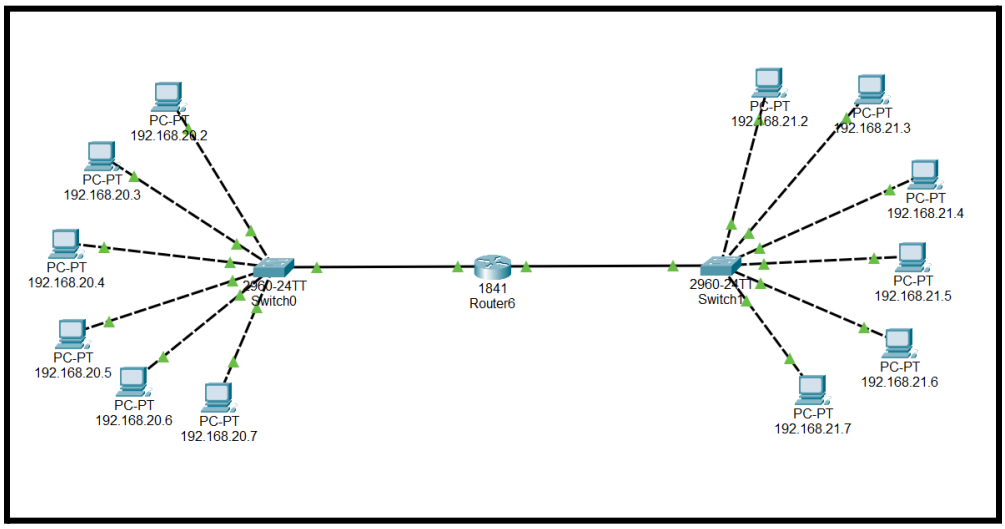
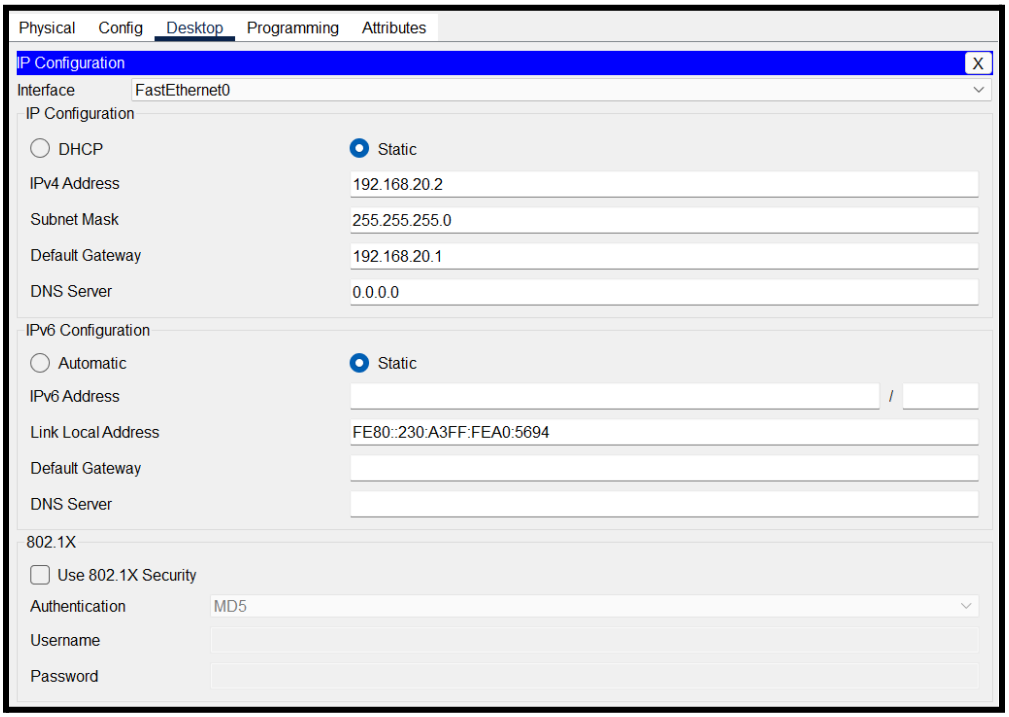
# Experiment - 2: Connecting IP Through Routers

