-if)#exit

Router(config)#interface FastEthernet0/1

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

no ip address

Router(config-if)#ip address 192.168.2.1 255.255.255.0

```
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

### **RIP Configuration**

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
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
no ip address
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

## **2. Router 1**

### **Interface Settings**

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.2.2 255.255.255.0
Router(config-if)#ip address 192.168.2.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet1/0
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
ip address 192.168.3.1 255.255.255.0
Router(config-if)#ip address 192.168.3.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
```

```
Router(config)#interface FastEthernet0/1
Router(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
ip address 192.168.4.1 255.255.255.0
Router(config-if)#ip address 192.168.4.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

### **RIP Configuration**

```
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.2.0
Router(config-router)#network 192.168.3.0
Router(config-router)#network 192.168.4.0
Router(config-router)#exit
Router(config)#exit
Router#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

```
192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.2.0/24 is directly connected, FastEthernet0/0
L 192.168.2.2/32 is directly connected, FastEthernet0/0
192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.3.0/24 is directly connected, FastEthernet1/0
L 192.168.3.1/32 is directly connected, FastEthernet1/0
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.4.0/24 is directly connected, FastEthernet0/1
L 192.168.4.1/32 is directly connected, FastEthernet0/1
```

Router#

## **3. Router 2**

### **Interface Settings**

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.4.2 255.255.255.0
Router(config-if)#ip address 192.168.4.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
```

```
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
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
ip address 192.168.5.1 255.255.255.0
Router(config-if)#ip address 192.168.5.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

### **RIP Configuration**

```
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.4.0
Router(config-router)#network 192.168.5.0
Router(config-router)#exit
Router(config)#exit
Router#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

```
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.4.0/24 is directly connected, FastEthernet0/0
L 192.168.4.2/32 is directly connected, FastEthernet0/0
192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.5.0/24 is directly connected, FastEthernet0/1
L 192.168.5.1/32 is directly connected, FastEthernet0/1
```

Router#

## **3. Routing Tables**

### **Router 0**

```
Router#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

```
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
```

C 192.168.1.0/24 is directly connected, FastEthernet0/0  
L 192.168.1.1/32 is directly connected, FastEthernet0/0  
192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.2.0/24 is directly connected, FastEthernet0/1  
L 192.168.2.1/32 is directly connected, FastEthernet0/1  
R 192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:01, FastEthernet0/1  
R 192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:01, FastEthernet0/1  
R 192.168.5.0/24 [120/2] via 192.168.2.2, 00:00:01, FastEthernet0/1

## **Router 1**

Router#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

R 192.168.1.0/24 [120/1] via 192.168.2.1, 00:00:00, FastEthernet0/0  
192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.2.0/24 is directly connected, FastEthernet0/0  
L 192.168.2.2/32 is directly connected, FastEthernet0/0  
192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.3.0/24 is directly connected, FastEthernet1/0  
L 192.168.3.1/32 is directly connected, FastEthernet1/0  
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.4.0/24 is directly connected, FastEthernet0/1  
L 192.168.4.1/32 is directly connected, FastEthernet0/1  
R 192.168.5.0/24 [120/1] via 192.168.4.2, 00:00:27, FastEthernet0/1

