VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COURSE TITLE

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
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BENGALURU-560019
JUN-2023 to SEP-2023

B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "LAB COURSE **COMPUTER NETWORK**" carried out by **ANAGHA K S (1BM21CS021),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respect of a **Computer network - (22CS4PCCON)** work prescribed for the said degree.

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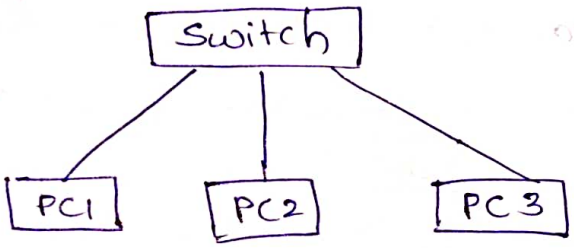
Experiment-1

Create a topology and simulate sending a simple PDU from source to destination using both hub and switch as connecting devices and demonstrate ping message.

Switch:

Aim: to create a topology and send simulate sending simple PDU from source to destination using switch as connecting device.

Topology:



Procedure:

Take 3 generic PC's connect them to switch. Set IP addresses of the PCs. When the switch is ready for communication, simulate sending a PDU from one PC to other.

In real time, Ping a PC by command prompt of sender PC

Result:

```
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=128
Reply from 10.0.0.2 bytes=32 time=0ms TTL=128
Reply from 10.0.0.2 bytes=32 time=0ms TTL=128
Reply from 10.0.0.2 bytes=32 time=0ms TTL=128

Ping statics for 10.0.0.2: Packets: sent=4, receiver=4, Lost=0 (0%
```

observation:

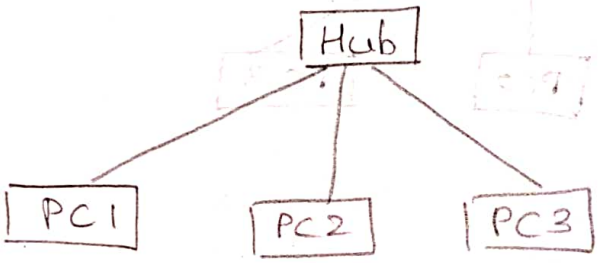
the PDU is sent to switch, it is broadcasted to all PCs. and then the PCs cohich are not destination PCs, rejects PDU. ~~Acknowled~~ Acknowledgement is sent to switch by the destination PC.

Then the PDU is sent to switch, switch broaeasts PDU to destination PC only.

Hub:

Aim: To creati a topology and simulati sending simple PDU from source to destination using Hub as connection device.

Topology:



Procedure: 3 generic PCs are taken. IP address of PCs are set. PCs are connected to the Hub.

Simulation of sending a PDU to one PC to other is done.

In real time, Ping message is sent from one PC to other.

Result:

Package tracer PC command line 1.0

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 = 21 ms TTL = 128

Reply from 10.0.0.2: bytes = 32 time = 7 ms TTL = 128

Reply from 10.0.0.2: bytes = 32 time = 0 ms TTL = 128

Reply from 10.0.0.2: bytes = 32 time = 0 ms TTL = 128

Ping statics for 10.0.0.2:

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

Approximate round trip times in milli-seconds:

minimum = 0 ms, maximum: 21 ms, Average = 7ms

Observation:

PDU is sent from source to hub. It is broadcasted to every other PC. The destination PC receives PDU other PCs reject. Acknowledgement is sent from destination PC.

Ping message is sent from source to destination.

Hub and switch:

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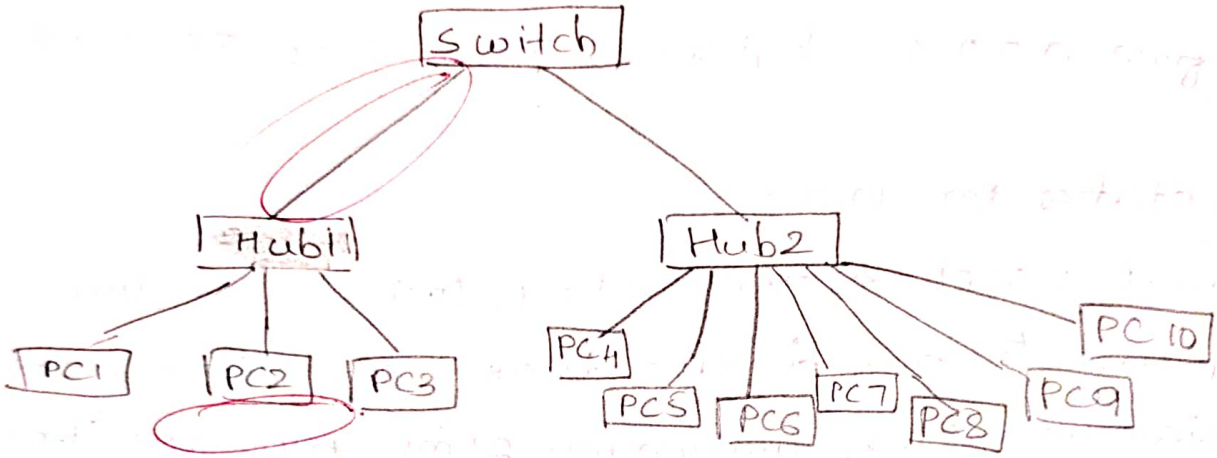
Aim: To create a topology and simulate sending PDU from source to destination using both hub and switch as connecting device.

Topology:



Procedure:

3 generic PCs are taken, IP addresses are set, and then connected to a hub.

7 generic PCs are taken, IP addresses are set, extra ports are added to hub if needed and the connections are made.

both hubs are then connected to a switch.

PDU is sent from one PC to other.

Ping message is sent from one PC to other.

Result:

Pinging 10.0.0.7 with 32 bytes of data:

Reply from 10.0.0.7: bytes=32 time=0ms TTL=128

Reply from 10.0.0.7: bytes=32 time=0ms TTL=128

Reply from 10.0.0.7: bytes=32 time=0ms TTL=128

Reply from 10.0.0.7: bytes=32 time=0ms TTL=128

Ping statics for 10.0.0.7:

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

Approximate round trip times in millie-seconds:

minimum = 0 ms, maximum = 0 ms, Average = 0 ms

Observation:

PDU sent from one PC goes to the hub connected to it. Hub broadcasts it to every other PC it is connected to and also to switch. Switch receives the PDU sends it to all hubs, the hub then broadcasts it to every PC it is connected to. The destination PC receives PDU and sends acknowledgement to hub that is sent to switch and sent back to source hub. All other PCs rejects the PDU.