## Network Structure




## IP configuration

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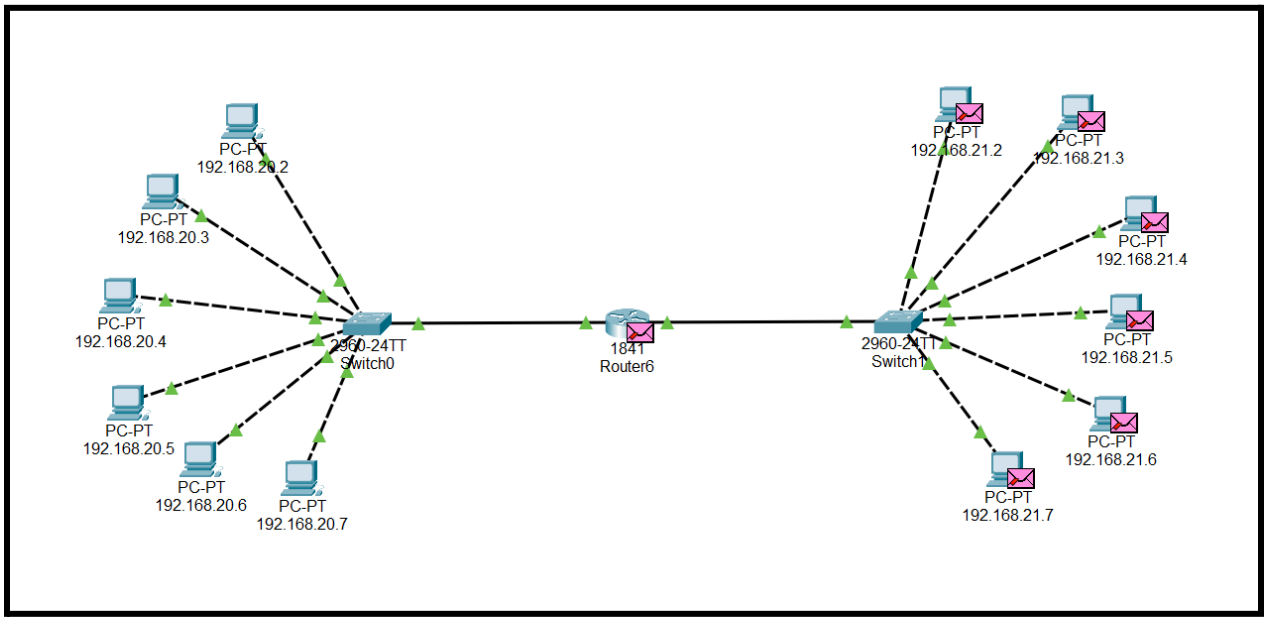
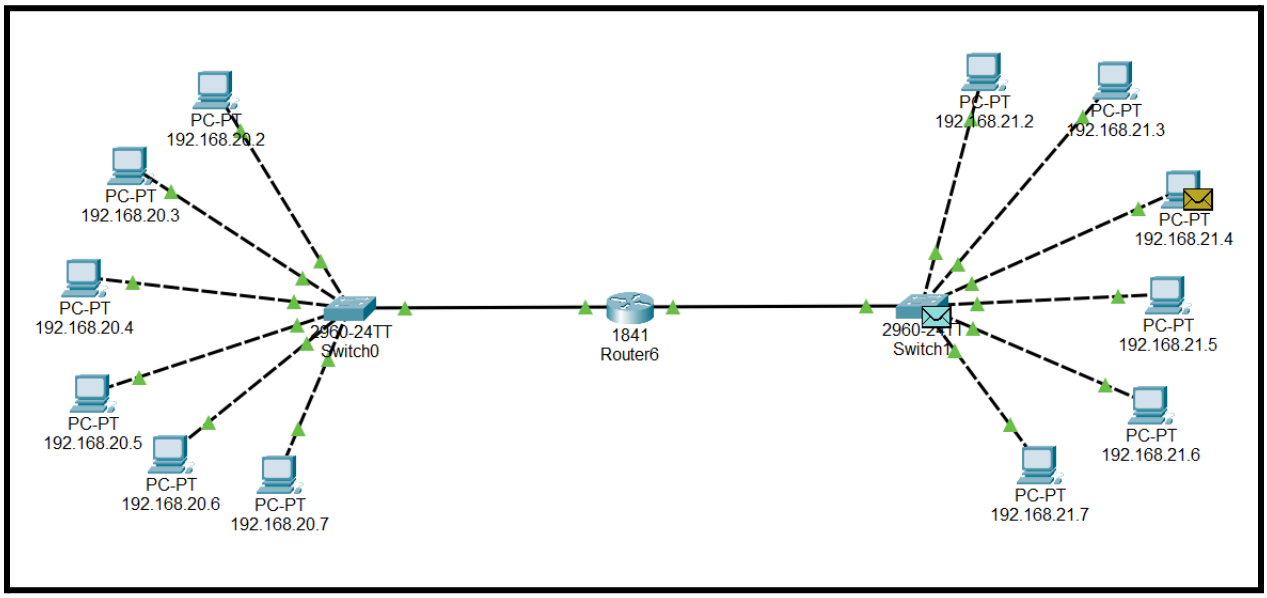
## Router Configuration

