

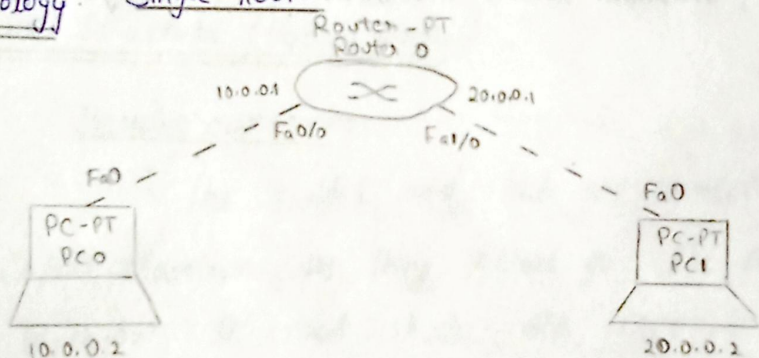
17/11/22

## Lab 2

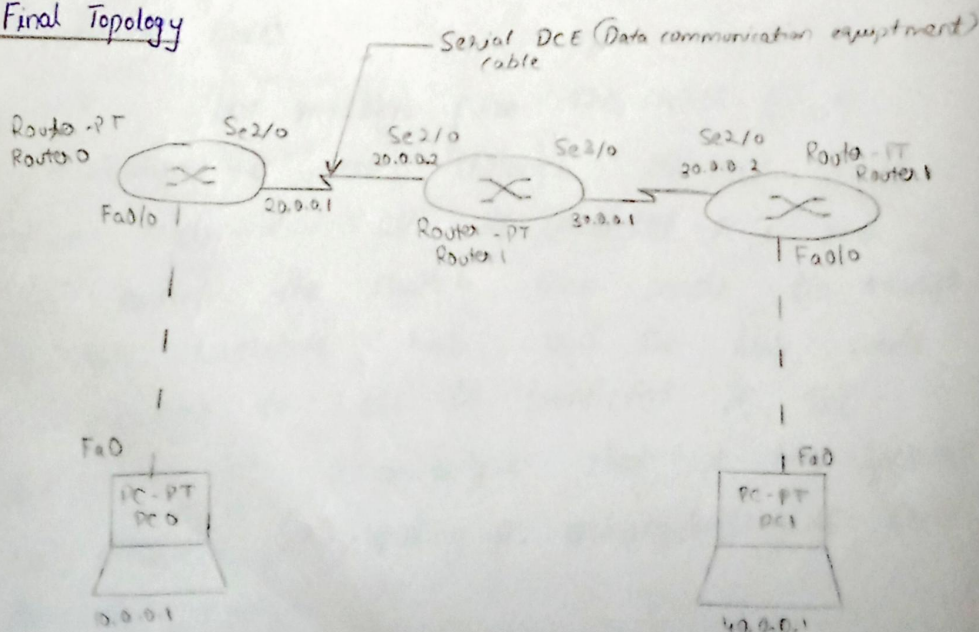
### Routers

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 FastEthernet 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-~~0~~) # 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, and 10.0.0.10 and 40.0.0.1, 40.0.0.10 respectively. ~~the~~

- In the router 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 7

- Configure router 2 similarly as router 0 with IP's of FA0/0 as 40.0.0.10 and S2/0 as 30.0.0.2.

- Configure router 1 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 route 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 packets are received by PC1. If we reverse ping from PC1 to PC0 all four packets are received 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 ~~router~~ 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

The screenshot shows the Cisco Packet Tracer Student interface. The network diagram features a central router (Router0) connected to two PCs (PC0 and PC1). PC0 has IP 10.0.0.2 and PC1 has IP 20.0.0.2. The router's Fa0/0 interface is connected to PC0, and Fa0/1 is connected to PC1. A Command Prompt window is open, displaying the results of a ping command from PC0 to PC1. The output shows that the ping was successful, with 4 packets sent, 4 received, and 0 lost.

```
PC>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Pinging 10.0.0.2: bytes=32 time=0ms TTL=127
Statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Reply from 10.0.0.2: bytes=32 time=0ms TTL=127
Pinging 10.0.0.2: bytes=32 time=0ms TTL=127
Statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
```

The screenshot shows the Cisco Packet Tracer Student interface. The network diagram is the same as in the previous screenshot. The Simulation Panel window is open, displaying a table of simulation events. The table has columns for Vis., Time(sec), Last Device, At Device, Type, and Info. The events listed are:

Vis.	Time(sec)	Last Device	At Device	Type	Info
0.002	0.002	Router0	PC1	ICMP	
0.003	0.003	PC1	Router0	ICMP	
0.004	0.004	Router0	PC0	ICMP	
17.727	17.727	--	Router0	CDP	
17.728	17.728	Router0	PC0	CDP	
17.729	17.729	--	Router0	CDP	
17.729	17.729	Router0	PC1	CDP	
17.729	17.729	--	Router0	CDP	

The screenshot shows the Cisco Packet Tracer Student interface. The network diagram is the same as in the previous screenshots. The Router0 CLI window is open, displaying the configuration for the router. The configuration includes the following commands:

```
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 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config)#interface FastEthernet0/2
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config)#interface FastEthernet0/3
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config)#interface FastEthernet0/4
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
```

# ROUTERS—REAL TIME

The image displays two screenshots of the Cisco Packet Tracer interface, showing network configurations for Router2 and Router0.

**Top Screenshot (Router2):**

- Network Diagram:** Shows a topology with three routers (Router-PT, Router-PT Router1, Router-PT) and two PCs (PC-PT PC0, PC-PT PC1). The routers are connected via serial interfaces (Se2/0, Se3/0, Se2/0) and fast Ethernet interfaces (Fa0/0). IP addresses are assigned to the interfaces: 10.0.0.10, 20.0.0.1, 20.0.0.2, 30.0.0.1, 30.0.0.2, 40.0.0.10, 10.0.0.1, and 40.0.0.1.
- CLI Window:** Shows the configuration for Router2. The configuration includes enabling the router, configuring the terminal, and setting up interfaces FastEthernet0/0 and Serial2/0 with IP addresses and no shutdown commands.

**Bottom Screenshot (Router0):**

- Network Diagram:** Shows the same topology as the top screenshot, but with different IP addresses assigned to the interfaces: 10.0.0.10, 20.0.0.1, 20.0.0.2, 30.0.0.1, 30.0.0.2, 40.0.0.10, 10.0.0.1, and 40.0.0.1.
- CLI Window:** Shows the configuration for Router0. The configuration includes enabling the router, configuring the terminal, and setting up interfaces FastEthernet0/0 and Serial2/0 with IP addresses and no shutdown commands. It also shows the configuration for the serial interfaces (Serial2/0) with IP addresses and no shutdown commands.



Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

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18M20CS082  
17 NOV 22

10.0.0.10 Router-PT 20.0.0.1 20.0.0.2 Router-PT Router1 30.0.0.2 Router2 40.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 40.0.0.1

Time: 00:26:25

Scenario 1

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Toggle PDU List Window

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

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

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17 NOV 22

10.0.0.10 Router-PT 20.0.0.1 20.0.0.2 Router-PT Router1 30.0.0.2 Router2 40.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 40.0.0.1

Time: 00:27:48.792

Scenario 1

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Toggle PDU List Window

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, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Event List

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	(delete)