22/6/23

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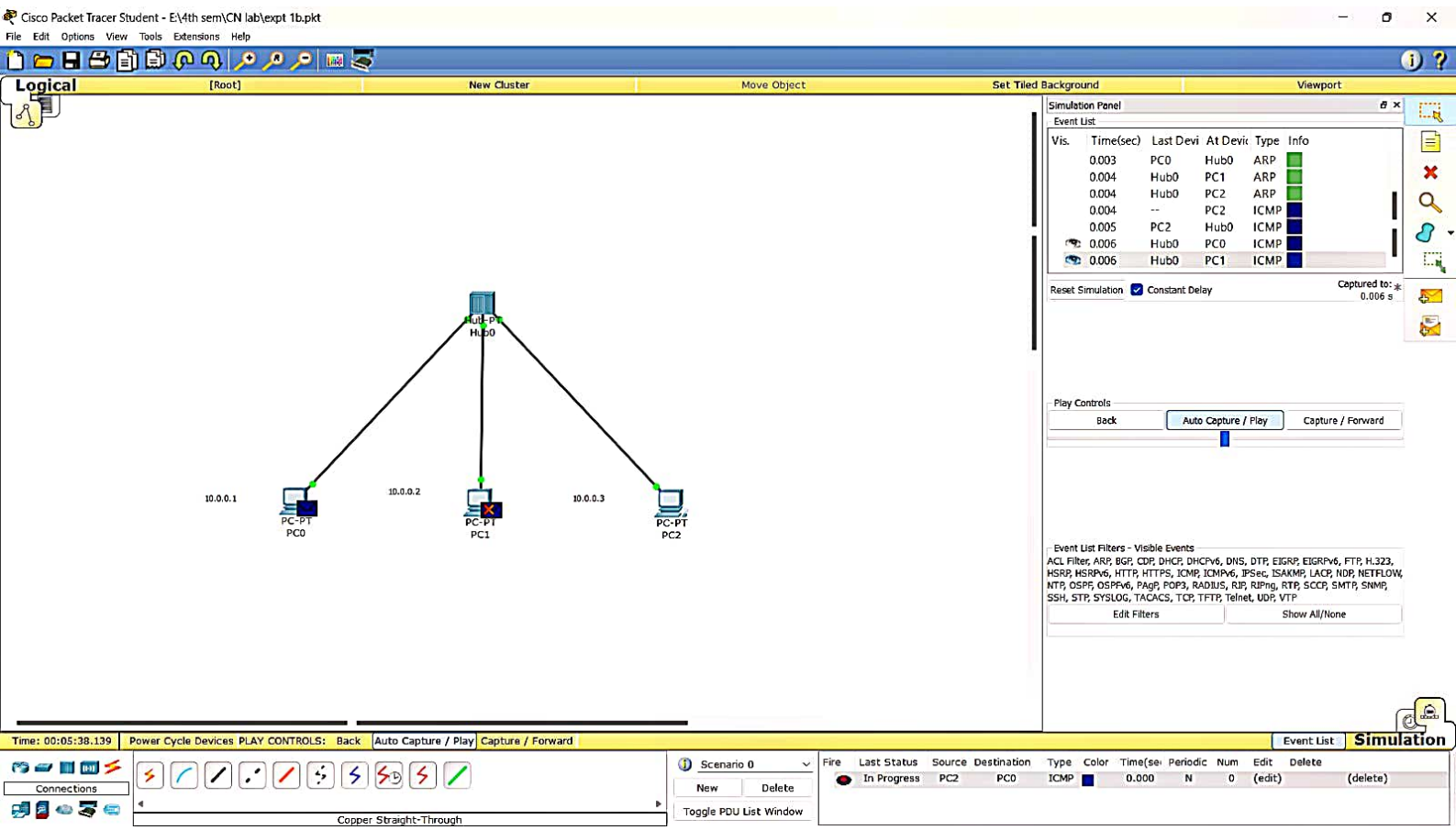
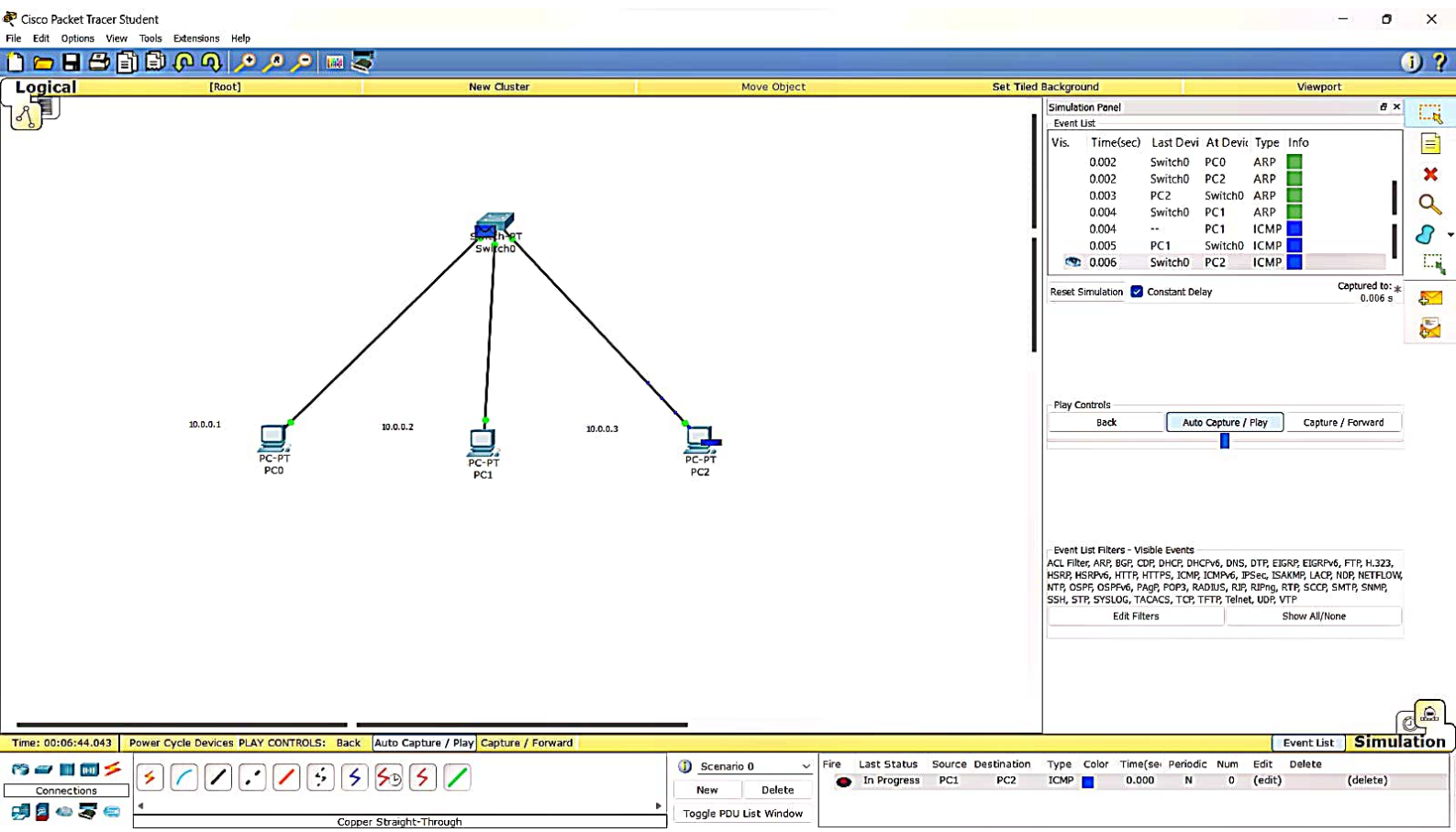
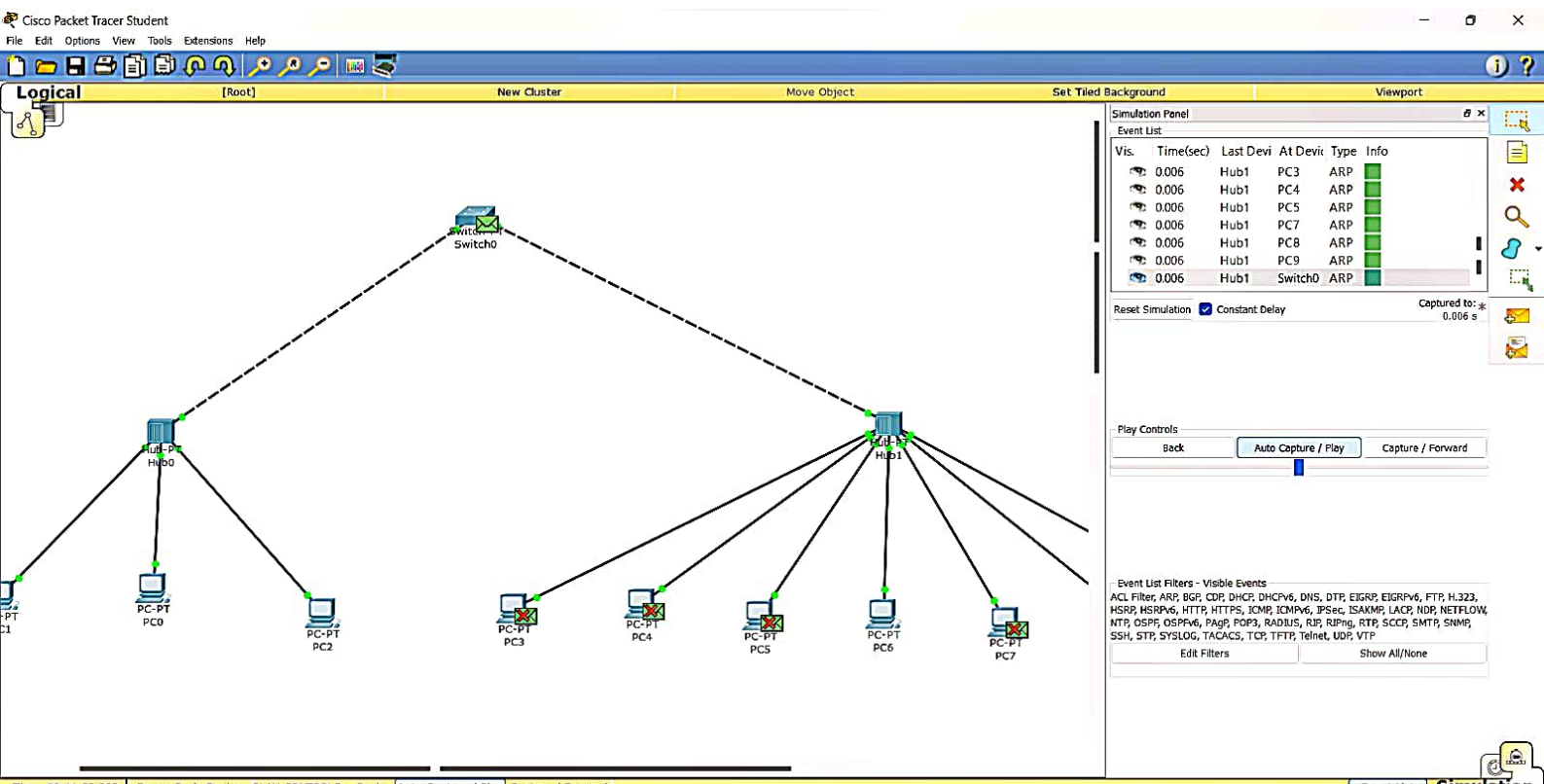
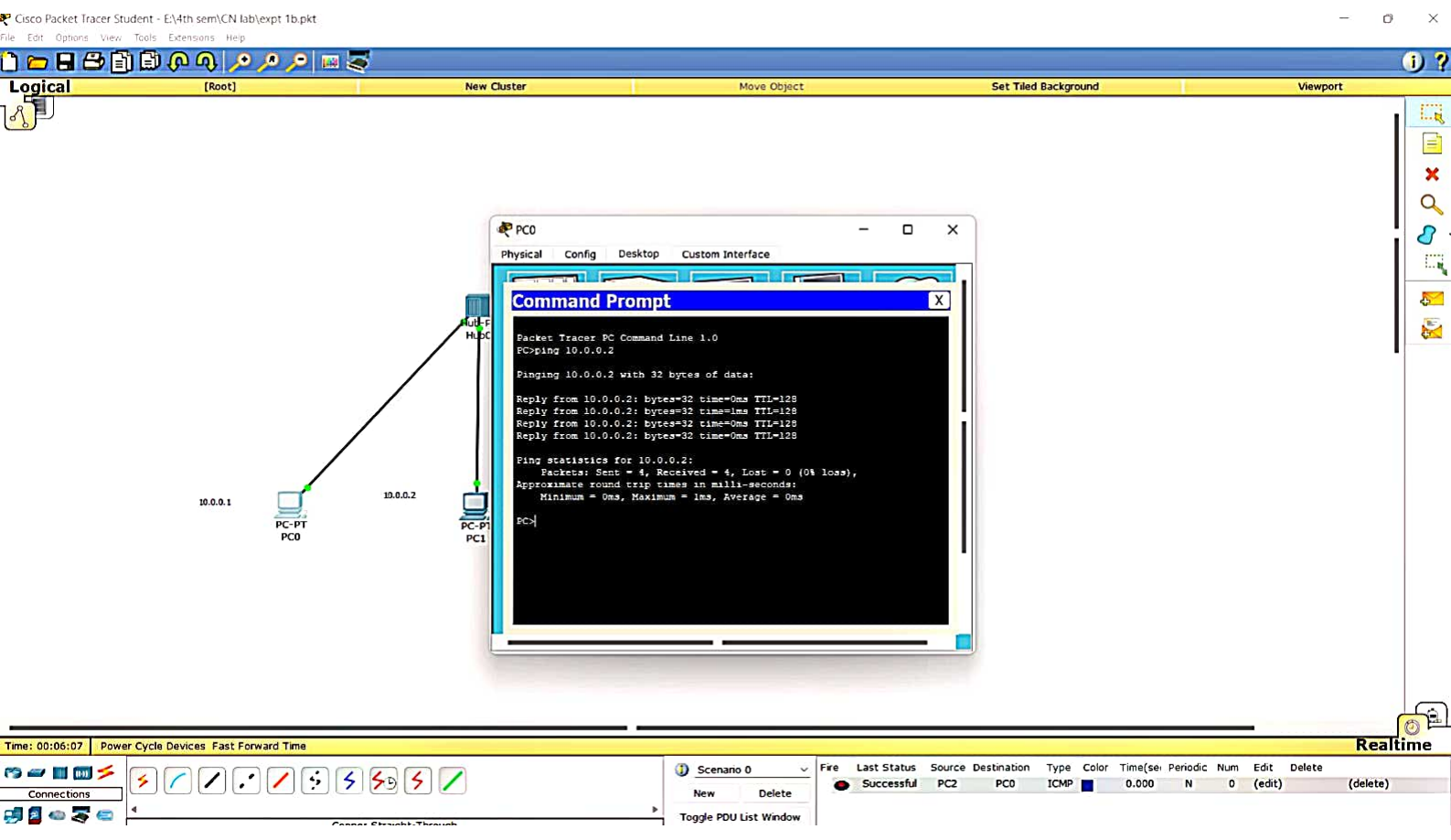
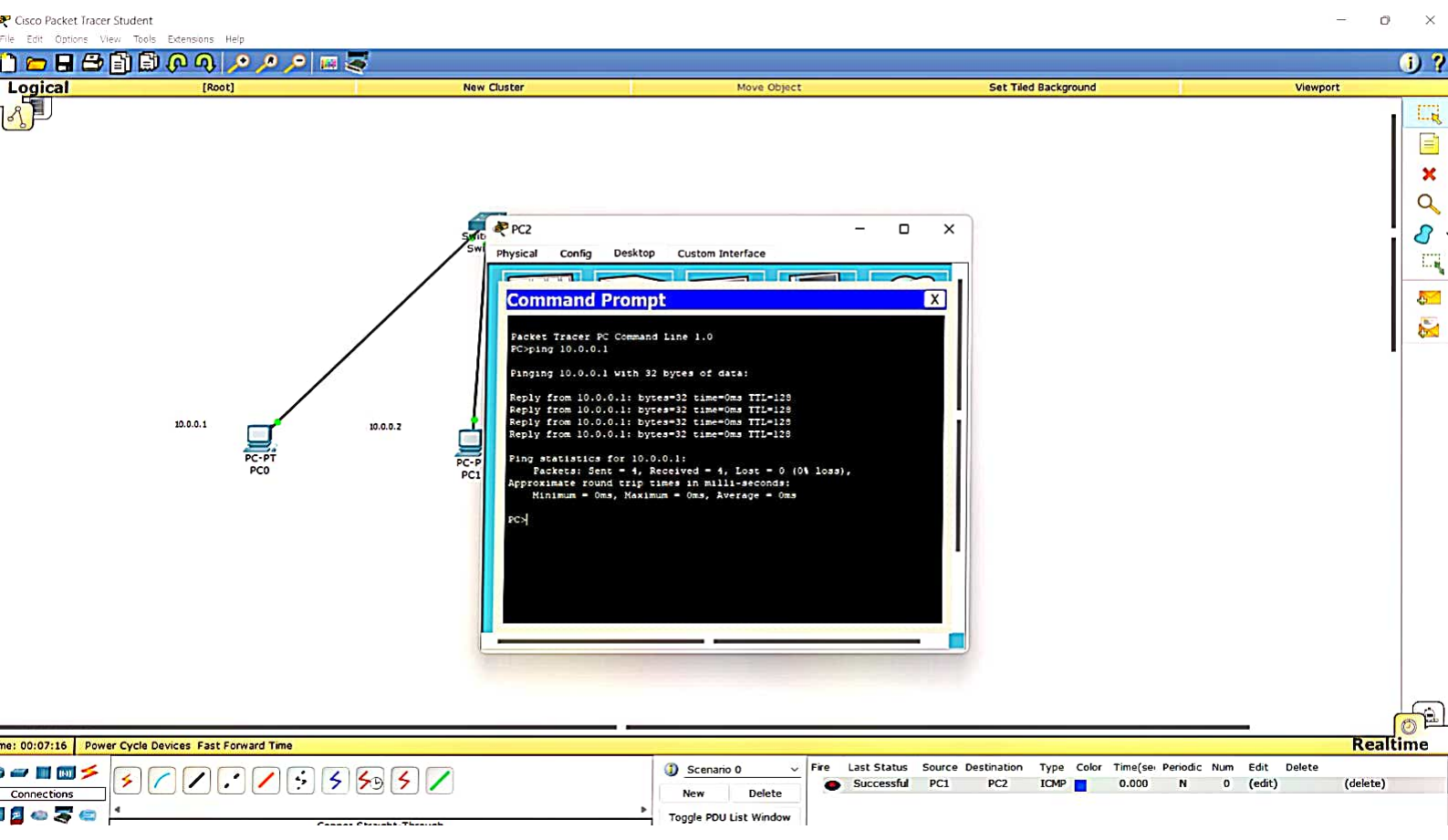
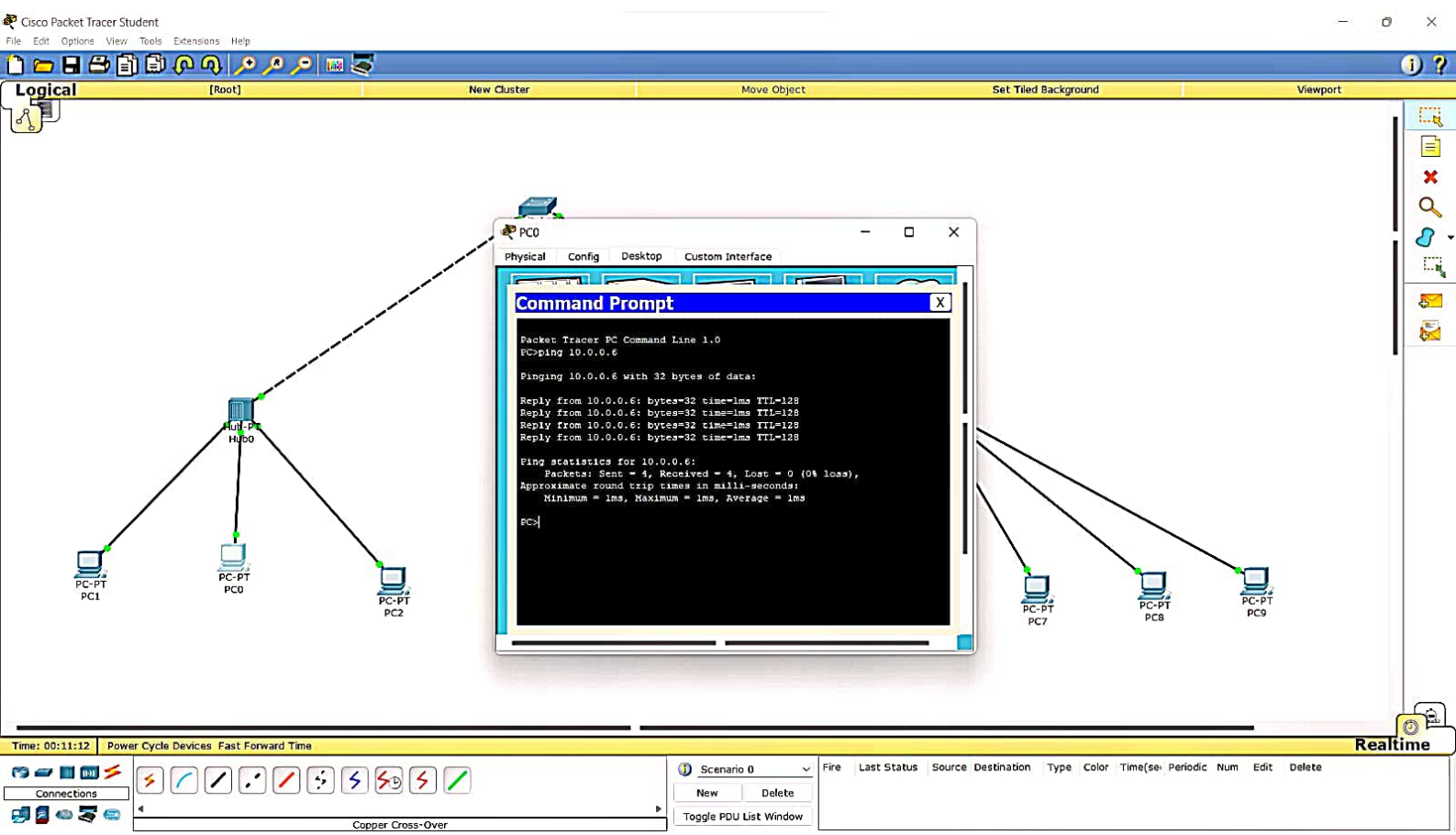

