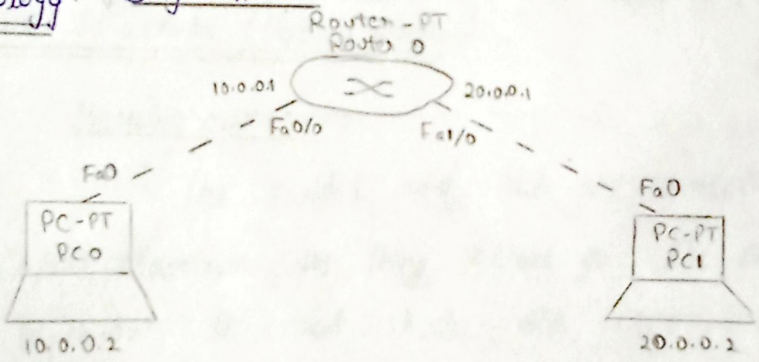
17/11/22

Lab 2

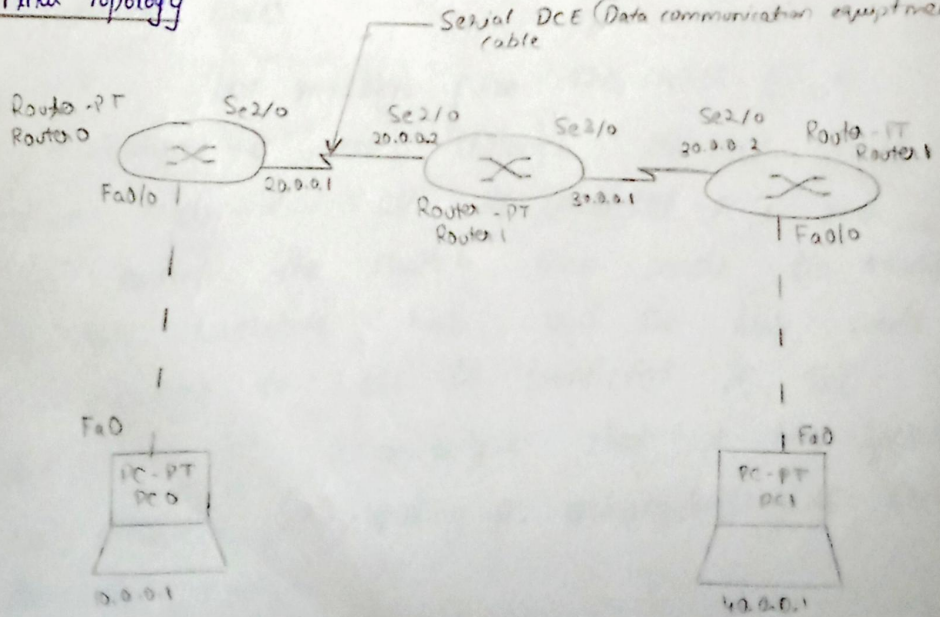
Routers

AIM: Configuring IP address to Routers in packet tracer. Explore the following messages: Ping Responses, Destination unreachable, Request time out, Reply

Topology: Single Router



Final Topology



Procedure:

Single Router

- Add a router and two PC to the workspace
- Configure the IP address of each PC as 10.0.0.2 and 20.0.0.2 respectively and gateway of each of the PC to 10.0.0.1 and 20.0.0.1 respectively. Connect the two PC's to the router using copper cross over.
- In the router go to CLI and type the following commands

```
Router> enable
Router# configure t
Router(config)# interface FastEternet 0/0
Router(config-if)# ip address 10.0.0.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface Fast Ethernet 1/0
Router(config-if)# ip address 20.0.0.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# exit
Router# exit
Router>
```

- After entering these command the lights between PC's and routers are turned green
- Ping PC1 from PC0 from desktop → command prompt.

Final topology :

• Add three routers and two PC's to the workspace as shown. Connect the router and PC using a copper cross over cable and two routers using a Serial DCE cable.