## **Router 2**

Router#show ip route

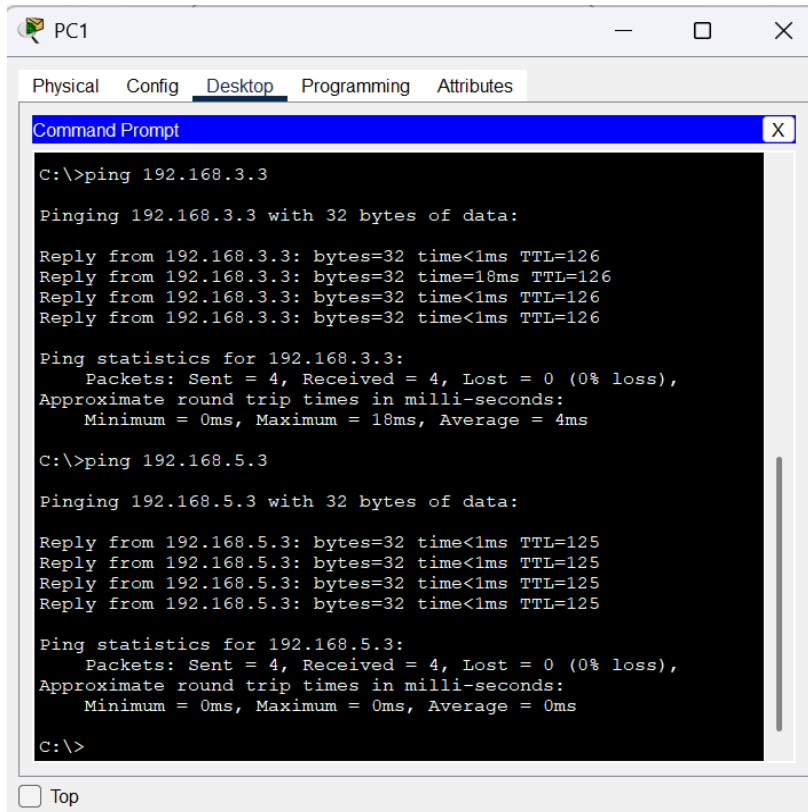
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
i - IS-IS, L1 - IS-IS level-1, 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

R 192.168.2.0/24 [120/1] via 192.168.4.1, 00:00:01, FastEthernet0/0  
R 192.168.3.0/24 [120/1] via 192.168.4.1, 00:00:01, FastEthernet0/0  
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.4.0/24 is directly connected, FastEthernet0/0  
L 192.168.4.2/32 is directly connected, FastEthernet0/0  
192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks  
C 192.168.5.0/24 is directly connected, FastEthernet0/1  
L 192.168.5.1/32 is directly connected, FastEthernet0/1

## 4. Connectivity Testing

### Ping Result



PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time<1ms TTL=126
Reply from 192.168.3.3: bytes=32 time=18ms TTL=126
Reply from 192.168.3.3: bytes=32 time<1ms TTL=126
Reply from 192.168.3.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 18ms, Average = 4ms

C:\>ping 192.168.5.3

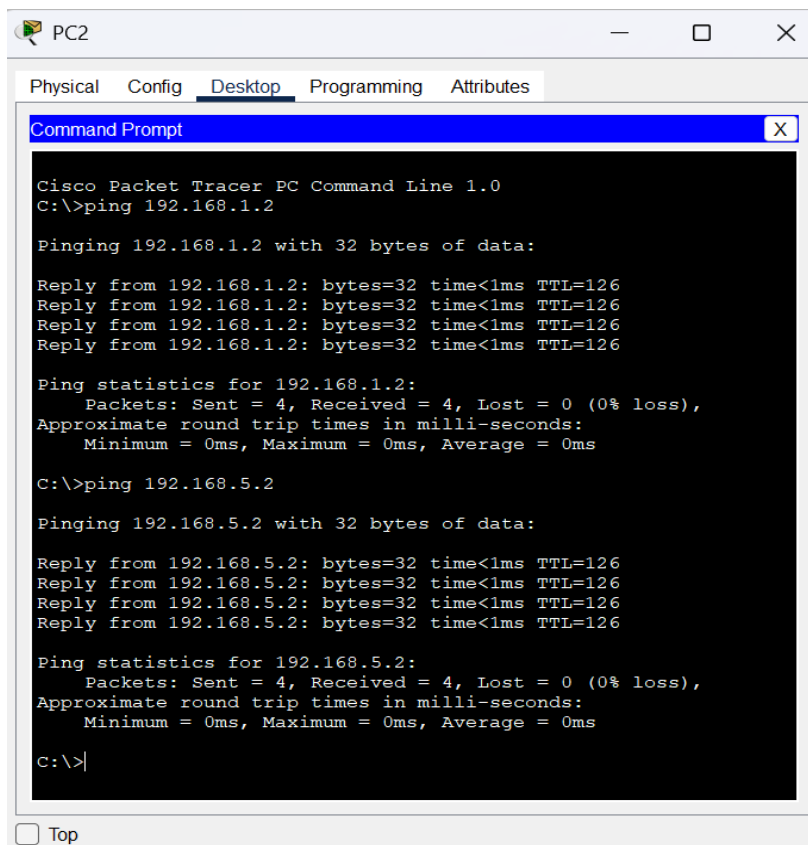
Pinging 192.168.5.3 with 32 bytes of data:

Reply from 192.168.5.3: bytes=32 time<1ms TTL=125
Reply from 192.168.5.3: bytes=32 time<1ms TTL=125
Reply from 192.168.5.3: bytes=32 time<1ms TTL=125
Reply from 192.168.5.3: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.5.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

☐ Top



PC2

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=126
Reply from 192.168.1.2: bytes=32 time<1ms TTL=126
Reply from 192.168.1.2: bytes=32 time<1ms TTL=126
Reply from 192.168.1.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.5.2

Pinging 192.168.5.2 with 32 bytes of data:

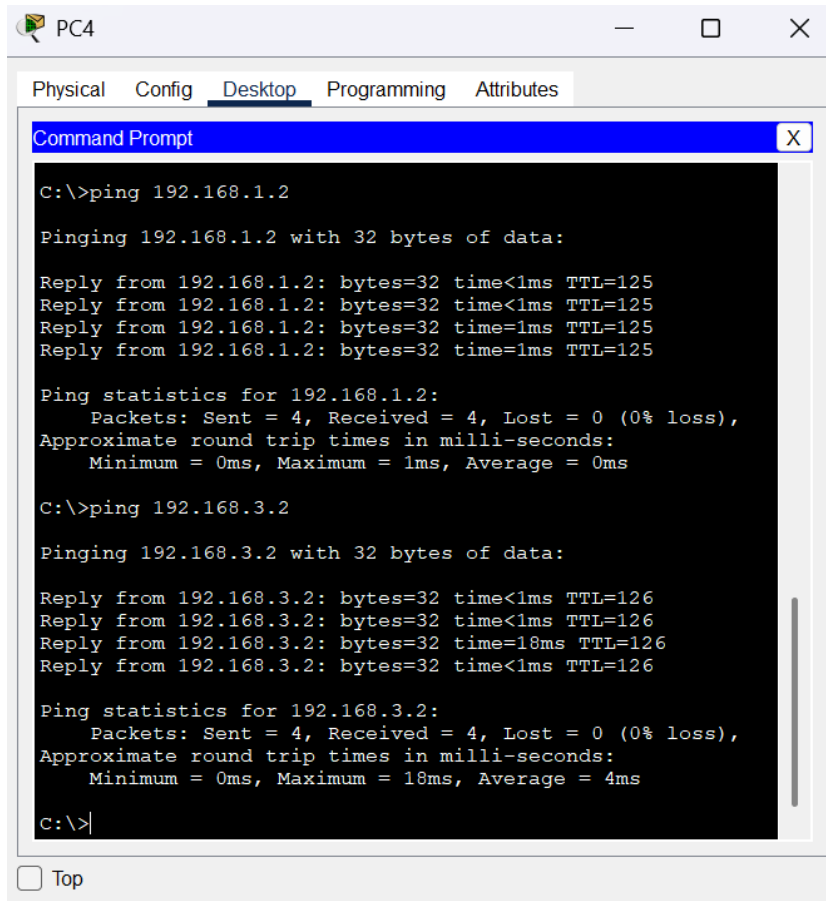
Reply from 192.168.5.2: bytes=32 time<1ms TTL=126
Reply from 192.168.5.2: bytes=32 time<1ms TTL=126
Reply from 192.168.5.2: bytes=32 time<1ms TTL=126
Reply from 192.168.5.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.5.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

☐ Top





PC4

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=125
Reply from 192.168.1.2: bytes=32 time<1ms TTL=125
Reply from 192.168.1.2: bytes=32 time=1ms TTL=125
Reply from 192.168.1.2: bytes=32 time=1ms TTL=125