Cisco Packet Tracer Student - E:\4th sem\CN lab\expt 1b.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devi Type Info
0.003 PC0 Hub0 ARP
0.004 Hub0 PC1 ARP
0.004 Hub0 PC2 ARP
0.004 -- PC2 ICMP
0.005 PC2 Hub0 ICMP
0.006 Hub0 PC0 ICMP
0.006 Hub0 PC1 ICMP
Reset Simulation
Constant Delay
Captured to:
0.006 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Hub-PT
Hub0
10.0.0.1
10.0.0.2
10.0.0.3
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Time: 00:05:38.139
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
In Progress PC2 PC0 ICMP 0.000 N 0 (edit) (delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch-PT
Switch0
10.0.0.1
10.0.0.2
10.0.0.3
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devi Type Info
0.002 Switch0 PC0 ARP
0.002 Switch0 PC2 ARP
0.003 PC2 Switch0 ARP
0.004 Switch0 PC1 ARP
0.004 -- PC1 ICMP
0.005 PC1 Switch0 ICMP
0.006 Switch0 PC2 ICMP
Reset Simulation
Constant Delay
Captured to:
0.006 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:06:44.043
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
In Progress PC1 PC2 ICMP 0.000 N 0 (edit) (delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch0
Hub0
Hub1
PC0
PC2
PC3
PC4
PC5
PC6
PC7
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devi Type Info
0.006 Hub1 PC3 ARP
0.006 Hub1 PC4 ARP
0.006 Hub1 PC5 ARP
0.006 Hub1 PC7 ARP
0.006 Hub1 PC8 ARP
0.006 Hub1 PC9 ARP
0.006 Hub1 Switch0 ARP
Reset Simulation
Constant Delay
Captured to:
0.006 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:11:33.223
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Cross-Over
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
In Progress PC1 PC6 ICMP 0.000 N 0 (edit) (delete)


Cisco Packet Tracer Student - E:\4th sem\CN lab\expt 1b.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
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=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128
Reply from 10.0.0.2: bytes=32 time=0ms TTL=128
Ping 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 = 1ms, Average = 0ms
PC>
10.0.0.1
10.0.0.2
PC-PT
PC0
PC-PT
PC1
Time: 00:06:07
Power Cycle Devices Fast Forward Time
Realtime
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Successful
PC2
PC0
ICMP
0.000
N
0
(edit)
(delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC2
Physical
Config
Desktop
Custom Interface
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=0ms TTL=128
Reply from 10.0.0.1: bytes=32 time=0ms TTL=128
Reply from 10.0.0.1: bytes=32 time=0ms TTL=128
Reply from 10.0.0.1: bytes=32 time=0ms TTL=128
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 = 0ms, Average = 0ms
PC>
10.0.0.1
10.0.0.2
PC-PT
PC0
PC-P
PC1
Power Cycle Devices Fast Forward Time
Realtime
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Successful
PC1
PC2
ICMP
0.000
N
0
(edit)
(delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.6
Pinging 10.0.0.6 with 32 bytes of data:
Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Reply from 10.0.0.6: bytes=32 time=1ms TTL=128
Ping statistics for 10.0.0.6:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>
Hub-PT
Hub0
PC-PT
PC1
PC-PT
PC0
PC-PT
PC2
PC-PT
PC7
PC-PT
PC8
PC-PT
PC9
Time: 00:11:12
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Copper Cross-Over
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete

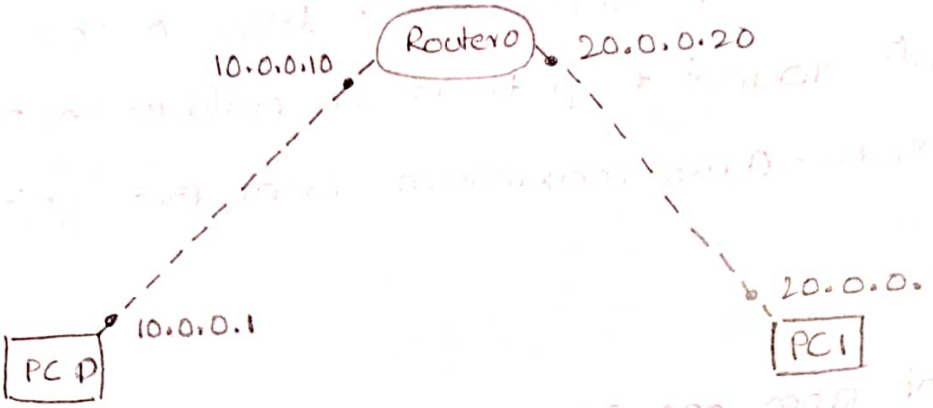
Experiment - 2

Name of the experiment: Create Configure IP address to routers in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.

2a:

Aim: To Configure IP address to routers in packet tracer and get ~~req~~ ping responses - request timed out, reply.

Topology:



Procedure:

- 2 PCs are connected to a router using copper cross over
- IP addresses are set for PCs and Router
- IP address for Router is set by giving following commands —

```
router > enable
router # config t
router(config)# ip address 10.0.0.10 255.0.0.0
router(config)# interface fastethernet 0/0
router (config-if)# ip address 10.0.0.10 255.0.0.0
router (config-if) # no shut
router (config-if) # exit
router(config)# interface fastethernet 1/0
router (config-if)# ip address 20.0.0.10 255.0.0.0
router (config-if) # no shut
router (config-if)# exit
```

• after all IPs are set, ping message is sent.

Result: PC> 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=0ms TTL=127

Reply from 20.0.0.1: bytes=32 time=0ms TTL=127

Reply from 20.0.0.1: bytes=32 time=0ms TTL=127

Ping statistics for 20.0.0.1:

packets: sent = 4, received = 3, lost = 1 (25% loss), approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

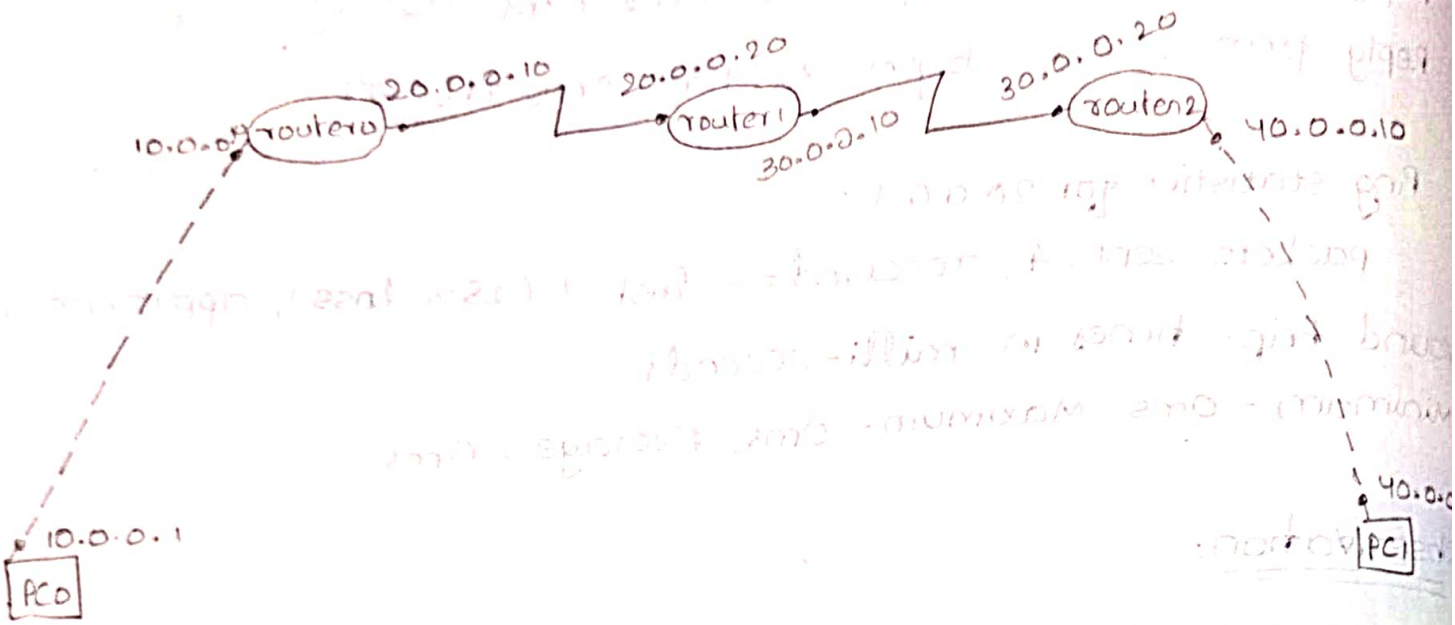
Observation:

PC 0 is in network 10.0.0.0 and PC1 is in 20.0.0.0. Hence we use router to connect them. when a ping message is sent from ~~network~~ PC 10.0.0.1 to 20.0.0.1, it the message reaches the destination through router. when a message is sent, the router captures it and sends to the ~~root~~ distination PC which is in another network.

26:

Aim: To configure IP address to routers in packet tracer and get ping responses, destination host unreachable, replies.

Topology:



Procedure:

- Connect ~~corresponding~~ PC to corresponding routers using copper cross-over
- connect routers using serial - DCE.
- set IP address for PCs.
- configure IP address to routers by giving commands in CLI
- After all IPs are set, ping PC to get distination host unreachable message
- route the IPs to the adjacent IPs using following command -

for router0 — router(config)# ~~30~~ ip route 30.0.0.0 255.0.0.0 20.0.0.20

router(config)# ip route 40.0.0.0

for router 1— router(config)# ip route 10.0.0.0 255.000
20.0.0.10

router(config)# ip route 40.0.0.0 255.0.0.0
30.0.0.20

for router 2— router(config)# ip route 10.0.0.0 255.0.0
30.0.0.10

router(config)# ip route 20.0.0.0 255.0.0.0
30.0.0.10

- After this is done, ping PC to get reply messages.

Result :

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 statics for 40.0.0.1:

packets: sent = 4, Received = 0, lost = 4 (100% loss),

② PC> ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.10: bytes=32 time=6ms TTL=128
Reply from 10.0.0.10: bytes=32 time=1ms TTL=128
Reply from 10.0.0.10: bytes=32 time=2ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128

ping statics for 10.0.0.1:

Packets: sent=4, Received=4, Loss=0, (0% loss)

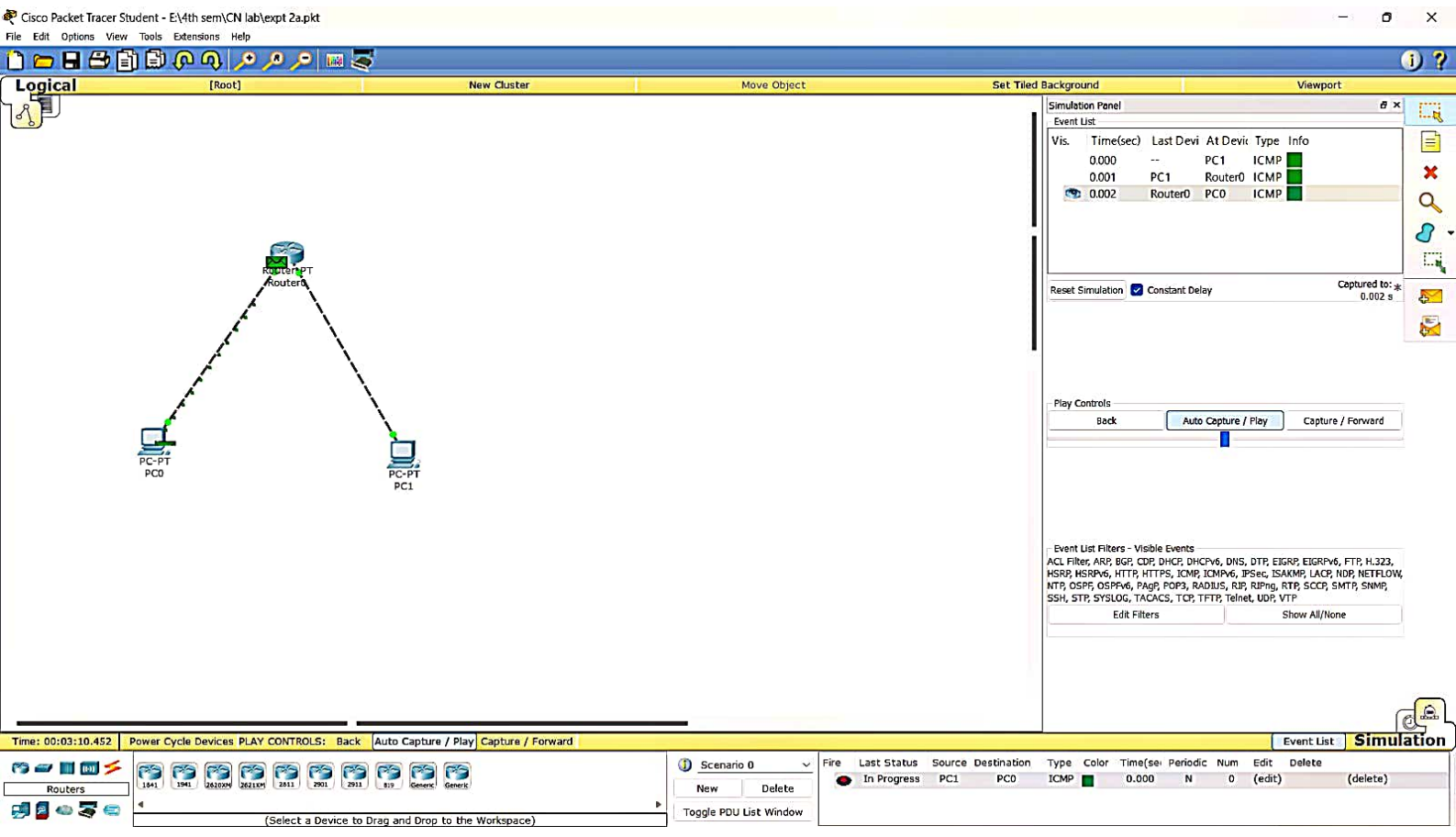
Approximate round trip times in milli-seconds:

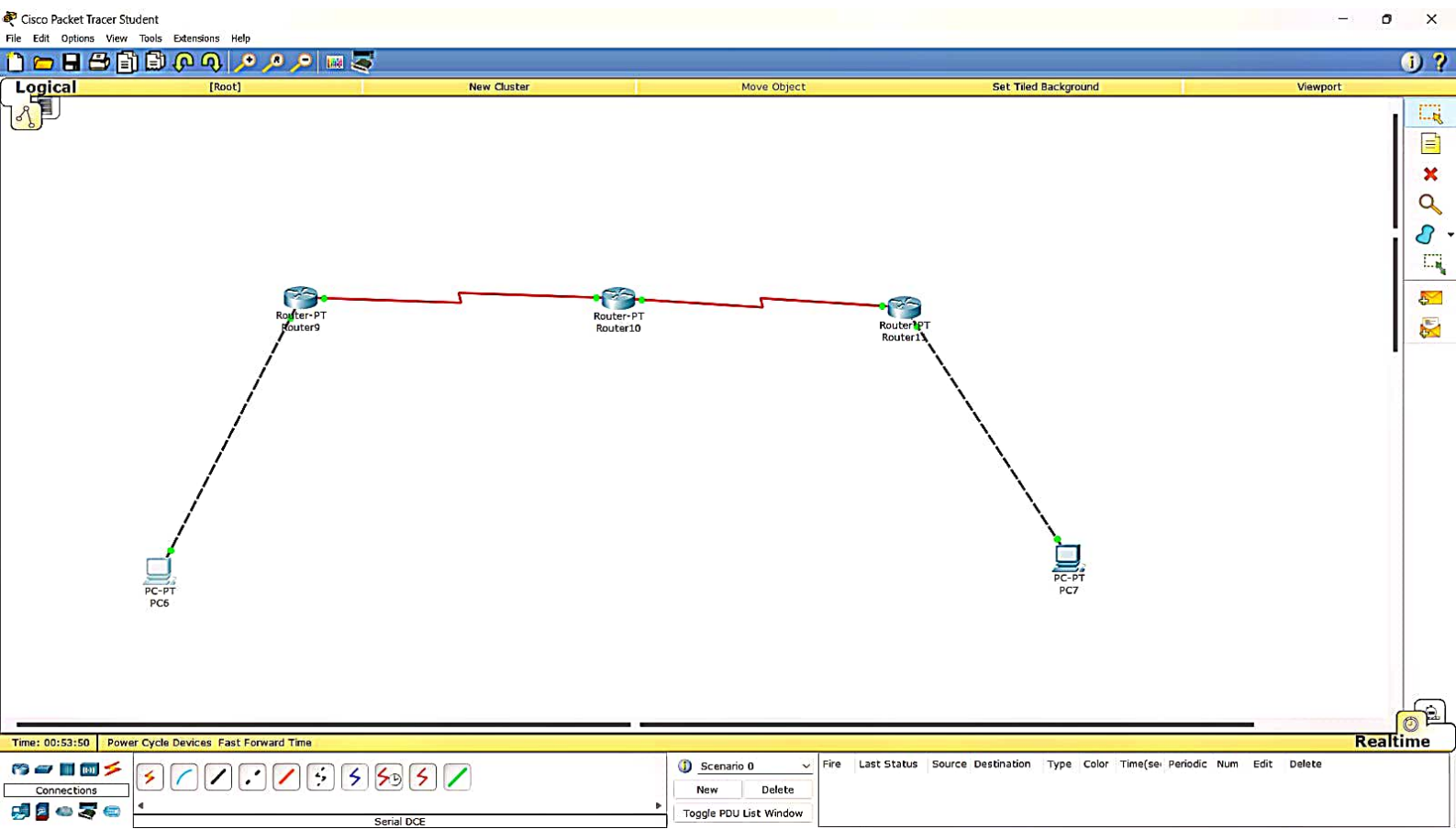
Minimum=1ms, maximum=16ms, average=6ms

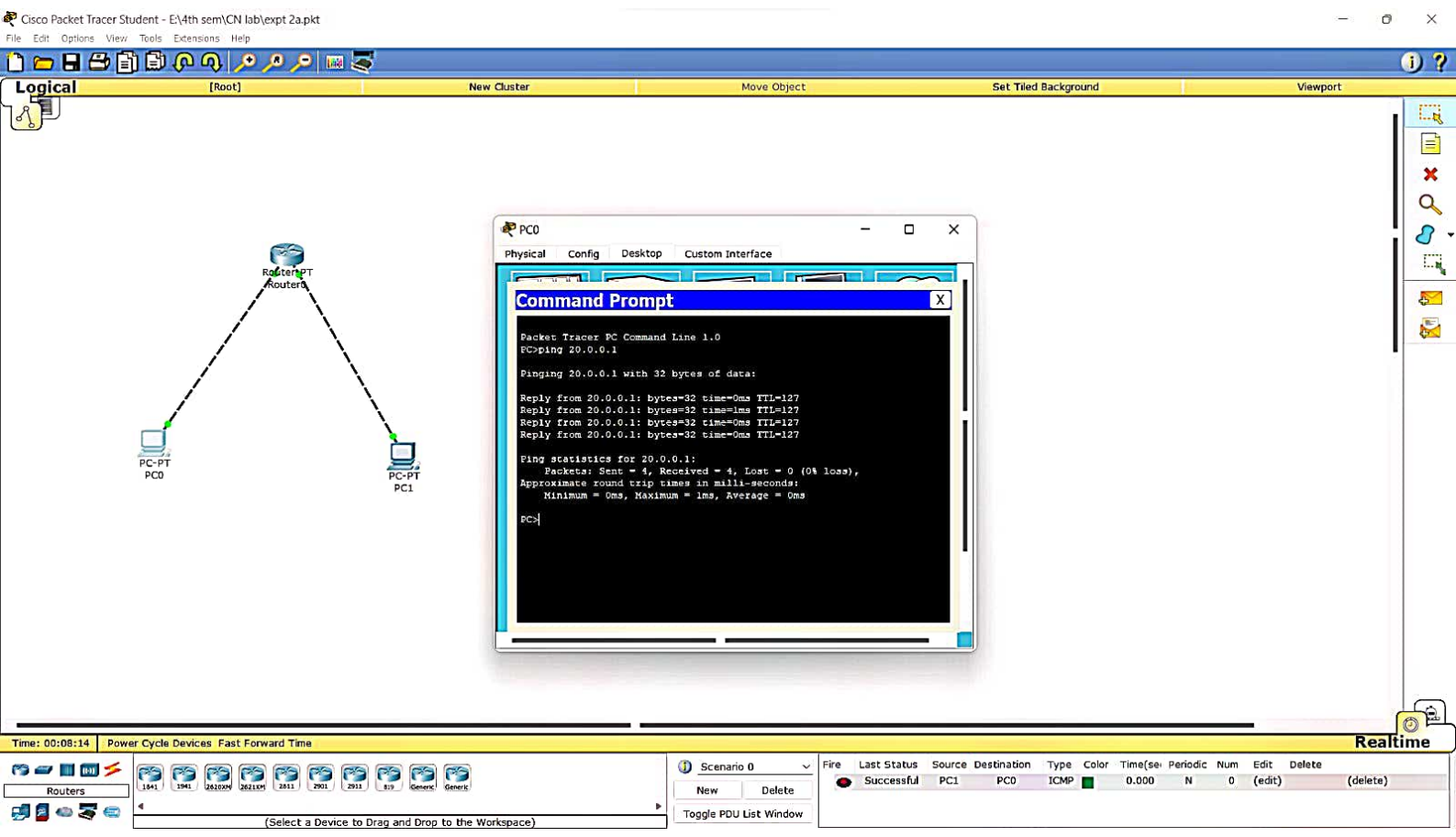
Observation:

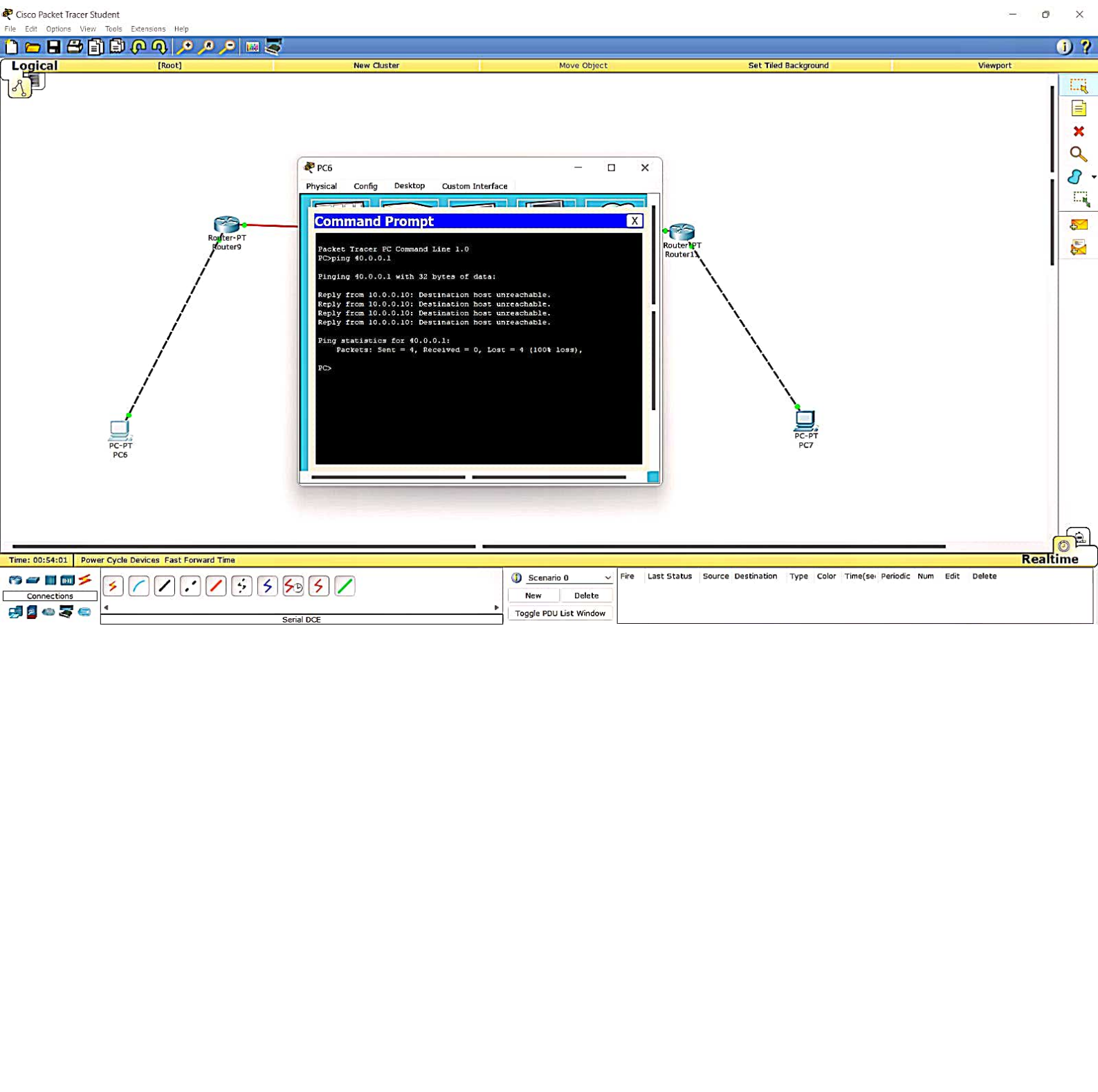
PC0 is in network 10.0.0.0 and PC1 is in network 40.0.0.0. There the 3 routers in between which initially directly connects 10.0.0.0, 20.0.0.0, 30.0.0.0 and 40.0.0.0. Hence when a ping message is sent from 40.0.0.1 to 40.0.0.1, it doesn't reach the destination. Instead it only reaches the first router and gives destination host unreachable message.

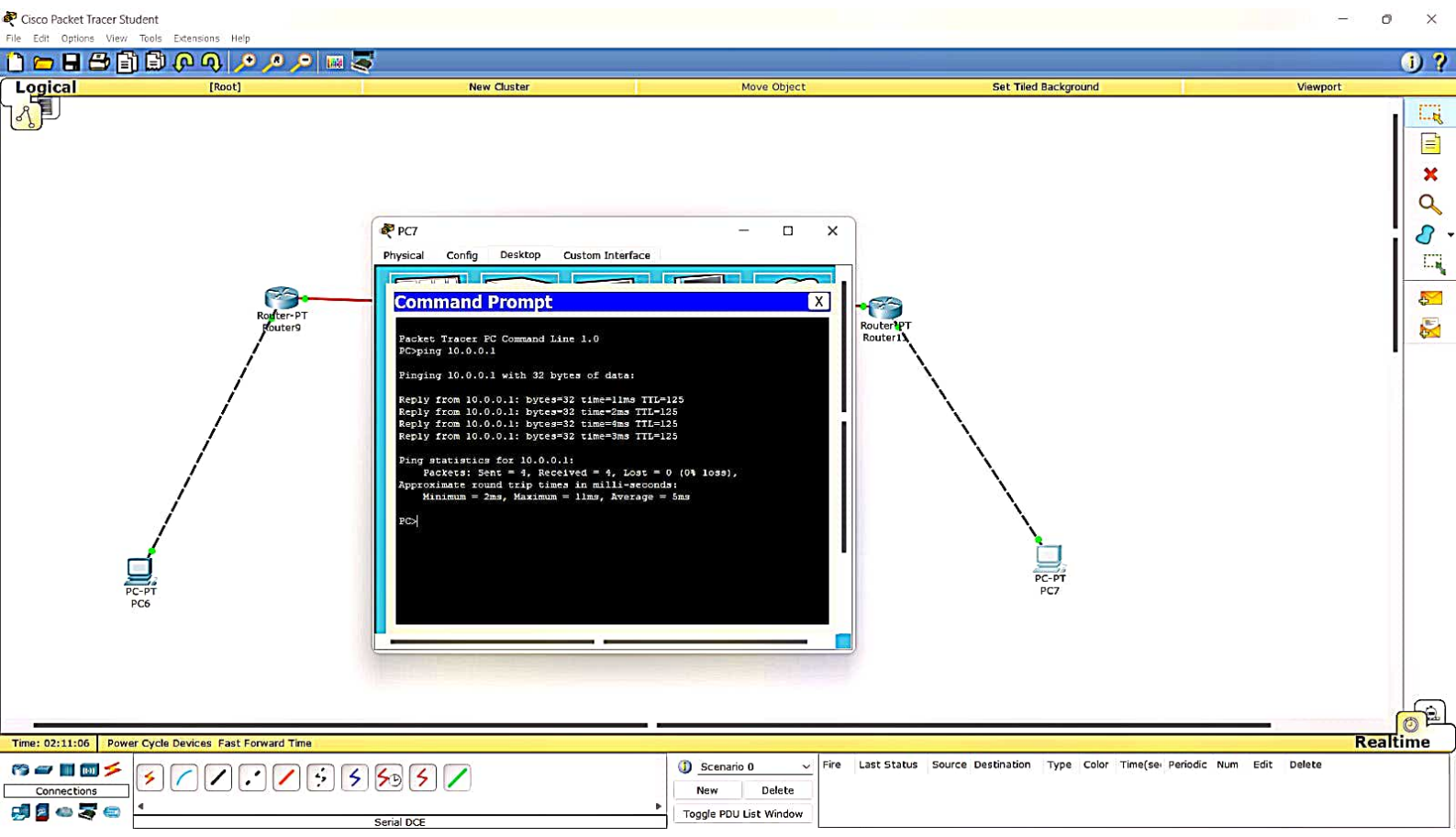
After letting the routers know about other adjacent networks, (next hop) we send a ping message from 40.0.0.1 to 10.0.0.1 to get desired result. The message reaches the destination.