• Configure the IP address and gateway of both PC's as 10.0.0.1, 10.0.0.10 and 40.0.0.1, 40.0.0.10 respectively.

• In the router0 go to the CLI and type the commands

```
Router > enable
Router# configure t
Router (config)# interface FastEthernet 0/0
Router (config-if)# ip address 10.0.0.10 255.0.0.0
Router (config-if)# no shutdown
Router (config-if)# exit
Router (config)# interface Serial 2/0
Router (config-if)# ip address 20.0.0.1 255.0.0.0
Router (config-if)# no shutdown
Router (config-if)# exit
Router (config)# exit
Router# exit
Router >
```

• Configure router2 similarly as router 0 with IP's of Fa0/0 as 40.0.0.10 and Se2/0 as 30.0.0.2.

• Configure router1 in CLI with both interface as Se 2/0 and Se 3/0 with IP's 20.0.0.2 and 30.0.0.1

• After performing all these commands all the lights are turned green indicating the circuit is complete and connected.

• The next hop of all the routers need to be configured to complete the connection

In the CLI of Router 0

```
Router (config) # ip route 30.0.0.0 255.0.0.0 20.0.0.2
Router (config)# ip router 40.0.0.0 255.0.0.0 20.0.0.2
Router (config)# exit
```

In the CLI of router 1

```
Router (config) # ip route 10.0.0.0 255.0.0.0 20.0.0.1
Router (config)# ip route 40.0.0.0 255.0.0.0 30.0.0.2
```

In the CLI of router 2

```
Router (config) # ip route 10.0.0.0 255.0.0.0 30.0.0.1
Router (config) # ip route 20.0.0.0 255.0.0.0 30.0.0.1
```

• Ping PC0 to PC1 from desktop → command prompt

Observation

Single Router

Learning Outcome: After all the connections are made to the router the lights are red till the router is configured in the CLI.

When PC0 pings PC1 for the first time we get the first packet as request timed out. When pinging for the second time all four packet are recieved by PC1. If we reverse ping from PC1 to PC0 all four packets are recieved as the router has learnt the address of its connected nodes.

Result: Ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data

Request timed out

Reply from 20.0.0.1 : bytes = 32 time<1ms TTL=127

Reply from 20.0.0.1 : bytes = 32 time<1ms TTL=127

Reply from 20.0.0.1 : bytes = 32 time<1ms TTL=127

Ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1 : bytes=32 time<1ms TTL=127

Reply from 20.0.0.1 : bytes=32 time<1ms TTL=127

Reply from 20.0.0.1 : bytes=32 time<1ms TTL=127

Reply from 20.0.0.1 : bytes=32 time<1ms TTL=127

Ping statistics for 20.0.0.1

packets : sent = 4 , recieved = 4, lost = 0 (0% loss)

Final Configuration

Observation : The routers even though being configured in CLI would only know the address of the nodes or routers that are directly connected to. To send a packet to a network that is not connected directly to it requires the need to configure its ip route. After providing the address of next hop of every networks to each router the packets are transferred smoothly.