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

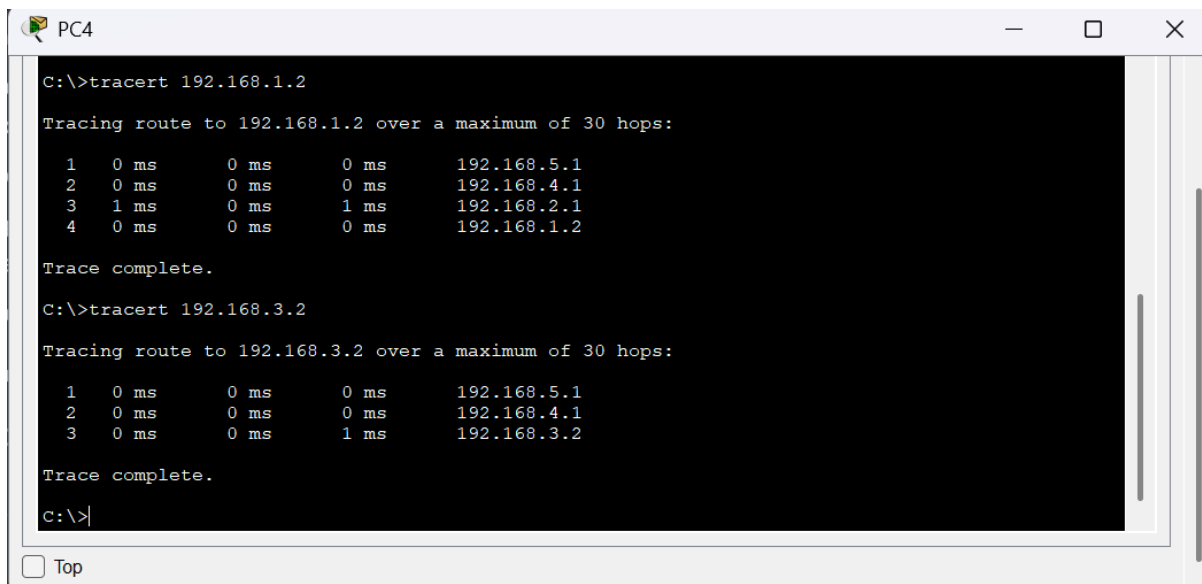
Reply from 192.168.3.2: bytes=32 time<1ms TTL=126
Reply from 192.168.3.2: bytes=32 time<1ms TTL=126
Reply from 192.168.3.2: bytes=32 time=18ms TTL=126
Reply from 192.168.3.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 18ms, Average = 4ms

C:\>|
```

☐ Top

### Traceroute Results:



PC4

```
C:\>tracert 192.168.1.2

Tracing route to 192.168.1.2 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    192.168.5.1
  2  0 ms    0 ms    0 ms    192.168.4.1
  3  1 ms    0 ms    1 ms    192.168.2.1
  4  0 ms    0 ms    0 ms    192.168.1.2

Trace complete.

C:\>tracert 192.168.3.2

Tracing route to 192.168.3.2 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    192.168.5.1
  2  0 ms    0 ms    0 ms    192.168.4.1
  3  0 ms    0 ms    1 ms    192.168.3.2

Trace complete.

