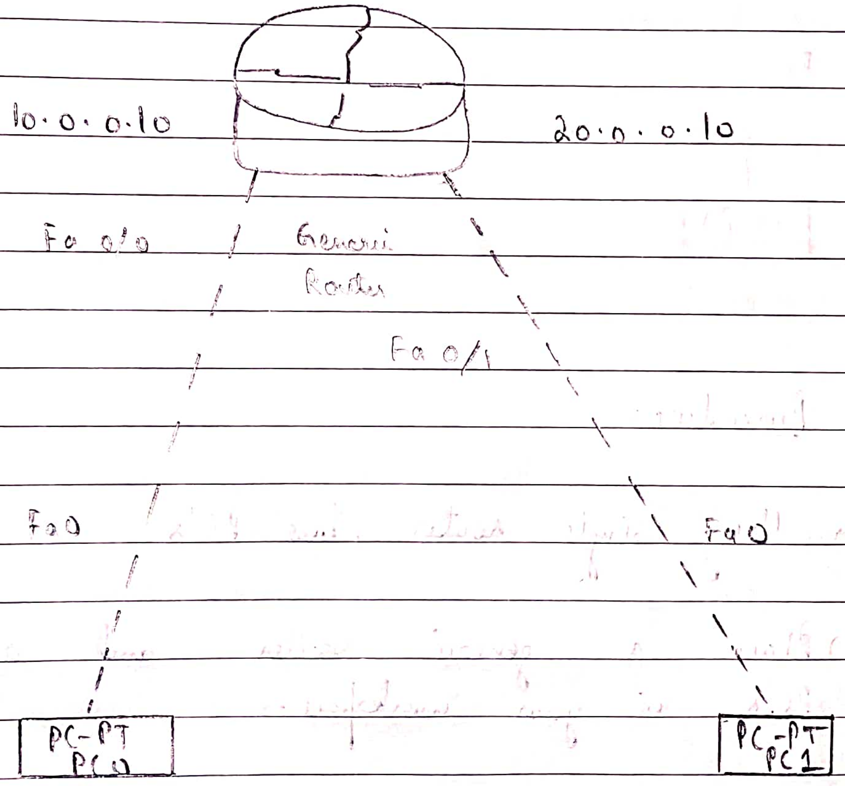
Lab: Week 2 Experiment using routers and PCs

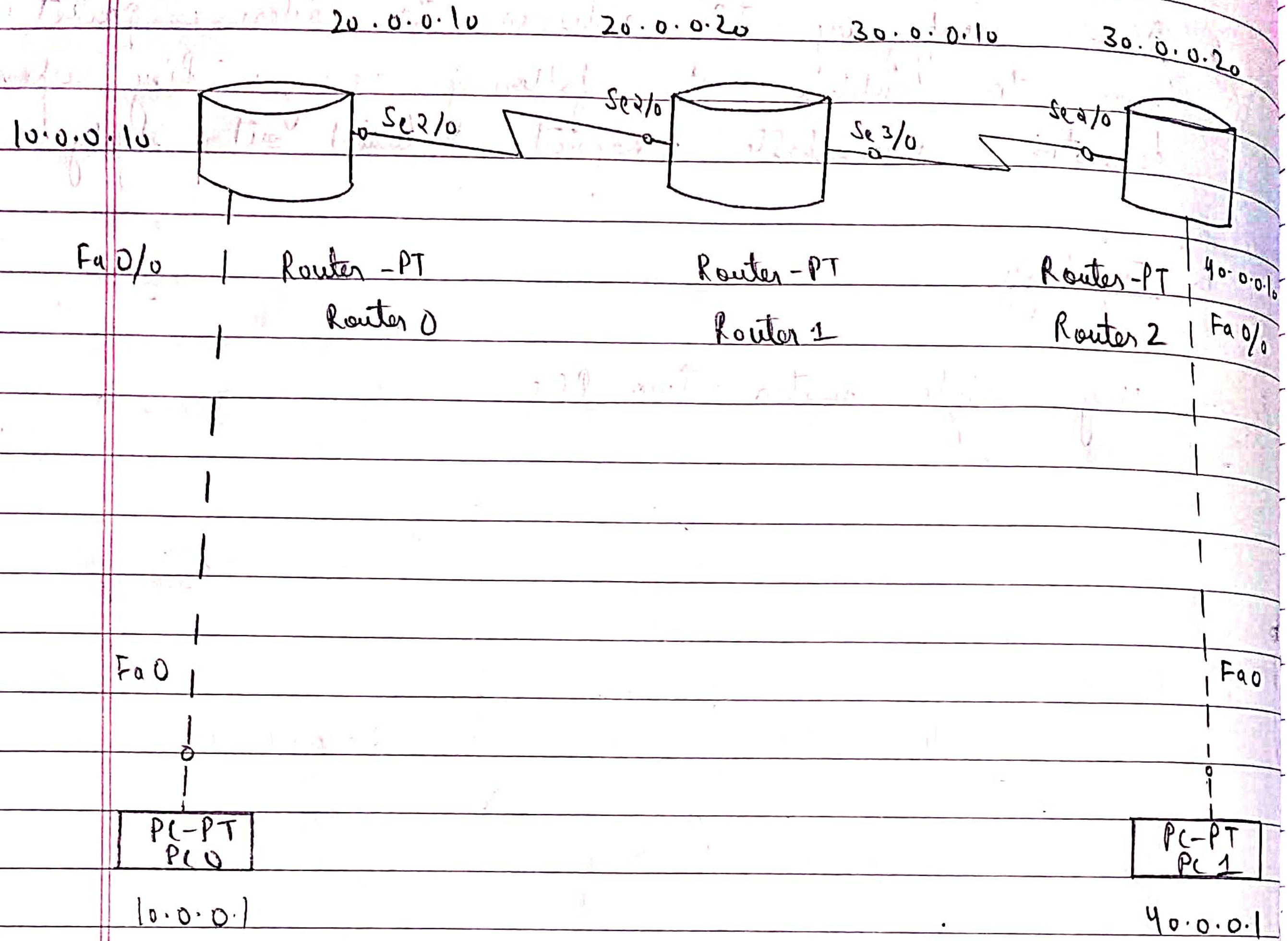
↳ **Aim:** Configuring IP addresses to routers in packet tracer to explore the following messages: Ping responses, destination unreachable, Request timed out, reply.