Cisco Packet Tracer Student - E:\4th sem\CN lab\expt 2a.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devi Type Info
0.000 -- PC1 ICMP
0.001 PC1 Router0 ICMP
0.002 Router0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to:
0.002 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:03:10.452
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
In Progress PC1 PC0 ICMP 0.000 N 0 (edit) (delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router9
Router-PT
Router10
Router-PT
Router11
PC-PT
PC6
PC-PT
PC7
Time: 00:53:50
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete


Cisco Packet Tracer Student - E:\4th sem\CN lab\expt 2a.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
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=127
Reply from 20.0.0.1: bytes=32 time=1ms TTL=127
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
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 = 1ms, Average = 0ms
PC>
Time: 00:08:14
Power Cycle Devices
Fast Forward Time
Realtime
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Successful
PC1
PC0
ICMP
0.000
N
0
(edit)
(delete)


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC6
Physical Config Desktop Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
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),
PC>
Router-PT
Router9
Router-PT
Router11
PC-PT
PC6
PC-PT
PC7
Time: 00:54:01
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC7
Physical
Config
Desktop
Custom Interface
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=11ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=4ms TTL=125
Reply from 10.0.0.1: bytes=32 time=3ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 11ms, Average = 5ms
PC>
Router-PT
Router9
Router-PT
Router11
PC-PT
PC6
PC-PT
PC7
Time: 02:11:06
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete

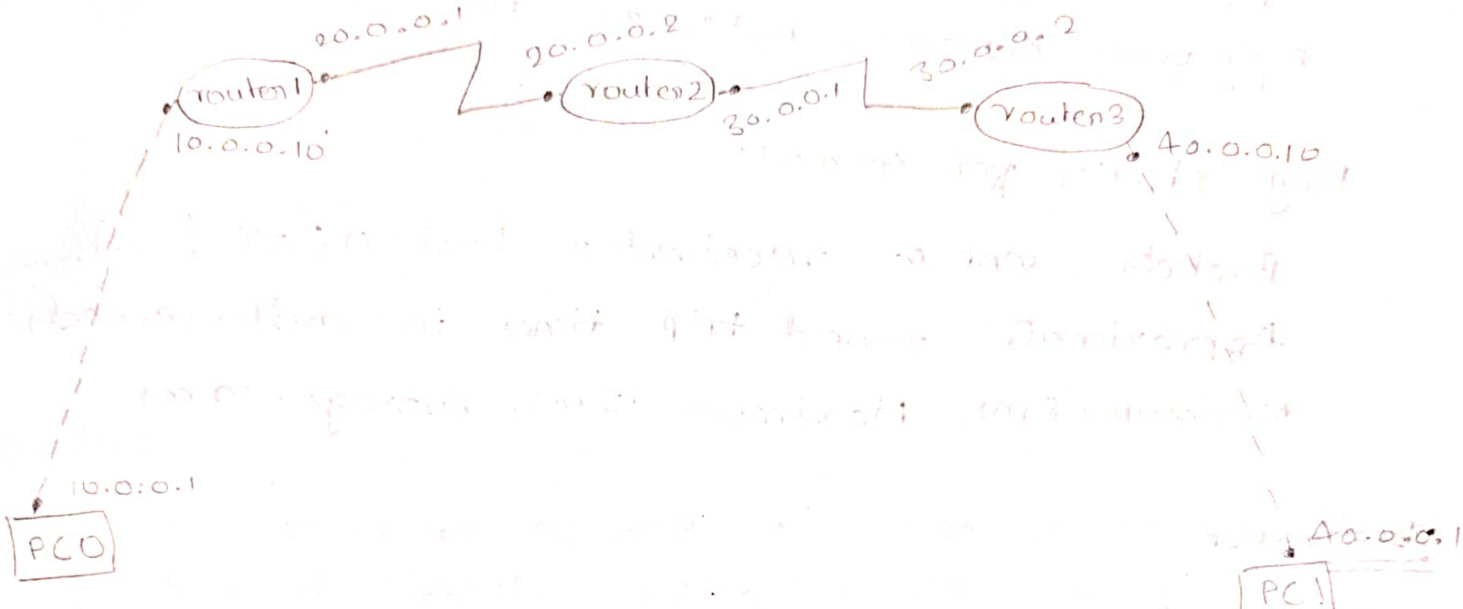
Experiment – 3

Name of the experiment:

Default routing

Aim: To configure IP address to routers and default routing

Topology:



Procedure:

- Configure 2 PCs IP address and gateway
- Configure Routers IP addresses through giving commands in CLI
- Default routing for router 1 →

  router(config)# ip route 0.0.0.0 0.0.0.0 20.0.0.2

  router 3 →

  router(config)# ip route 0.0.0.0 0.0.0.0 30.0.0.1

  Static routing is done for router 2.
- Simple PDA is sent from PC1 to PC0 and

a ping mesage from PC0 to

Result:

PC > ping 40.0.0.1

pinging 40.0.0.1 with 32 bytes of data:

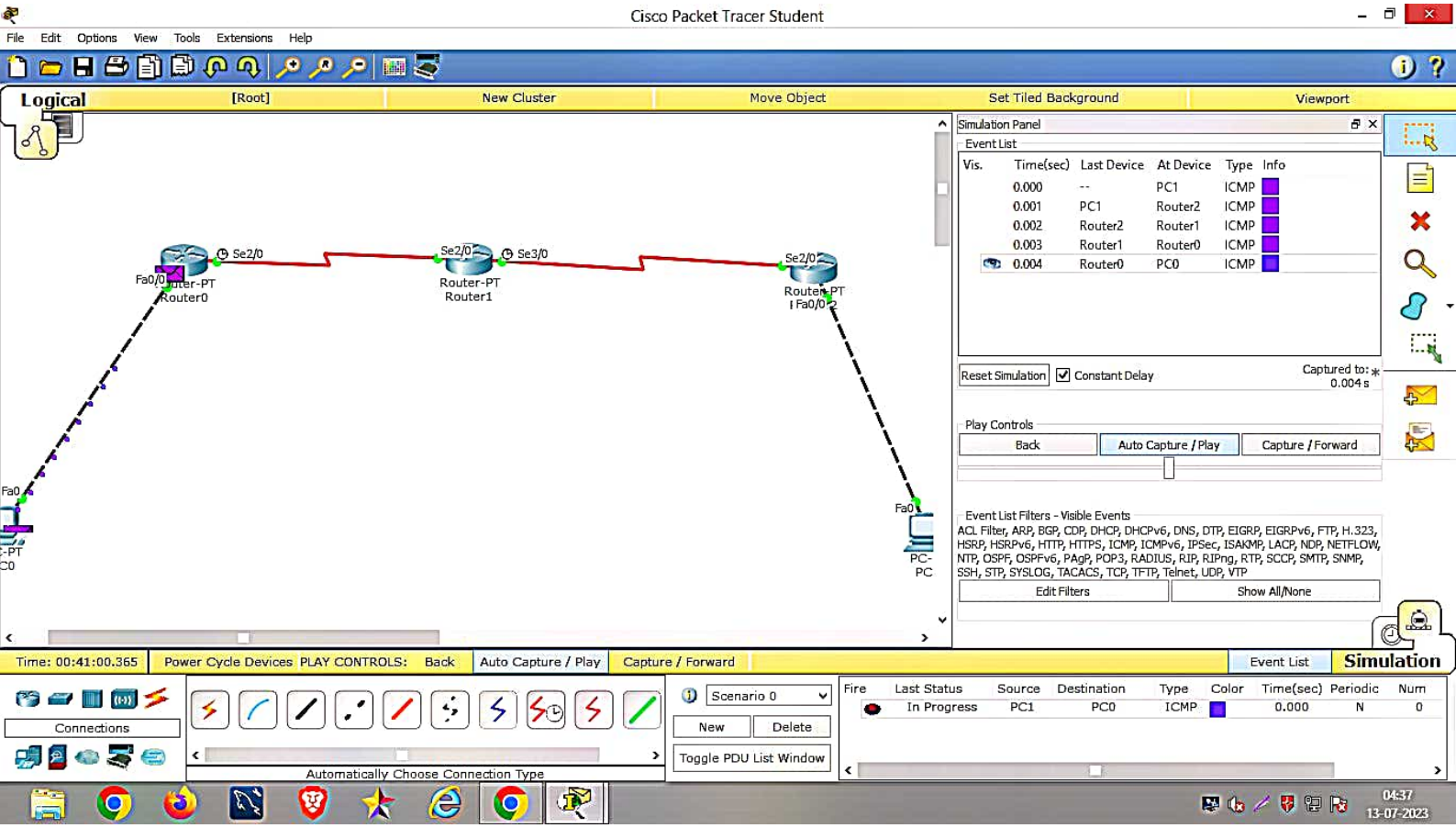
Reply from 40.0.0.1: bytes = 32 time = 10ms TTL=125
Reply from 40.0.0.1: bytes = 32 time = 10 ms TTL=125
Reply from 40.0.0.1: bytes = 32 time = 8 ms TTL=125
Reply from 40.0.0.1: bytes = 32 time = 15 ms TTL=125

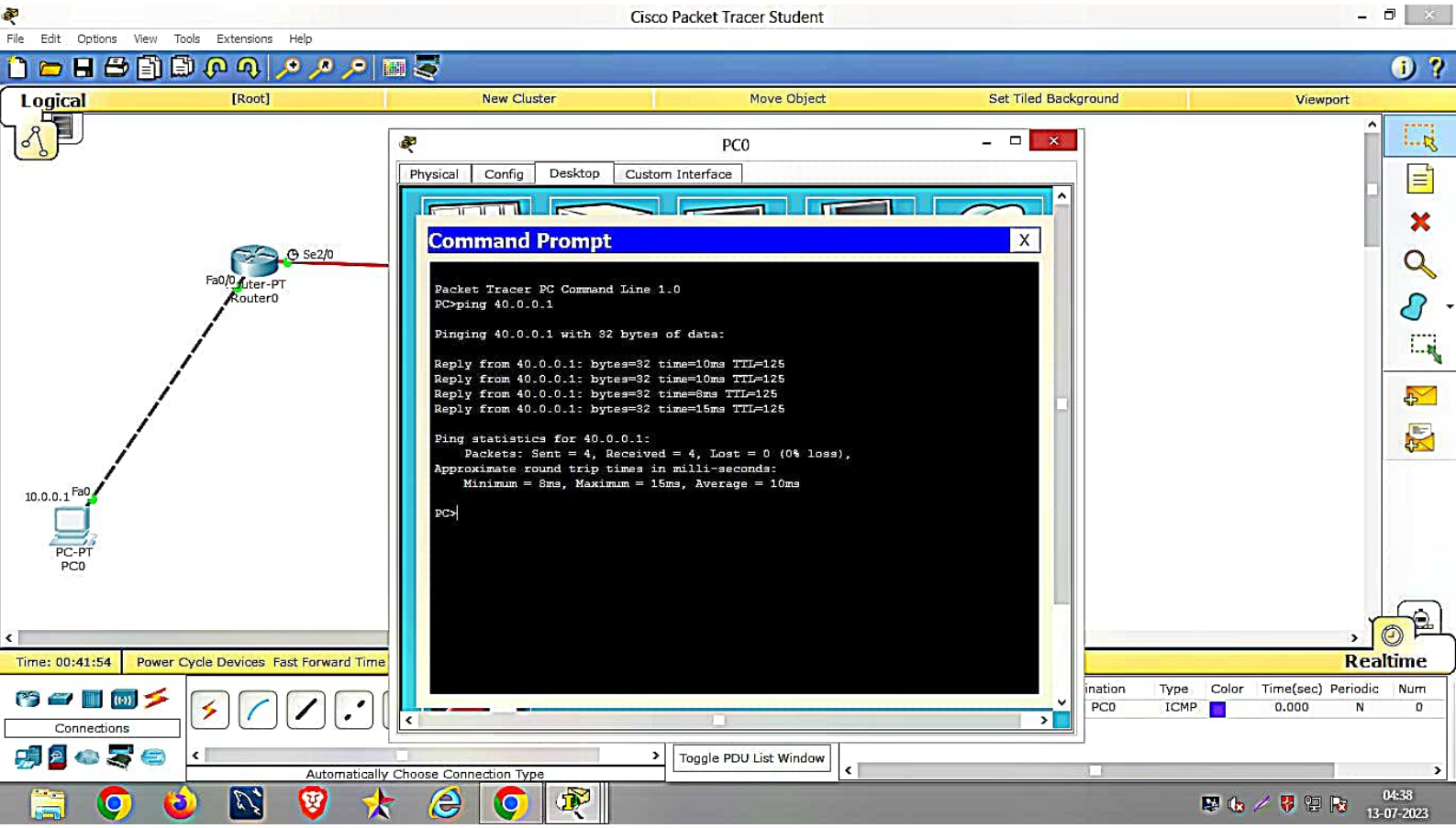
Ping statics for 40.0.0.1:

Packets: sent=4, received=4, Lost=0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8 ms, Maximum = 15 ms, Average = 10 ms

Observation:

- A default route is the route which takes effect when no ther route is available for an IP address destination
- if a packet is received, the device first checks the IP destination address, if the IP destination address is not local the device checks its routing table.
- if the remote destination subnet is not listed then the packet is forwarded to the next hop towards the destination using the default route
- The process repeats until the packet is delivered.

