

Program 3

To demonstrate configuration of default and static routes through a connection of routers.

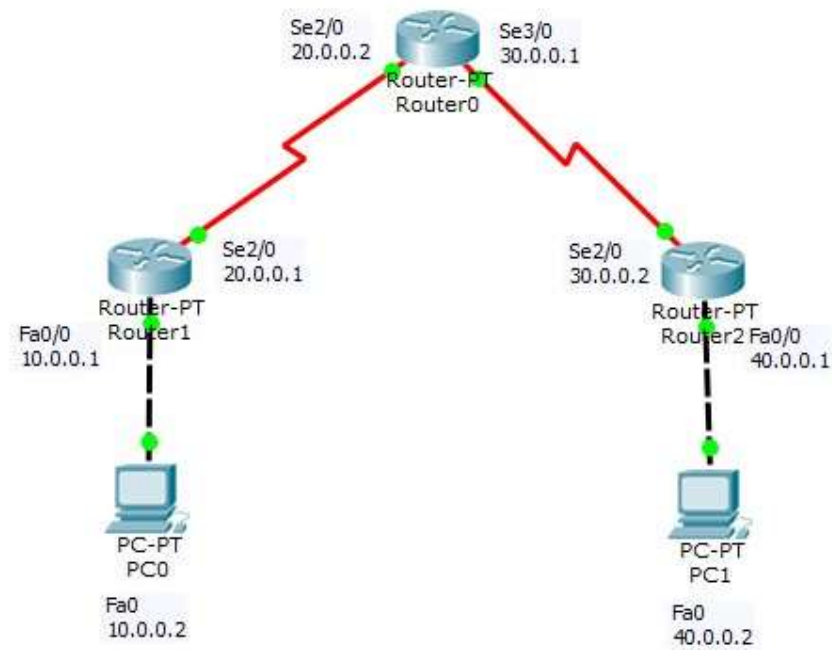


Figure 14: Topology for static route

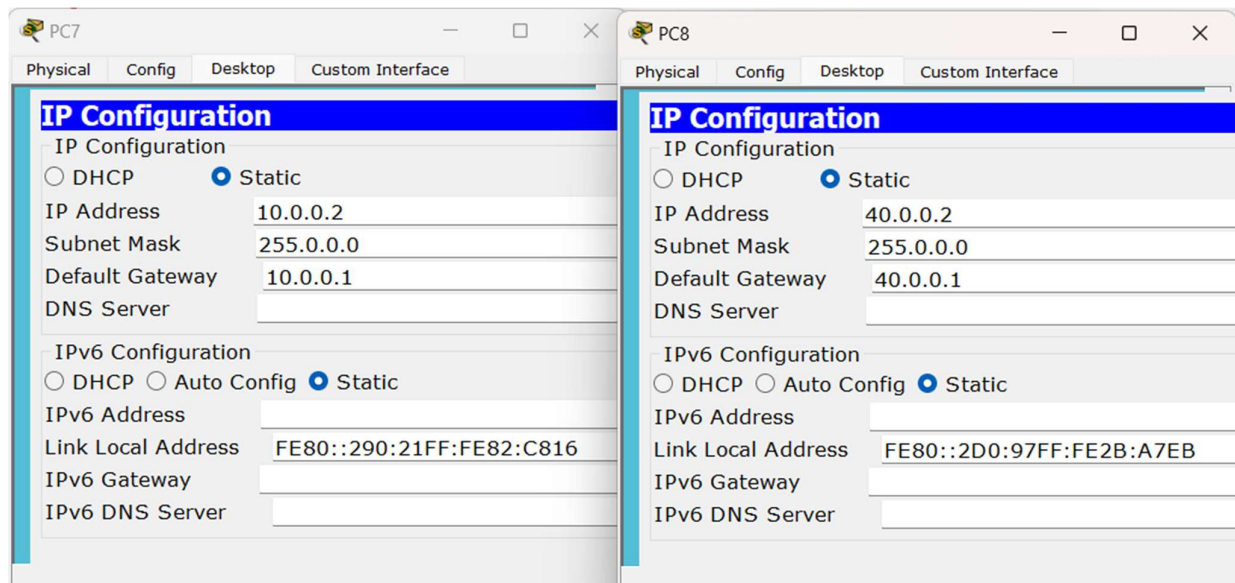


Figure 15: IP addresses

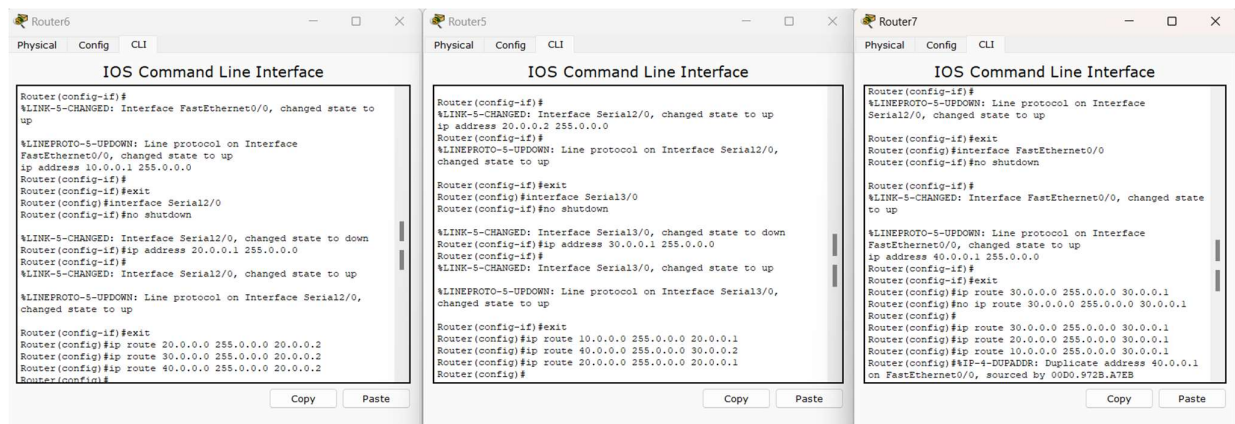


Figure 16: Routers CLI

```

Command Prompt

Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=1ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>ping 30.0.0.1

Pinging 30.0.0.1 with 32 bytes of data:

Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=1ms TTL=254
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=3ms TTL=254

Ping statistics for 30.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 4ms, Average = 3ms