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, 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

C    192.168.20.0/24 is directly connected, FastEthernet0/0
C    192.168.21.0/24 is directly connected, FastEthernet0/1

Router#ping 192.168.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.20.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms

Router#ping 192.168.21.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.21.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms
```

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shut down

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
exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.21.1 255.255.255.0
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
exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit
```

# Packet Simulation




| Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete |
|---|---|---|---|---|---|---|---|---|---|---|
| | Successful | 192.1… | 192.168.21.4 | ICMP | | 0.000 | N | 0 | (edit) | (delete) |
| | Successful | 192.1… | 192.168.21.5 | ICMP | | 0.000 | N | 1 | (edit) | (delete) |

Pinging 192.168.20.2 to 192.168.21.2

```
C:\>ping 192.168.21.5

Pinging 192.168.21.5 with 32 bytes of data:

Reply from 192.168.21.5: bytes=32 time<1ms TTL=127
Reply from 192.168.21.5: bytes=32 time=1ms TTL=127
Reply from 192.168.21.5: bytes=32 time<1ms TTL=127
Reply from 192.168.21.5: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.21.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Pinging 192.168.20.2 to 192.168.21.25

```
C:\>ping 192.168.21.25

Pinging 192.168.21.25 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.21.25:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Pinging 192.168.20.2 to 192.168.21.4

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.21.4

Pinging 192.168.21.4 with 32 bytes of data:

Request timed out.
Reply from 192.168.21.4: bytes=32 time=9ms TTL=127
Reply from 192.168.21.4: bytes=32 time<1ms TTL=127
Reply from 192.168.21.4: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.21.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 9ms, Average = 3ms
```

Pinging from router CLI

```
Router#ping 192.168.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.20.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms

Router#ping 192.168.21.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.21.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms

Router#
```

Pinging from 192.168.20.6 to 192.168.20.4 (Same network)

```
C:\>ping 192.168.20.4

Pinging 192.168.20.4 with 32 bytes of data:

Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

## Description:

I connected six PCs with IP addresses ranging from **192.168.20.2 to 192.168.20.7** to a switch within the **192.168.20.0/24** network. Similarly, I connected another six PCs with IP addresses from **192.168.21.2 to 192.168.21.7** to a switch within the **192.168.21.0/24** network. The default gateway for the first network was set to **192.168.20.1**, while the second network used **192.168.21.1** as its gateway. A **Cisco 1841 router** was added and connected to the switches via **FastEthernet** ports. The router interfaces were configured accordingly to establish communication between the two networks.

To verify connectivity, I conducted **ping tests** within the same network, such as **pinging 192.168.20.6 from 192.168.20.4**, to ensure internal communication. Additionally, I tested **inter-network connectivity** by pinging across different subnets, such as **pinging 192.168.20.2 from 192.168.21.4**, to validate proper routing and packet transmission.