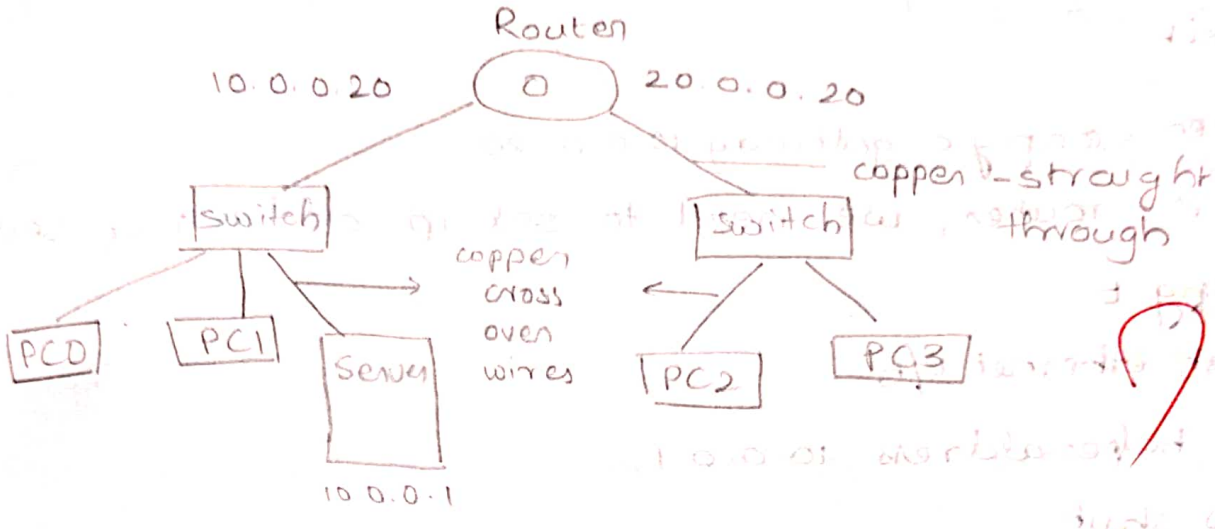

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
Router-PT Router0
Router-PT Router1
Router-PT
PC-PT PC0
Se2/0
Se3/0
Fa0/0
Fa0
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC1 ICMP
0.001 PC1 Router2 ICMP
0.002 Router2 Router1 ICMP
0.003 Router1 Router0 ICMP
0.004 Router0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.004 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:41:00.365
Power Cycle Devices
PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
In Progress PC1 PC0 ICMP 0.000 N 0
04:37
13-07-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
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=10ms TTL=125
Reply from 40.0.0.1: bytes=32 time=10ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=15ms 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 = 8ms, Maximum = 15ms, Average = 10ms
PC>
Se2/0
Fa0/0
Router-PT
Router0
10.0.0.1
Fa0
PC-PT
PC0
Time: 00:41:54
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
PC0
ICMP
0.000
N
0
04:38
13-07-2023

Experiment - 4

Aim: Connection of server LAN within and outside the network using ~~star~~ switches and routers

Topology:



Procedure

- Select two or more PC and a server connecting to a switch and another network with only end devices and switch
- devices and switch
- connect both switches to router
- set IP address of server ~~to~~ as ~~router~~ 10.0.0.1
- go to service < select DHCP < save the current IP address
- Now, check the IP addresses of other devices in the network in the IP configuration in desktop.
- following commands are given in CLI of router
  > enable
  # config t
  # interface fastethernet 4/0

Ip address 10.0.0.10 255.0.0.0
no shut
exit
interface fastethernet 0/0
Ip address 20.0.0.20 255.0.0.0
no shut
exit

- server <config< gateway 10.0.0.20
- Now in router, we need to set ip address of server

config t
fast ethernet 0/0
ip helper-address 10.0.0.1
no shut
exit

- Now go to server < services< DHCP < add new IP address 20.0.0.2
- To check connection, IP configuration of PC outside the network in click DHCP and IP gateway will be visible.

Ping output

packet tracer PC command line 1.0

PC> ping 20.0.0.2

pinging 20.0.0.2 with 32 bytes of data:

Request timed out

Reply from 20.0.0.2: bytes = 32 time = 0ms TTL=127

Reply from 20.0.0.2: bytes = 32 time = 0ms TTL=127

Reply from 20.0.0.2: bytes = 32 time = 0ms TTL=127

Ping statics for 20.0.0.2

Packets sent = 4, received = 3, lost = 1 (25% loss),

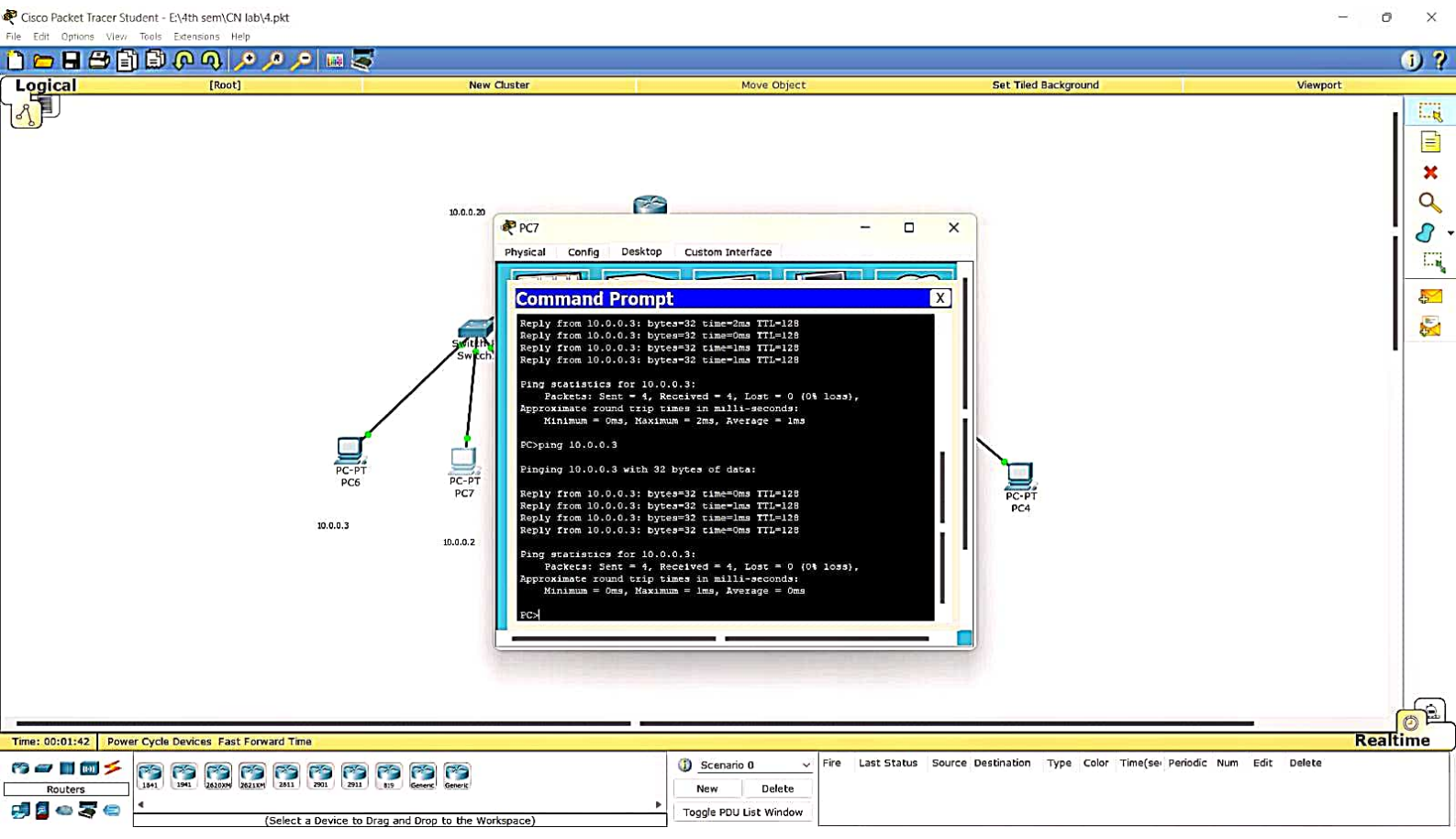
Approximate round trip times in millie-seconds:

minimum = 0 ms, Maximum = 0 ms, Average = 0 ms.

Observation:

- DHCP is used to assign IP addresses dynamically to different devices.
- To assign continuous IP address we create a server pool where we assign the starting IP address and a default gateway number for PC's under different switches we create a different server pool again and start.

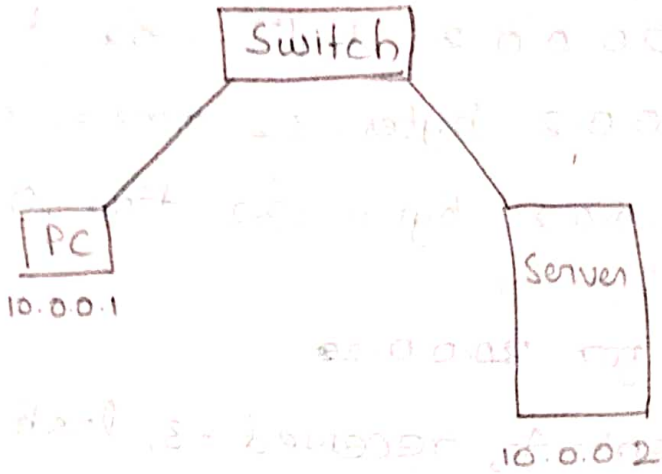
(9) This takes care of delivering the packets to correct destination IP address and also sends back the Ack to the initial device.


Cisco Packet Tracer Student - E:\4th sem\CN lab\4.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.20
PC7
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Reply from 10.0.0.3: bytes=32 time=2ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 2ms, Average = 1ms
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>
Switch
PC-PT PC6
PC-PT PC7
PC-PT PC4
10.0.0.3
10.0.0.2
Time: 00:01:42
Power Cycle Devices
Fast Forward Time
Realtime
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Periodic
Num
Edit
Delete

Experiment 4 & 5

Aim: To understand the working of DNS

Topology:



Procedure

1. Connect a switch, PC and a server to form a LAN.
2. Set IP address of PC as 10.0.0.1 and IP address of server as 10.0.0.2
3. Go to PC > web browser and give server IP address as URL. A default page is generated.
4. Go to server > services > http > index make any changes and save.
5. repeat step 3. Changes will be seen.
6. Go to Server > services > DNS and turn it on. Give a name and save.
7. Go to PC > web browser, type the given name as url. the same page will be generated.
8. Repeat step 4. Generate your cv. in index.
9. repeat step 7. Your generated cv is shown as output.

Output:

Resume

Anagha K.S

I am Anagha K.S , currently studying in BMSCE 2nd year CSE dept. This is my resume.

Interests

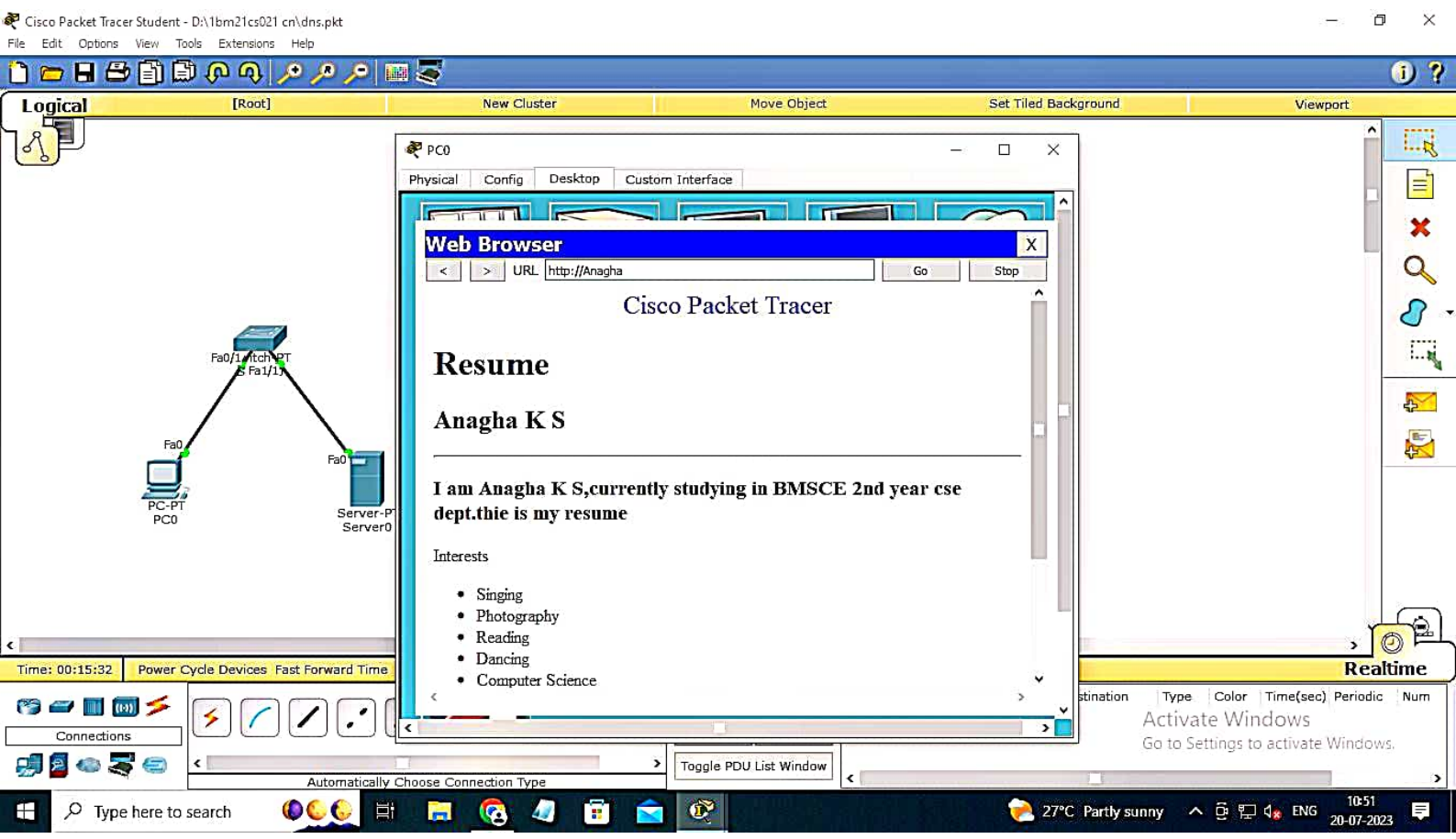
- Singing
- Photography
- Reading
- Dancing
- Computer Science.