PC>ping 40.0.0.2

Pinging 40.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 40.0.0.2: bytes=32 time=6ms TTL=125
Reply from 40.0.0.2: bytes=32 time=4ms TTL=125
Reply from 40.0.0.2: bytes=32 time=4ms TTL=125

Ping statistics for 40.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 6ms, Average = 4ms

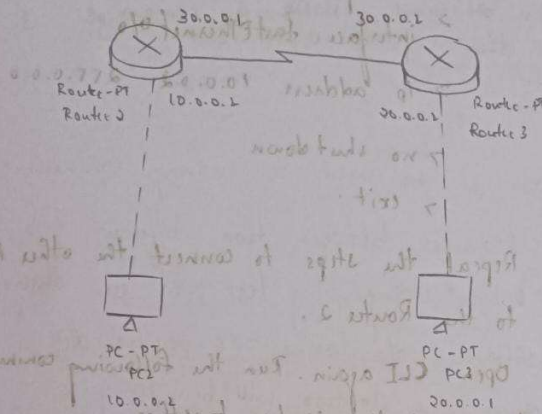
PC>

```

Figure 17: Output

Experiment 4.20

1. Connection of two Routers:



Aim: (i) Configuration of two routers.

(ii) Communication between two end devices of two different router connections.

Topology: Two PCs are connected to two different routers using Copper Cross Over and those two routers are connected to each other using

Serial DCE

Procedure:

1. Connect the 2 PCs as mentioned in the Topology.
2. Initialize the IP address of each device as shown in the figure.

Figure 18: Observation book 1

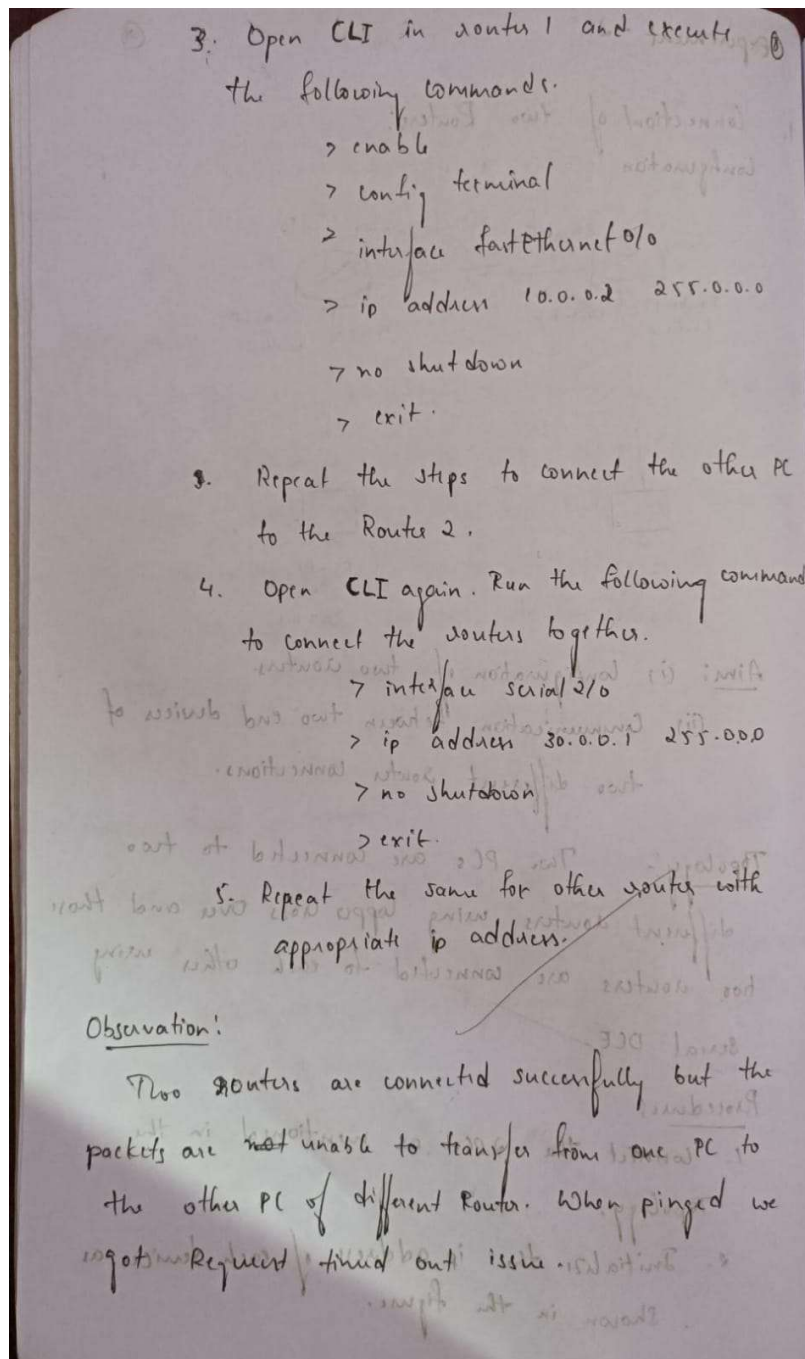


Figure 19: Observation book 2

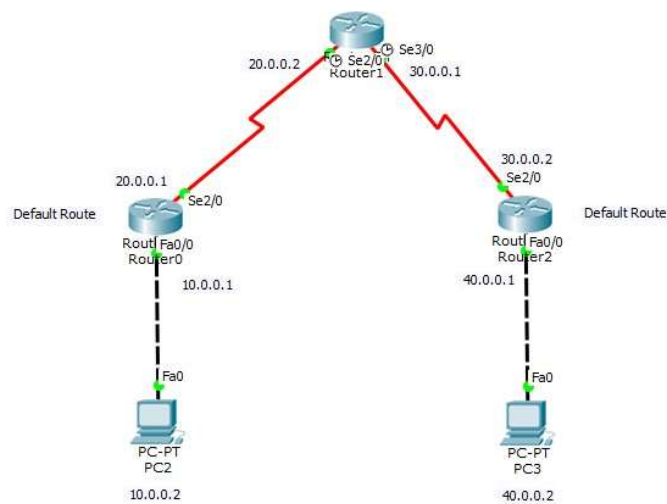


Figure 20: Topology for default route

PC7

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address: 10.0.0.2

Subnet Mask: 255.0.0.0

Default Gateway: 10.0.0.1

DNS Server:

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address:

Link Local Address: FE80::290:21FF:FE82:C816

IPv6 Gateway:

IPv6 DNS Server:

PC8

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address: 40.0.0.2

Subnet Mask: 255.0.0.0

Default Gateway: 40.0.0.1

DNS Server:

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address:

Link Local Address: FE80::2D0:97FF:FE2B:A7EB

IPv6 Gateway:

IPv6 DNS Server:

Figure 21: IP addresses

Router9

Physical Config CLI

IOS Command Line Interface

```
FastEthernet0/0, changed state to up
ip address 10.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial2/0, changed state to
down
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial2/0, changed state to up
Router(config-if)#exit
Router(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.2
Copy Paste
```

Router8

Physical Config CLI

IOS Command Line Interface

```
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to
up
ip address 20.0.0.2 255.0.0.0
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial2/0, changed state to up
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial3/0, changed state to
down
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#
Copy Paste
```