↳ **Topology:**

→ Using single router, two PCs:



→ Using three routers, two PCs:



↳ **Procedure:**

→ Using single router, two PC's

i) Place a generic router and add two generic PC's in your workspace.

ii) Connect the router and PCs using copper cross over wire.

iii) Configure IP address of each PC and in the configuration tab under settings set gateways for both PCs to the router.

iv) Click on the generic router and go to the CLI

Tab: Enter the following commands to set up a connection between PCs (1) and generic router through gateway 10.0.0.10.

→ No
→ enable
\# config t
(config)# interface fastethernet 0/0.
(config-if)# ip address 10.0.0.10 255.0.0.0
\# no shut
\# exit

Now to set up connection between PC2 and the router through gateway 20.0.0.10

\# interface fastethernet 1/0
\# ip address 20.0.0.10 255.0.0.0
\# no shut
\# exit

Once we enter no shut both times the amber light between the PC and router turns green indicating that the two devices are ready for use.

Simulation mode: Add a simple PDU by selecting the PCs and click on auto capture from right panel.

Real time mode: Select the PC you want to send the packet from which is PC0 in our case and open its command prompt from desktop tab. Specify the destination address. A response is sent from destination PC to source PC.

→ Using three routers, two PCs

i) Place 3 generic routers and 2 generic PCs in the workspace.

ii) Place a note for each device [PC and router] and specify the IP address.

iii) Connect the router and PC using copper cross-over.

iv) Connect the routers using serial DCE.

v) Click on each PC, go to the configure tab. Set the IP address and subnet mask in fastethernet

vi) Next click on settings in the config tab. Set the gateway as the IP address of the next router [e.g 10.0.0.10]

vii) IP address of PC and its gateway address should belong to the same network.

For <u>connecting two routers</u>:

Click on Router 0. Go to CLI and enter the following commands.

→ no
→ enable
→ config t
→ interface serial 2/0
→ ip address 20.0.0.10 255.0.0.0
→ no shut

Click on router 1, open CLI and enter the following commands.

→ no
→ enable
→ config t
→ interface serial 2/0
→ ip address 20.0.0.20 255.0.0.0
→ no shut

After this procedure, the red lights between the two routers will now turn green [router 0 and router 1]. Indicating that they are now ready for communication.

For connecting two devices [1 PC and one router].

i) Since IP address of the PC0 is already configured, go to router.

ii) Open CLI for router 0 and enter the following commands.

→ no
→ enable
→ config t
→ interface fastethernet 0/0
→ ip address 10.0.0.10 255.0.0.0
→ no shut

The red light turns green meaning that the router is ready for communication.