Result : Ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

Reply from 40.0.0.1 : bytes = 32 time < 1 ms TTL = 127

Reply from 40.0.0.1 : bytes = 32 time < 1 ms TTL = 127

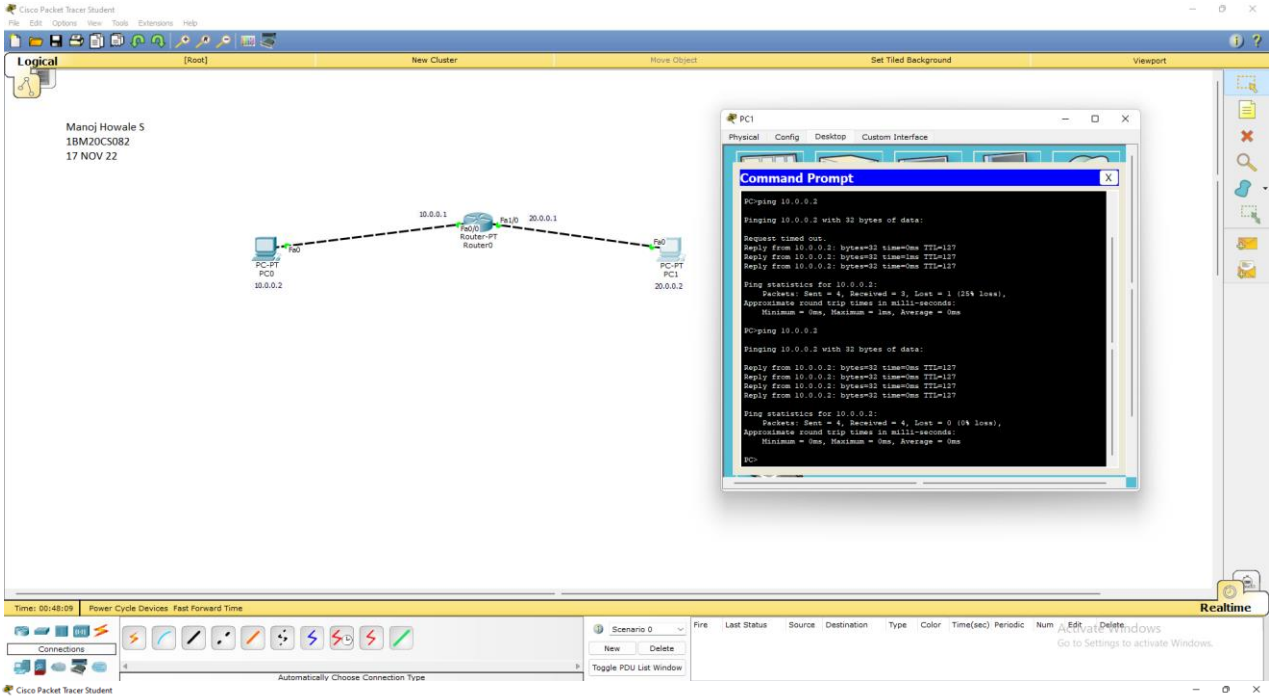
Reply from 40.0.0.1 : bytes = 32 time < 1 ms TTL = 127

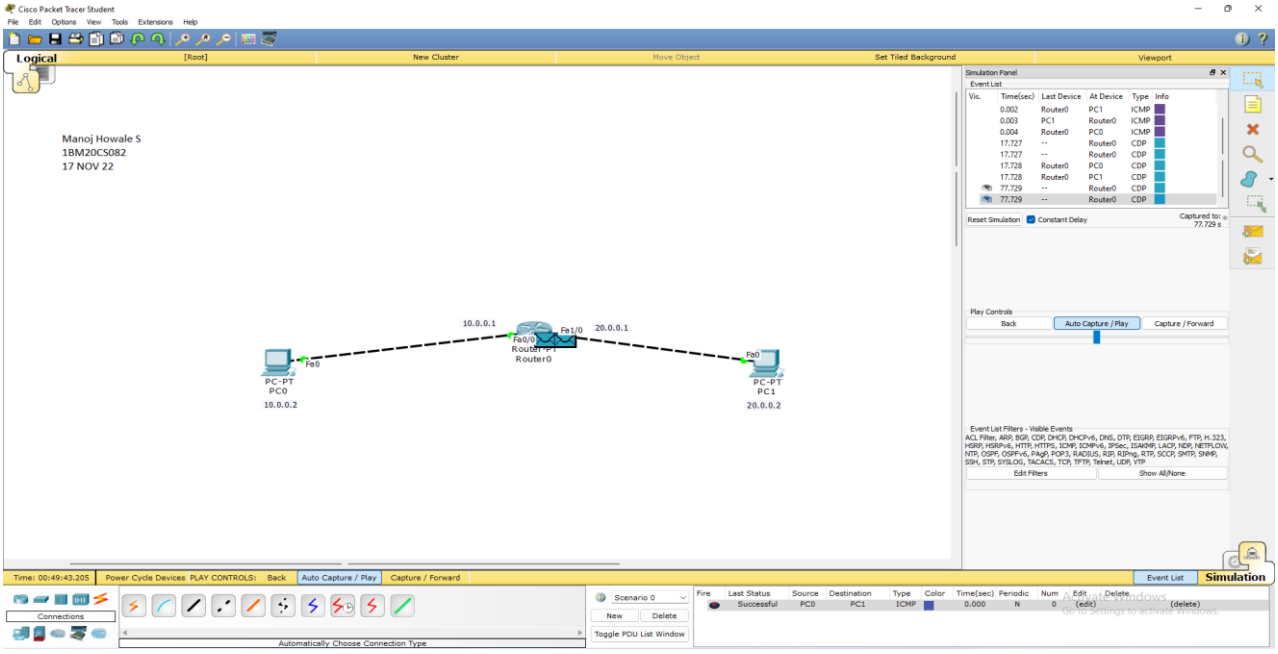
Reply from 40.0.0.1 : bytes = 32 time < 1 ms TTL = 127