Router10

Physical Config CLI

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial2/0, changed state to up
ip address 30.0.0.2 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
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
ip address 40.0.0.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#ip route 0.0.0.0 0.0.0.0 30.0.0.1
Router(config)#
Copy Paste
```

Figure 22: Router CLI Commands

Command Prompt

```
PC>ping 40.0.0.2

Pinging 40.0.0.2 with 32 bytes of data:

Reply from 40.0.0.2: bytes=32 time=21ms TTL=123
Reply from 40.0.0.2: bytes=32 time=16ms TTL=123
Reply from 40.0.0.2: bytes=32 time=9ms TTL=123
Reply from 40.0.0.2: bytes=32 time=9ms TTL=123

Ping statistics for 40.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 9ms, Maximum = 21ms, Average = 13ms
```

Figure 23: ping command output

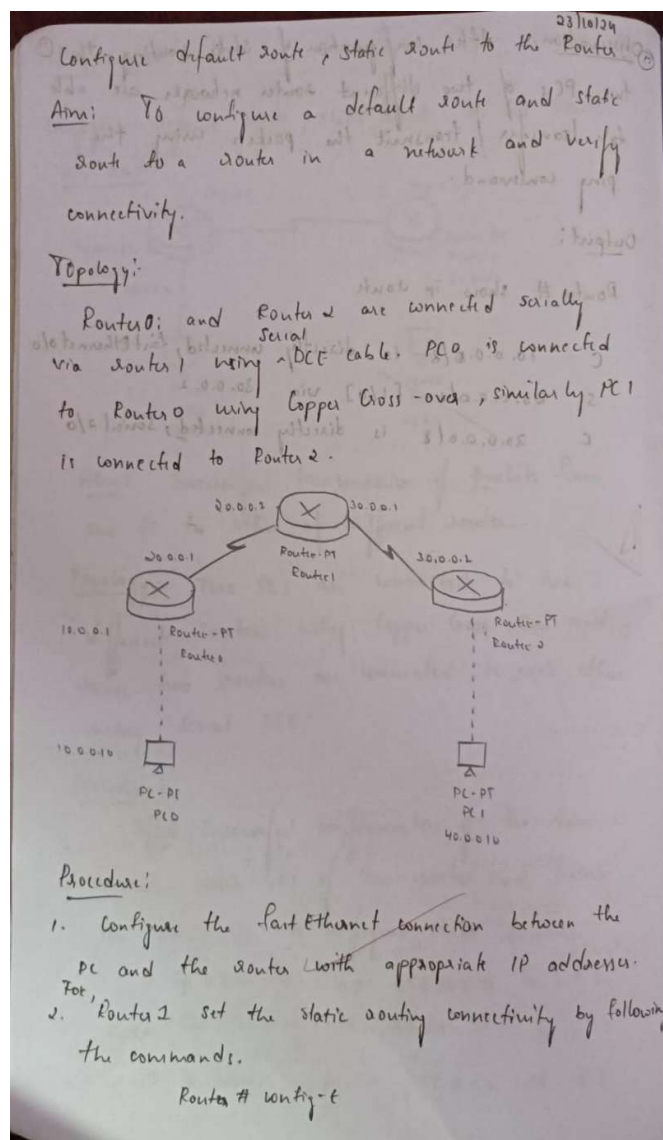


Figure 24: Observation book 1

Router(Config)# ip route 40.0.0.0 255.0.0.0 20.0.0.1 (13)
 Router(Config)# ip route 10.0.0.0 255.0.0.0 20.0.0.1

These commands will set the static routing of the Router #1.

3. Set the default Routing of Router 0 and Router 2.

- Open CLI on Router 0
 Router# config-t
 Router(Config)# ip route 0.0.0.0 0.0.0.0 20.0.0.1
 Router

- Open CLI on Router 2
 Router# config-t
 Router(Config)# ip route 0.0.0.0 0.0.0.0 30.0.0.1

When the network and the subnet mask are set as 0.0.0.0. Any unknown network will be transferred to the next hop address mentioned.

Observation:
 After configuring the default route, PC0 could communicate with external networks, including PC1. The static route ensured that packets are followed the specified path as given in the static routing.

Output:
 Router1: # show ip route

S	10.0.0.0/8	[1/0]	via 20.0.0.1
C	20.0.0.0/8	is directly connected, Serial 2/0	
C	30.0.0.0/8	is directly connected, Serial 3/0	
S	40.0.0.0/8	[1/0]	via 30.0.0.2

Figure 25: Observation book 2