Languages

- C
- Java
- html
- CSS

Observation:

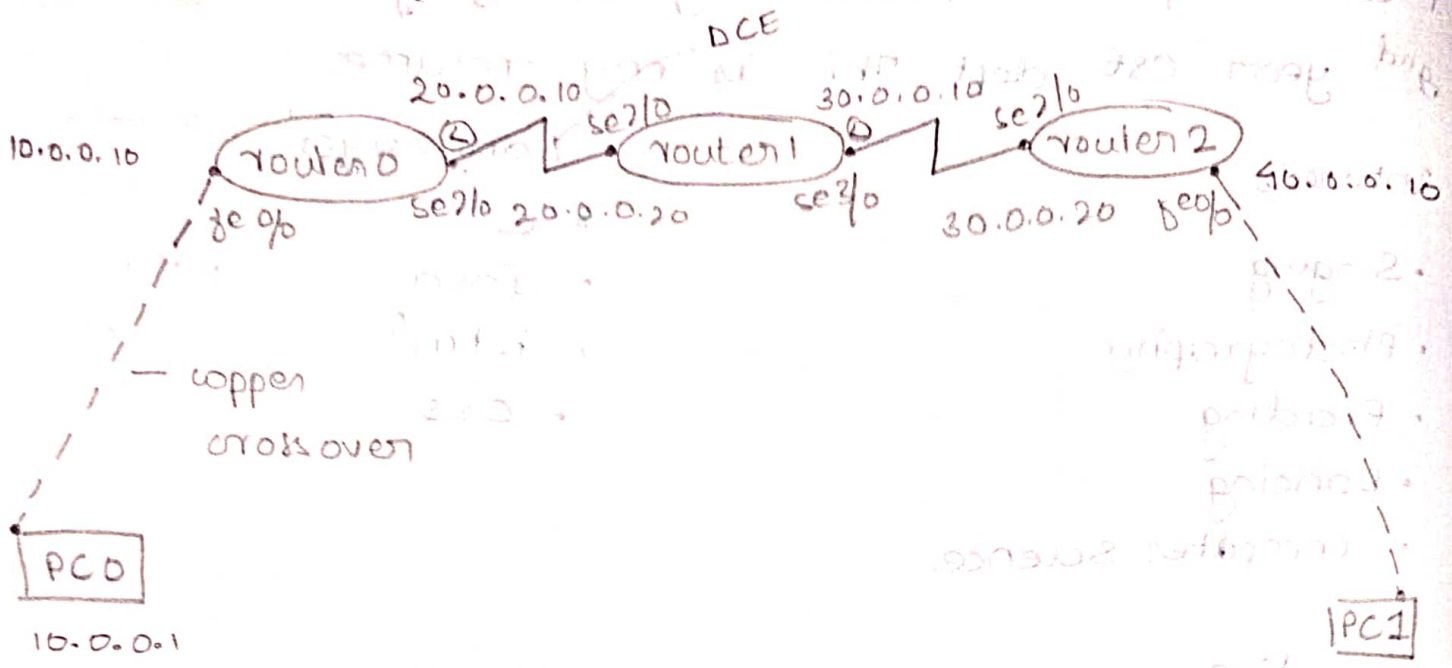
* DNS- domain naming system , it uses a mapping table. from IP addresses to domain names.
* So, in the beginning before giving a name, we used IP address as URL for websit then we gave a domain name and used the name as a URL instead.


Cisco Packet Tracer Student - D:\1bm21cs021 cn\dns.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Web Browser
URL http://Anagha
Go
Stop
Cisco Packet Tracer
Resume
Anagha K S
I am Anagha K S,currently studying in BMSCE 2nd year cse dept.thie is my resume
Interests
Singing
Photography
Reading
Dancing
Computer Science
Fa0/1 Switch-PT
Fa1/11
Fa0
PC-PT
PC0
Server-PT
Server0
Time: 00:15:32
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
27°C Partly sunny
ENG
10:51
20-07-2023

Experiment 6

Aim : To understand working of RIP.

Topology:



Procedure

1. Connect 3 routers using DCE and connect two PCs (end devices) using copper crossover.
2. Set IPs and gateways for PCs.
3. Configure IPs for routers. For fastethernet port—
   for router → 0

```
router > enable
router# config t
router(config)# interface fastethernet 0/0
router(config-if)# ip address 10.0.0.10 255.0.0.0
router(config-if)# no shut
router(config-if)# exit
```

4. For router to router configuration follow same steps till ip address

router(config-if)# encapsulation PPP ← this step for every router to router configuration

router(config-if)# clock rate 64000 ← This step for every interface with clock on it (router 0 se 2/0 & router 1 se 3/0)

router(config-if)# no shut

router(config-if)# exit.

5. For RIP →

router 0:

(router)# config t

router(config)# router RIP

router(config-router)# network 10.0.0.0

router(config-router)# network 20.0.0.0

router(config-router)# exit

repeat the same steps for all routers.

6. Ping PC1 from PC0.

Output:

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 = 9ms TTL = 125

Reply from 40.0.0.1 : bytes 32 time = 15 ms TTL = 125

Reply from 40.0.0.1 : bytes 32 time = 9 ms TTL = 125

Ping statics for 40.0.0.1

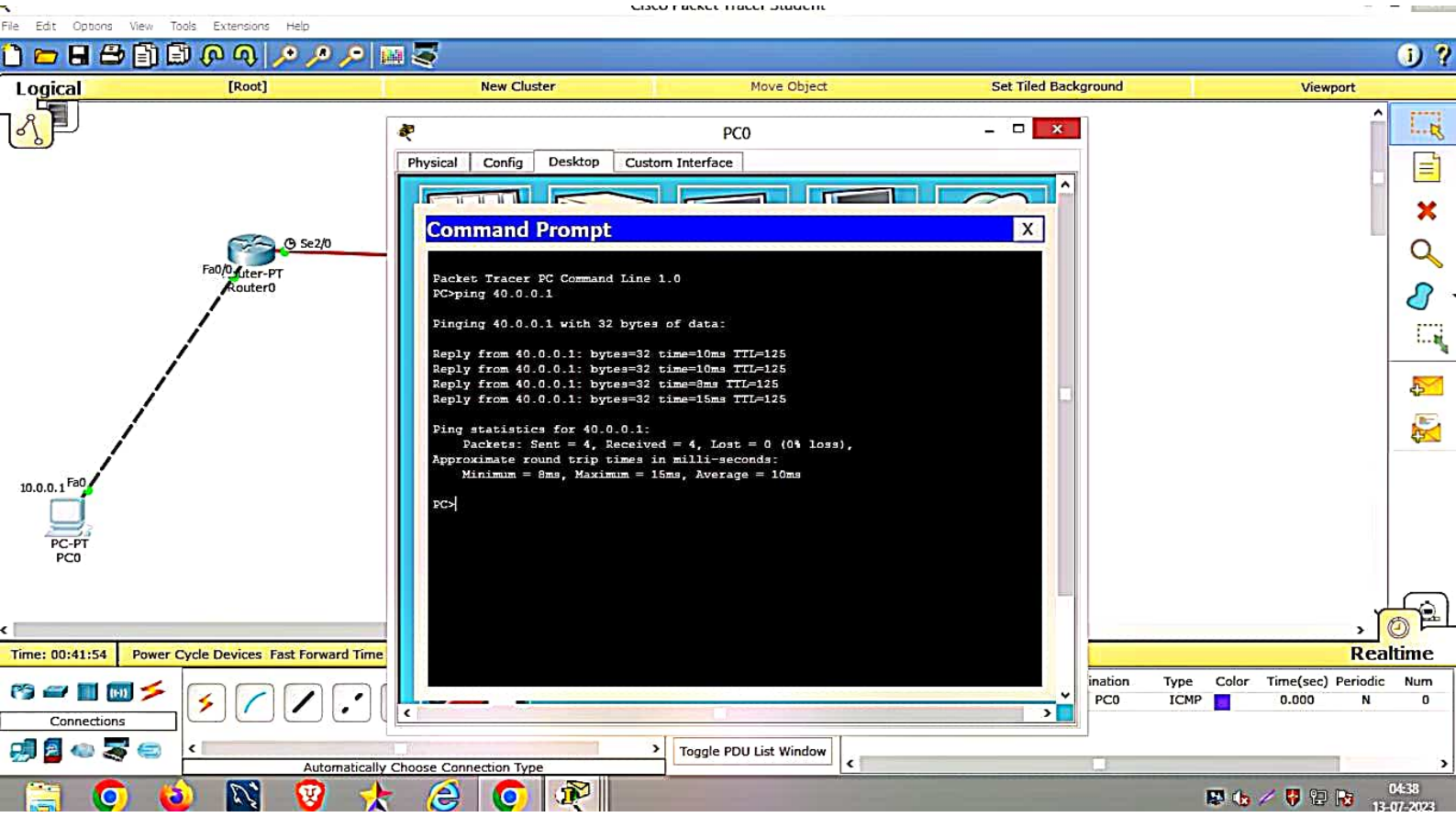
Packets : sent = 4 , received = 3, loss = 1 (25% loss)

Approximate round trip times in millie-seconds:

minimum = 9 ms, Maximum = 15 ms, Average = 11 ms

Observation:

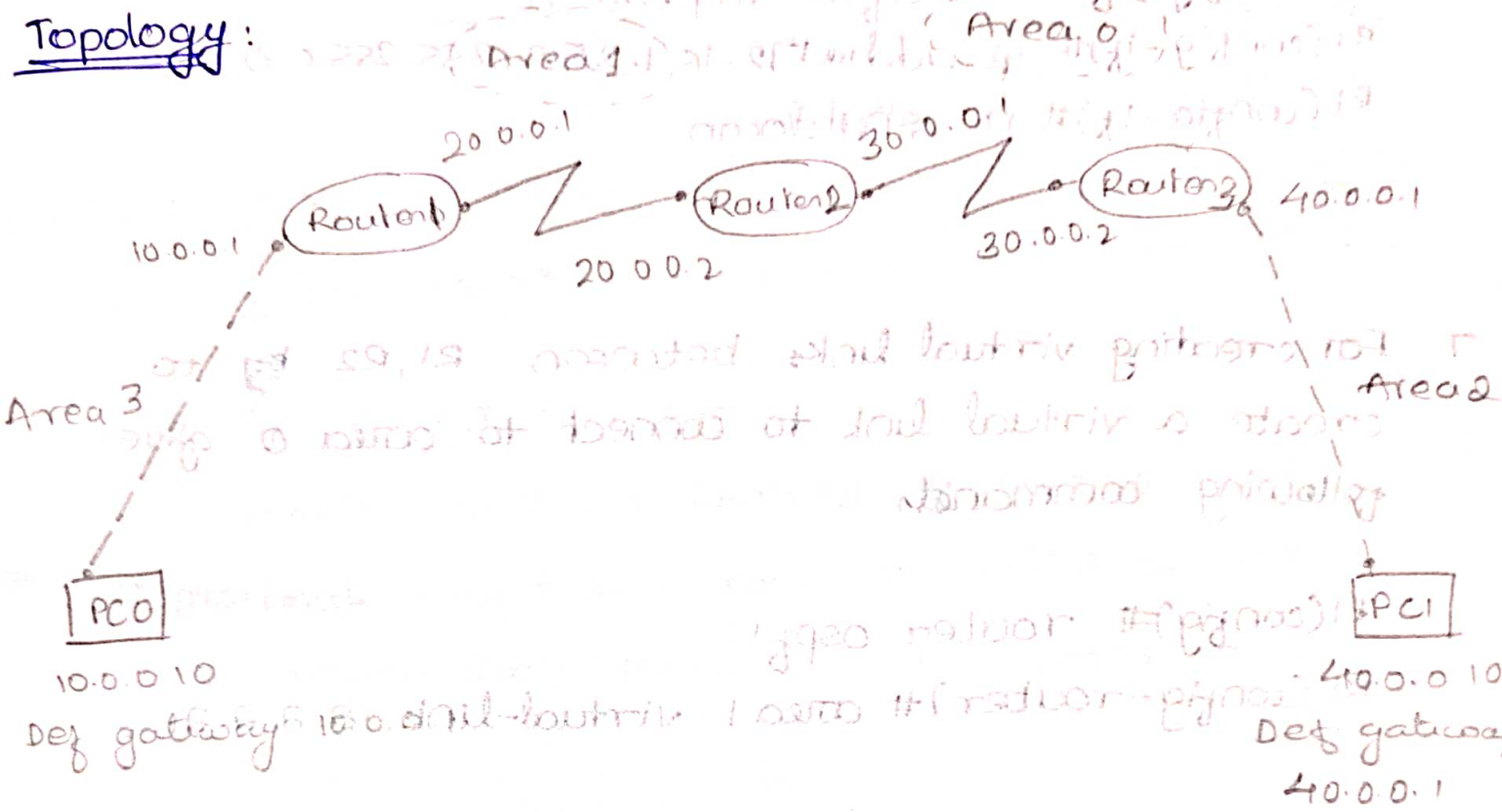
- Routing information protocol (rip) is a dynamic routing protocol that uses hop count as a routing metric to find the best path between source and destination. It is a distance vector routing protocol.
- Hop count is the no. of routers coming in between source and destination. The path with least hop count is selected.
- Updates of the network are exchanged periodically.
- updates of routing information are always broadcat
- Full routing tables are sent in updates
- Router always trust routing information received from neighbor routers.


File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
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=10ms TTL=125
Reply from 40.0.0.1: bytes=32 time=10ms TTL=125
Reply from 40.0.0.1: bytes=32 time=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=15ms 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 = 8ms, Maximum = 15ms, Average = 10ms
PC>
Se2/0
Fa0/0
Router-PT
Router0
10.0.0.1
Fa0
PC-PT
PC0
Time: 00:41:54
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
PC0
ICMP
0.000
N
0
04:38
13-07-2023

Experiment-7

Aim: To understand working of OSPF (open shortest path first)

Topology:



Procedure:

1. Configure the routers and PCs with IPs and gate-ways as per the topology.
2. Configure each of routers according to IP's shown in topology.
3. Encapsulation ppp and clock rate need to be set as done in RIP experiment.
4. Give the following commands

Router1 → Router(config)# router ospf 1
Router(config-router)# router-id 1.1.1.1
Router(config-router)# network 10.0.0.0 0.255.255.255 area
Router(config-router)# network 20.0.0.0 0.255.255.255 area

Router (config-router)# exit

5. Repeat same steps for all routers.
6. For loop backs give following commands

R2 serial 3/0
R3 serial 2/0

R1 (config)# interface serial 2/0
R1 (config-if)# interface loopback 0
R1 (config-if)# ip addr 172.16.1.252 255.255.0.0
R1 (config-if)# no shutdown