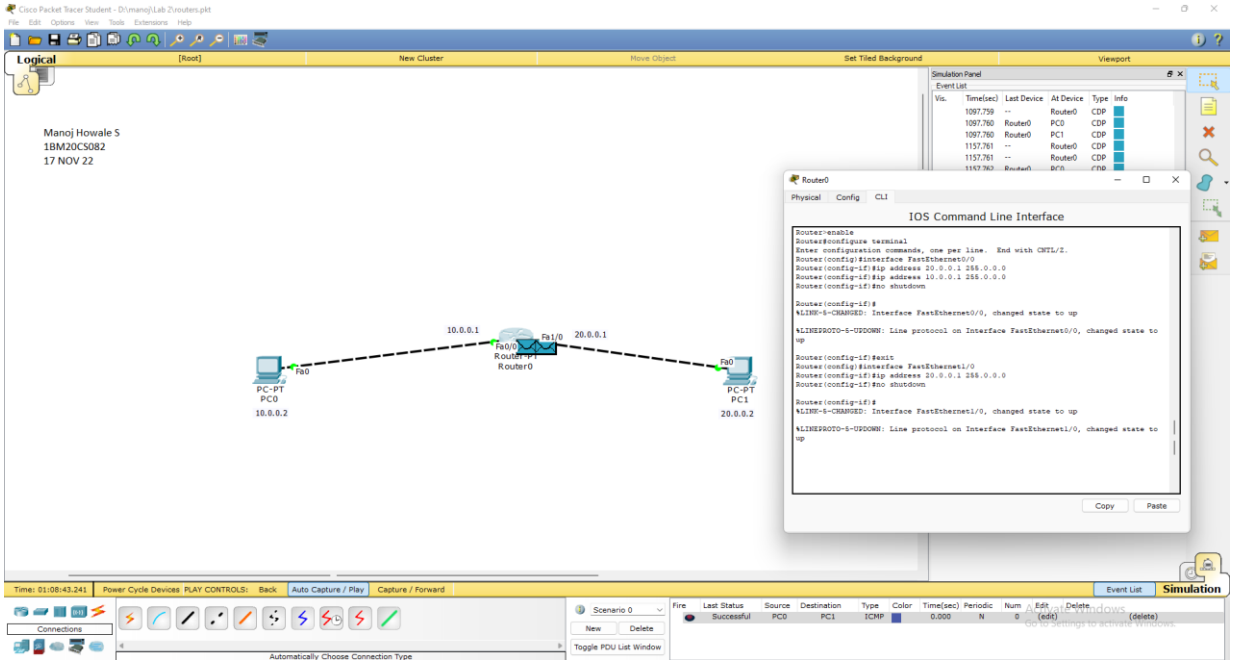
Ping statistics for 40.0.0.1

Packets : sent = 4 , recieved = 4 , lost = 0 (0% loss)