Teaching Router 0 of network 30:

→ no
→ enable
→ config t
→ interface serial 2/0
→ ip route 30.0.0.0 255.0.0.0 20.0.0.20
→ exit
→ show ip route

Teaching Router 0 of network 40:

→ no
→ enable
→ config t
→ interface serial 2/0
→ ip route 40.0.0.0 255.0.0.0 20.0.0.20
→ exit
→ show ip route.

Similarly repeat this for router 1 and router 2.

Simulation mode: Add a simple PDU by selecting the PC 2 and click on auto capture from right panel.

Real time mode: Select the PC PC0 and go to its command prompt and ping the router 0. Once the message has been sent sucessfully Repeat this with routers 1 and 2 as well. Finally, ping PC1

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b) Observation :
Learning outcome

→ 1 Router :
When PC0 pings PC1 for the first time, we get the first packet as request timed out.
Now, if we ping PC1 again from PC0 we get all 4 packets without any loss. Now reverse pinging of PC0 from PC1 will also not lead to any loss, all packets are acknowledged.

→ 3 routers :

Before training the routers, we get the results as destination host unreachable. After training the routers, we get clear statistics as the Result.

↳ Result:

→ Using 1 router, two PCs.

C:\> 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 < 1 ms TTL = 127.
Reply from 20.0.0.1 : bytes = 32 time < 1 ms TTL = 127.
Reply from 20.0.0.1 : bytes = 32 time < 1 ms TTL = 127.

Ping statistics for 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data :

Reply from 20.0.0.1 : bytes = 32 time < 1 ms TTL = 127
Reply from 20.0.0.1 : bytes = 32 time < 1 ms 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 , received = 4, lost = 0 (0% loss)

→ Using three routers, two PCs:

1. PC> Ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data

Reply from 10.0.0.10 : destination host unreachable.
Reply from 10.0.0.10 : destination host unreachable.
Reply from 10.0.0.10 : destination host unreachable
Reply from 10.0.0.10 : destination host unreachable
Ping statistics for 40.0.0.1
Packets : sent = 4, received = 0 , lost = 4 (100% loss)

2. PC> Ping 10.0.0.10 with 32 bytes of data

Reply from 10.0.0.10 : bytes = 32 time = 0ms TTL=255
Reply from 10.0.0.10 : bytes = 32 time = 0 ms TTL= 255
Reply from 10.0.0.10 : bytes = 32 time = 0 ms TTL=255
Reply from 10.0.0.10 : bytes = 32 time = 0 ms TTL= 255.
Ping statistics for 10.0.0.10:
Packets : sent = 4, Received = 4, lost = 0 (0% lost)

3. PC> Ping 20.0.0.10 with 32 bytes of data

Reply from 20.0.0.10 : bytes = 32 time = 1ms TTL=255
Reply from 20.0.0.10 : bytes = 32 time = 0ms TTL=255
Reply from 20.0.0.10 : bytes = 32 time = 0ms TTL= 255
Reply from 20.0.0.10 : bytes = 32 time = 0 ms TTL= 255.

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Ping statistics for 20.0.0.10:
Packets : sent = 4, received = 4, lost = 0 (0% lost)

4. PC> ping 30.0.0.10
Pinging 30.0.0.10 with 32 bytes of data

Reply from 30.0.0.10: bytes = 32 time = 1ms TTL = 254.
Reply from 30.0.0.10: bytes = 32 time = 1ms TTL = 254
Reply from 30.0.0.10: bytes = 32 time = 1ms TTL = 254
Reply from 30.0.0.10: bytes = 32 time = 8ms TTL = 254.

Ping statistics for 30.0.0.10:
packets : sent = 4, received = 4, lost = 0 (0% lost)

5. PC> 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 = 10ms TTL = 125
Reply from 40.0.0.1 : bytes = 32, time = 13ms TTL = 125
Reply from 40.0.0.1: bytes = 32, time = 8ms TTL = 125.

Ping statistics for 40.0.0.1:
Packets : sent = 4, received = 3, lost = 1 (25% loss)

6. PC> ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:

Reply from 40.0.0.1 : bytes = 32 time = 2ms TTL = 125.
Reply from 40.0.0.1 : bytes = 32 time = 24ms TTL = 125.
Reply from 40.0.0.1 : bytes = 32 time = 9ms TTL = 125.
Reply from 40.0.0.1 : bytes = 32 time = 9ms TTL = 125.
Ping statistics for 40.0.0.1:
packets : sent = 4, received = 4, lost = 0 (0% loss).

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