C:\>|
```

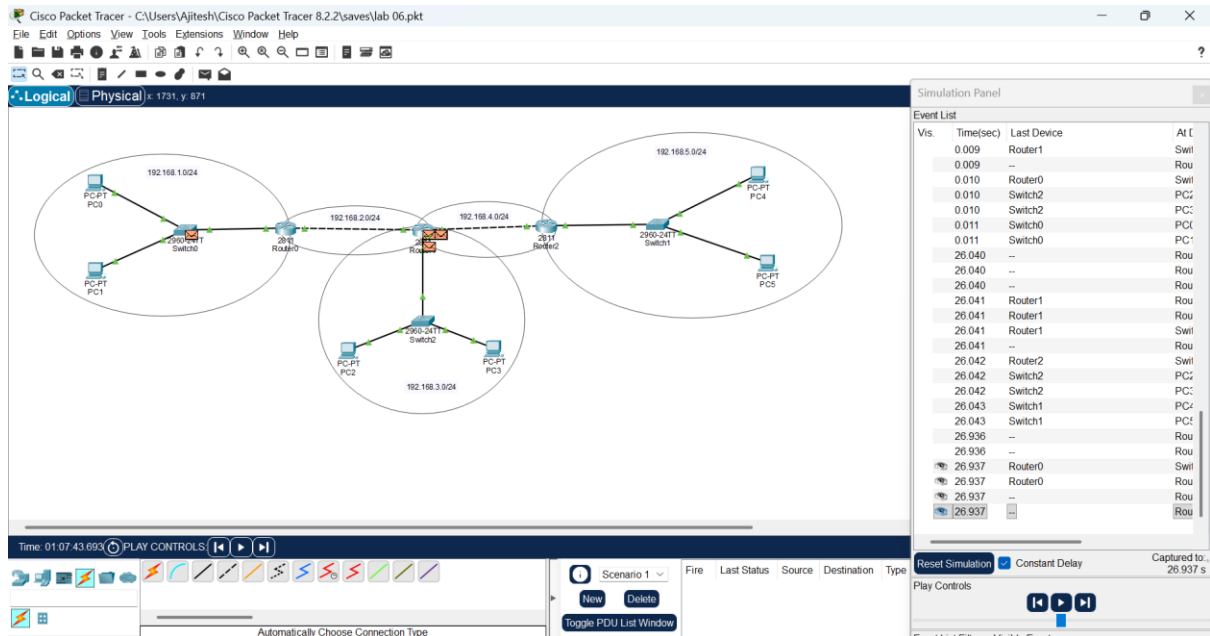
☐ Top

## RIP Updates Observation

Vis.	Time(sec)	Last Device	At Device
	0.000	--	Router0
	0.000	--	Router0
	0.000	--	Router0
	0.000	--	Router0
	0.001	--	Router0
	0.001	Router0	Switch0
	0.001	Router0	Router1
	0.001	--	Router0
	0.002	Router0	Switch0
	0.002	Router0	Router1
	0.002	Switch0	PC0
	0.002	Switch0	PC1
	0.003	Switch0	PC0
	0.003	Switch0	PC1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.003	--	Router1
	0.004	--	Router1
	0.004	--	Router1
	0.004	Router1	Router0
	0.004	--	Router1

Vis.	Time(sec)	Last Device	At Device
	0.004	Router1	Router0
	0.004	--	Router1
	0.004	--	Router0
	0.004	Router1	Switch2
	0.004	Router1	Router2
	0.005	--	Router1
	0.005	Router1	Router0
	0.005	--	Router1
	0.005	Router1	Switch2
	0.005	Router1	Router2
	0.005	Switch2	PC2
	0.005	Switch2	PC3
	0.005	--	Router0
	0.006	Router1	Router0
	0.006	Router1	Switch2
	0.006	Router0	Switch0
	0.006	Switch2	PC2
	0.006	Switch2	PC3
	0.006	--	Router0
	0.006	--	Router2
	0.006	--	Router2
	0.006	--	Router2
	0.006	--	Router2
	0.007	--	Router2
	0.007	Router0	Switch0
	0.007	Switch2	PC2

Vis.	Time(sec)	Last Device	At Device
	0.007	Router0	Switch0
	0.007	Switch2	PC2
	0.007	Switch2	PC3
	0.007	Switch0	PC0
	0.007	Switch0	PC1
	0.007	Router2	Router1
	0.007	--	Router2
	0.007	--	Router1
	0.007	Router2	Switch1
	0.008	Router2	Router1
	0.008	--	Router1
	0.008	Router2	Switch1
	0.008	Switch0	PC0
	0.008	Switch0	PC1
	0.008	--	Router1
	0.009	Router1	Router0
	0.009	Router1	Switch2
	0.009	--	Router0
	0.010	Router0	Switch0
	0.010	Switch2	PC2
	0.010	Switch2	PC3
	0.011	Switch0	PC0
	0.011	Switch0	PC1
	26.040	--	Router1
	26.040	--	Router1
	26.040	--	Router1



## Conclusion

This practical successfully demonstrated the configuration and verification of routing across multiple interconnected networks using Cisco Packet Tracer. The primary objective of enabling communication between five distinct IP networks was achieved through the implementation of the **Routing Information Protocol (RIPv2)**.

The key steps involved:

- **IP Addressing:** All end devices (PCs) and router interfaces were configured with static IPv4 addresses, subnet masks, and default gateways appropriate for their respective network segments.
- **Dynamic Routing:** The RIPv2 dynamic routing protocol was enabled on the routers, allowing them to automatically learn about remote networks from their neighbors and populate their routing tables. The `show ip route` command confirmed that all routers had learned the necessary routes, indicated by the 'R' code in the routing tables.
- **Verification:** End-to-end connectivity was successfully verified using the **ping** command between PCs in different networks, with 0% packet loss in the tests. Furthermore, the **tracert** command was used to trace the hop-by-hop path that packets took, confirming that data was being correctly forwarded by the routers according to the established routes.