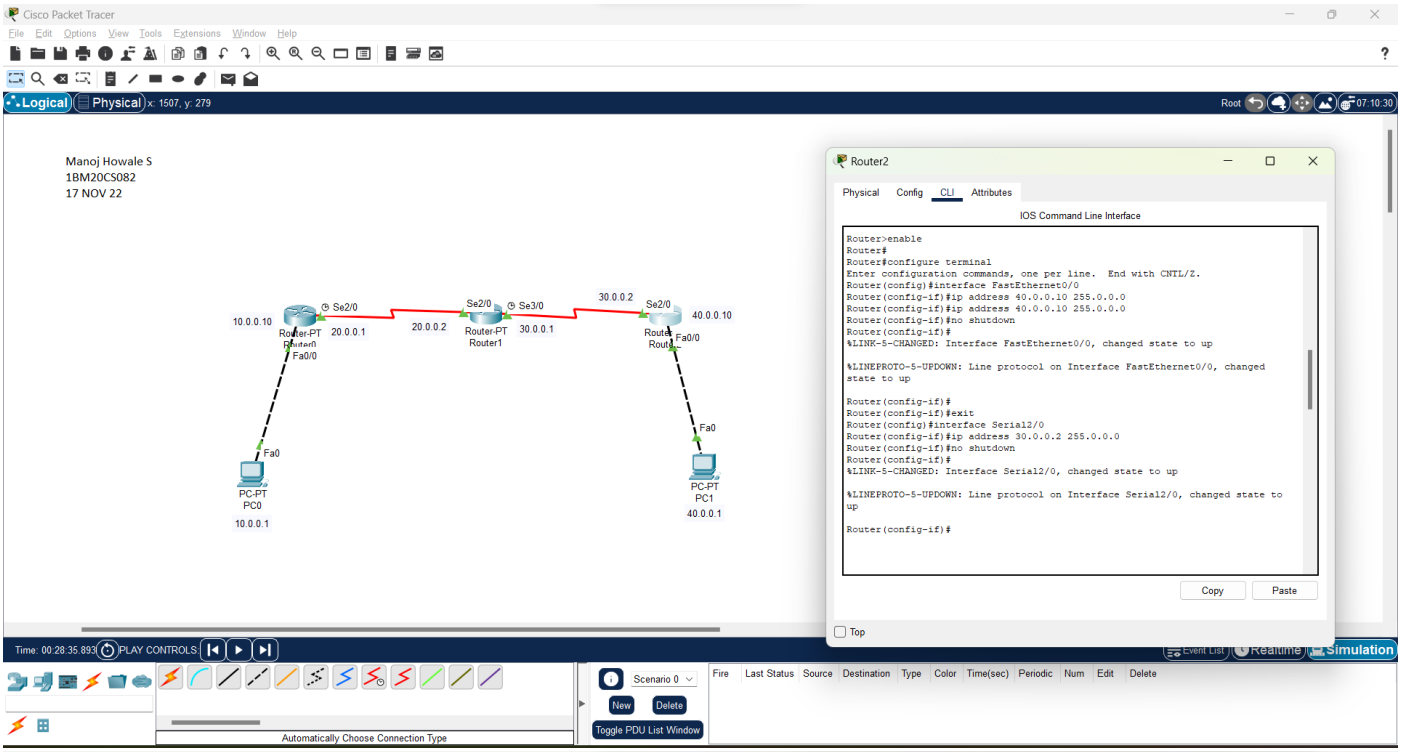
SINGLE ROUTER—REAL TIME

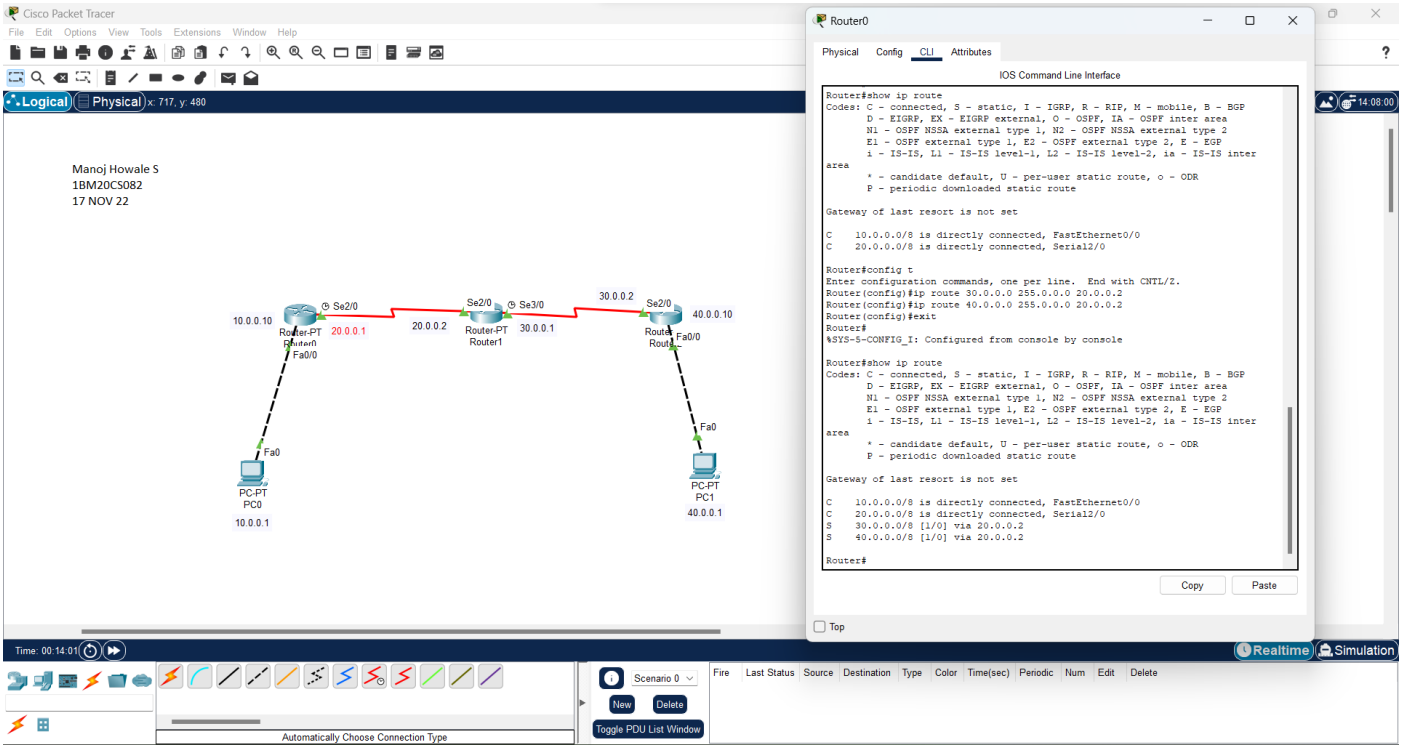


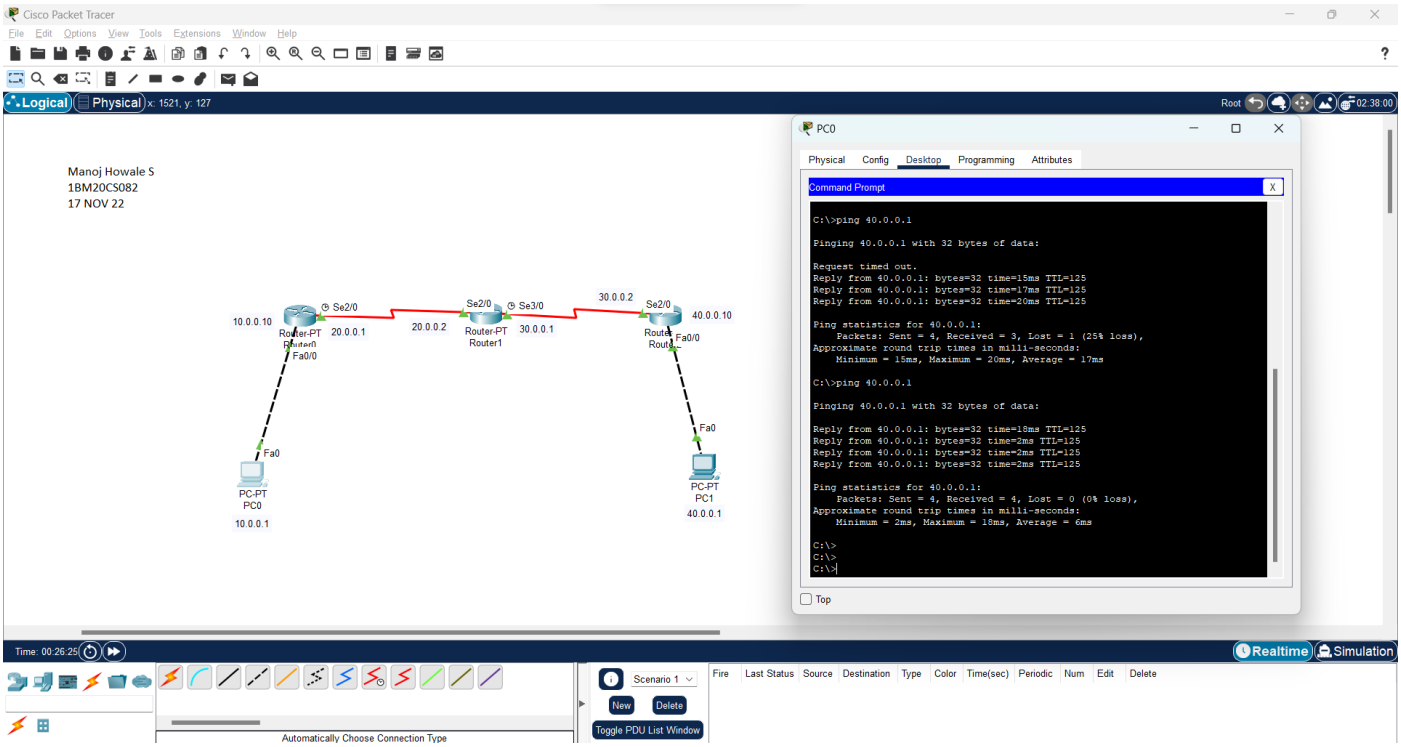


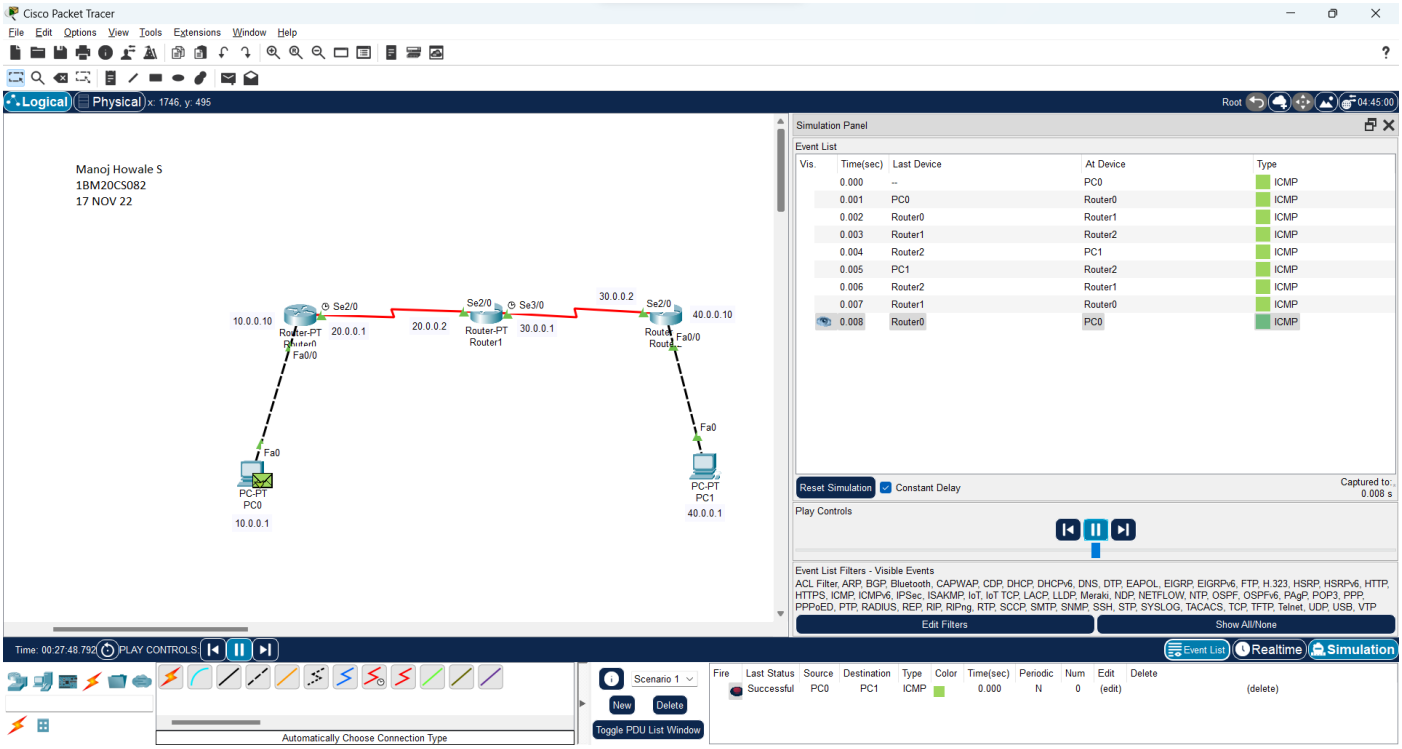


ROUTERS—REAL TIME






Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1521, y: 127
Root 02:38:00
Manoj Howale S
1BM20CS082
17 NOV 22
10.0.0.10
Se2/0
Router-PT
Router0
Fa0/0
20.0.0.1
Se2/0
Se3/0
20.0.0.2
Router-PT
Router1
30.0.0.1
30.0.0.2
Se2/0
Router
Router2
Fa0/0
40.0.0.10
Fa0
PC-PT
PC0
10.0.0.1
Fa0
PC-PT
PC1
40.0.0.1
PC0
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.1: bytes=32 time=15ms TTL=125
Reply from 40.0.0.1: bytes=32 time=17ms TTL=125
Reply from 40.0.0.1: bytes=32 time=20ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 15ms, Maximum = 20ms, Average = 17ms
C:\>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes=32 time=18ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 18ms, Average = 6ms
C:\>
C:\>
C:\>
Top
Time: 00:26:25
Realtime Simulation
Scenario 1
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Automatically Choose Connection Type


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1746, y: 495
Root 04:45:00
Manoj Howale S
1BM20CS082
17 NOV 22
10.0.0.10
Se2/0
Router-PT
Router0
Fa0/0
20.0.0.1
Se2/0
Se3/0
20.0.0.2
Router-PT
Router1
30.0.0.1
30.0.0.2
Se2/0
Router
Router2
Fa0/0
40.0.0.10
Fa0
PC-PT
PC0
10.0.0.1
Fa0
PC-PT
PC1
40.0.0.1
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 Router2 ICMP
0.004 Router2 PC1 ICMP
0.005 PC1 Router2 ICMP
0.006 Router2 Router1 ICMP
0.007 Router1 Router0 ICMP
0.008 Router0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to:
0.008 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 00:27:48.792
PLAY CONTROLS:
Event List
Realtime Simulation
Scenario 1
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
Automatically Choose Connection Type