R2 253
R3 254

remaining same

7. For creating virtual links between R1, R2 by to create a virtual link to connect to area 0 give following commands.

R1(config)# router ospf 1
R1 (config-router)# area 1 virtual-link 2.2.2.2
R2

area 1

R1(config-router)# exit

8. Show IP route. 30 and 40 are directly connected Make sure all networks are listed.

Output

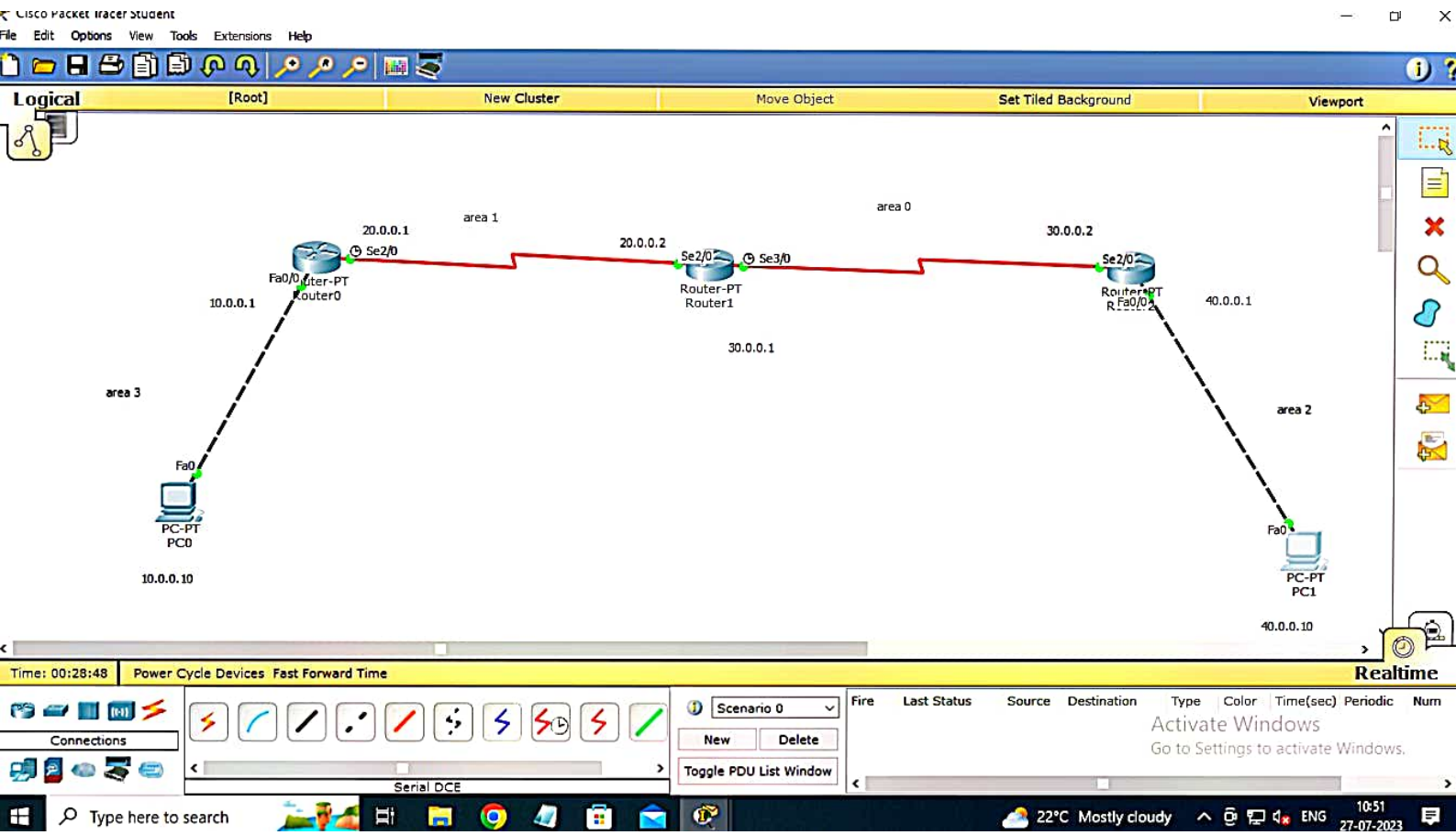
```
PC> ping 40.0.0.10

pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10 : bytes = 32 time= 2ms TTL=125
Reply from 40.0.0.10 : bytes = 32 time = 3ms TTL=125
Reply from 40.0.0.10 : bytes = 32 time = 22ms TTL=125
Reply from 40.0.0.10 : bytes = 32 time= 2ms TTL=125

ping statics for 40.0.0.10 :
    Packets : Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in millie-seconds:
    Minimum = 2ms, Maximum = 22ms, Average = 7ms
```

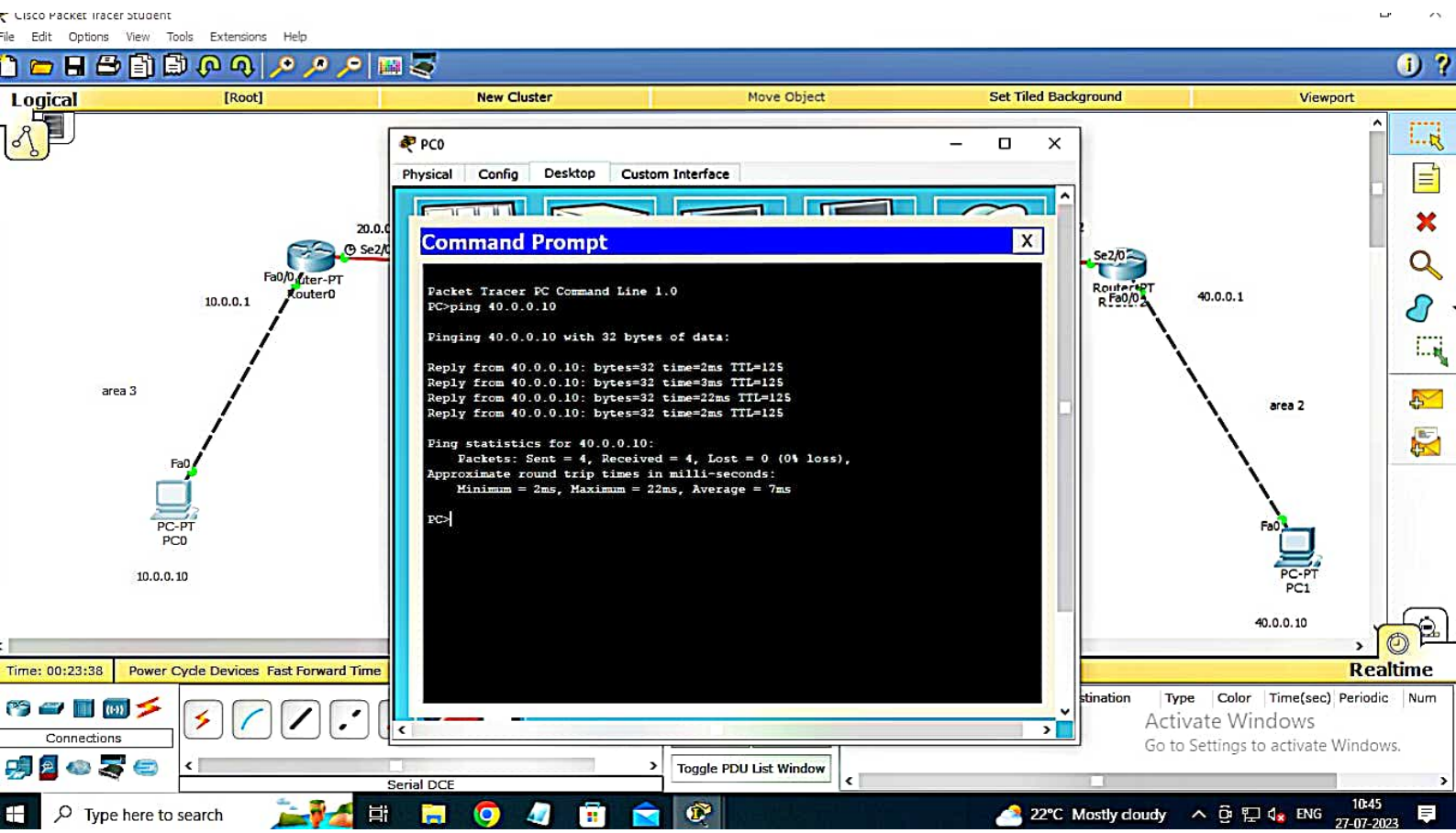
IP route =>

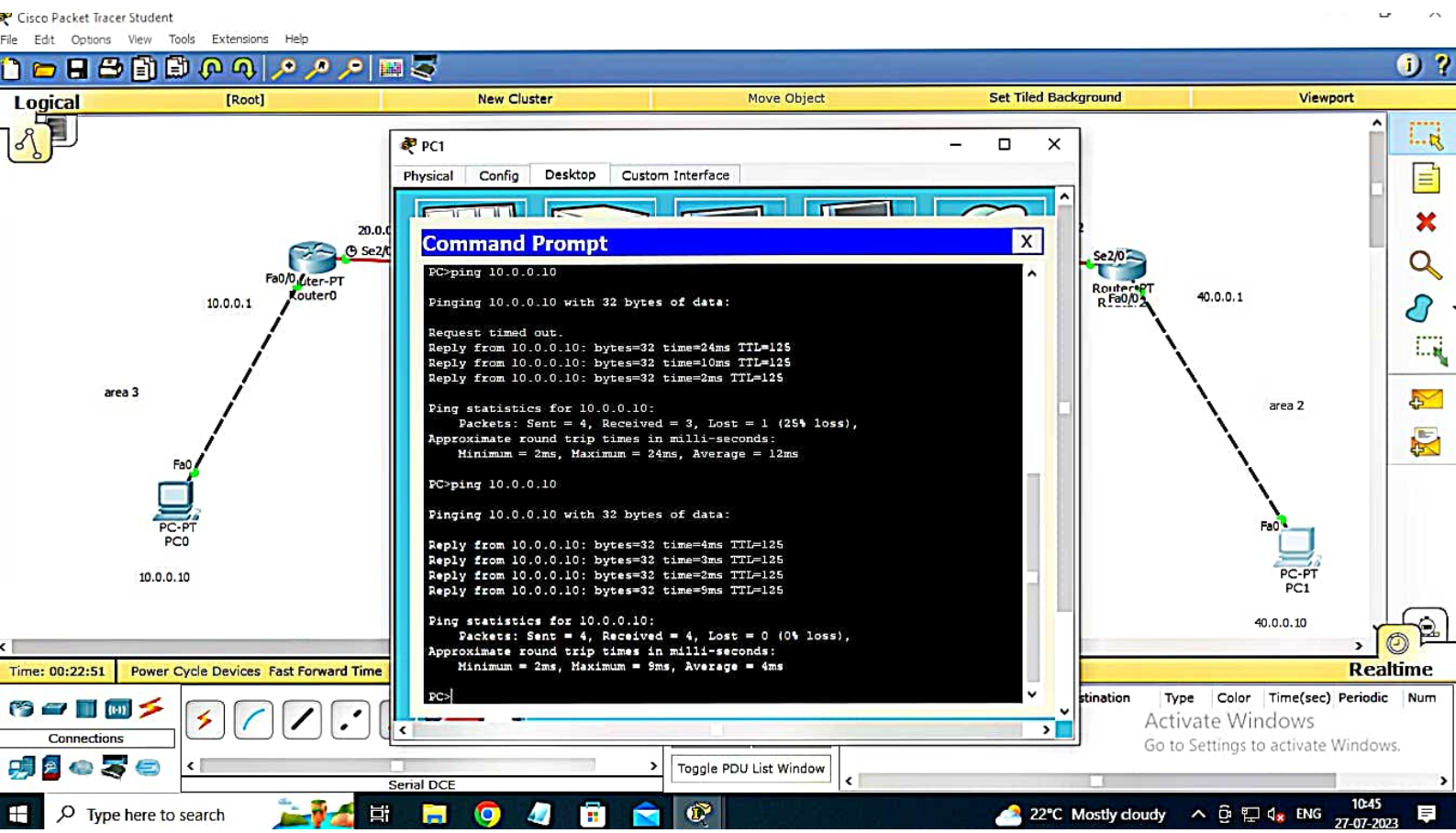
```
C    10.0.0.0/8 is directly connected, fastethernet 0/0
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 mask
C       20.0.0.0/8 is directly connected, serial 2/0
C       20.0.0.2/32 is directly connected, serial 2/0
O    30.0.0.0/8 [110/128] via 20.0.0.2, 00:03:23, serial 2/
O IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:03:23, serial 2/0
C    127.16.0.0/16 is directly connected, Loopback 0
```

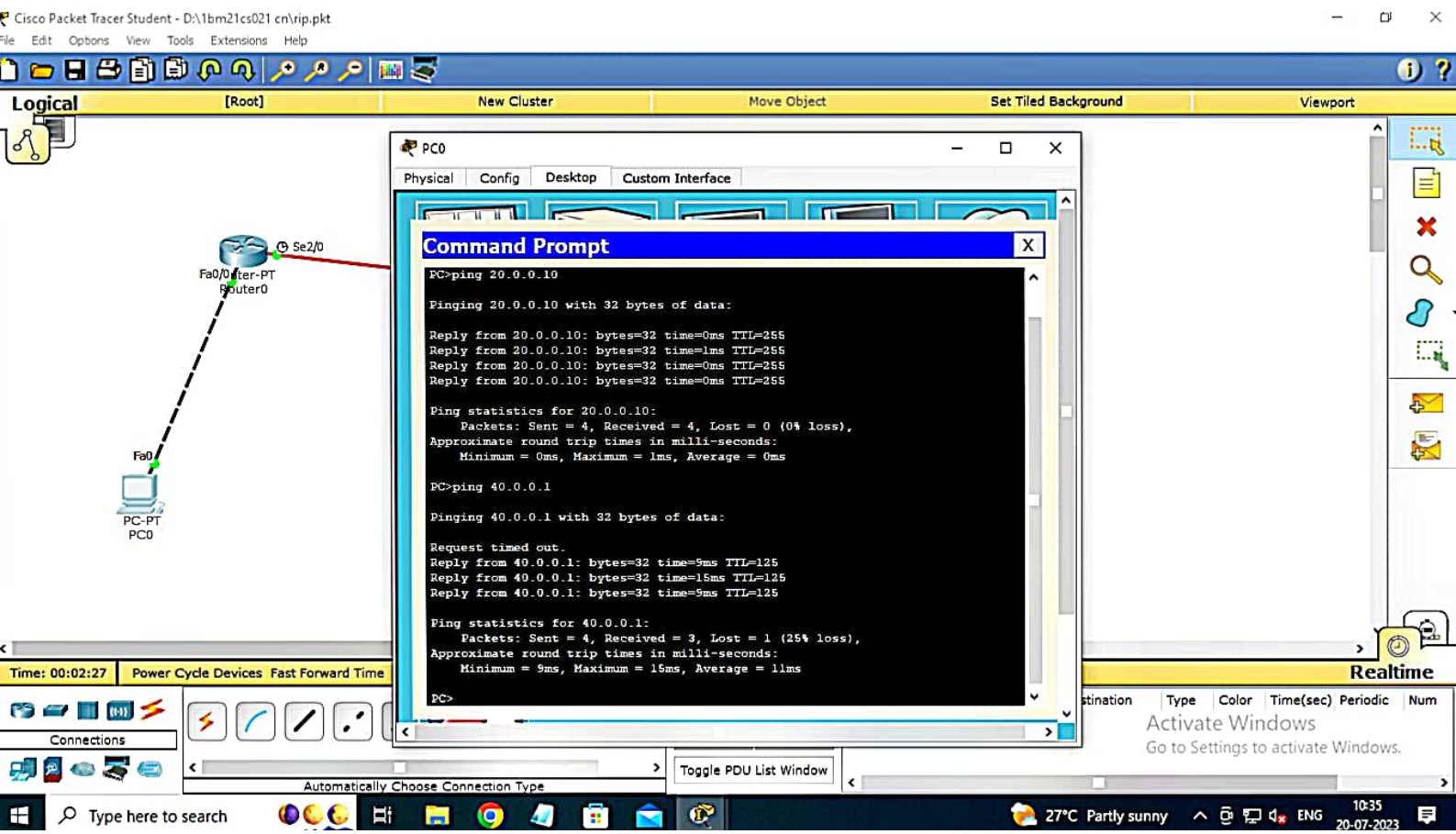
Observation:

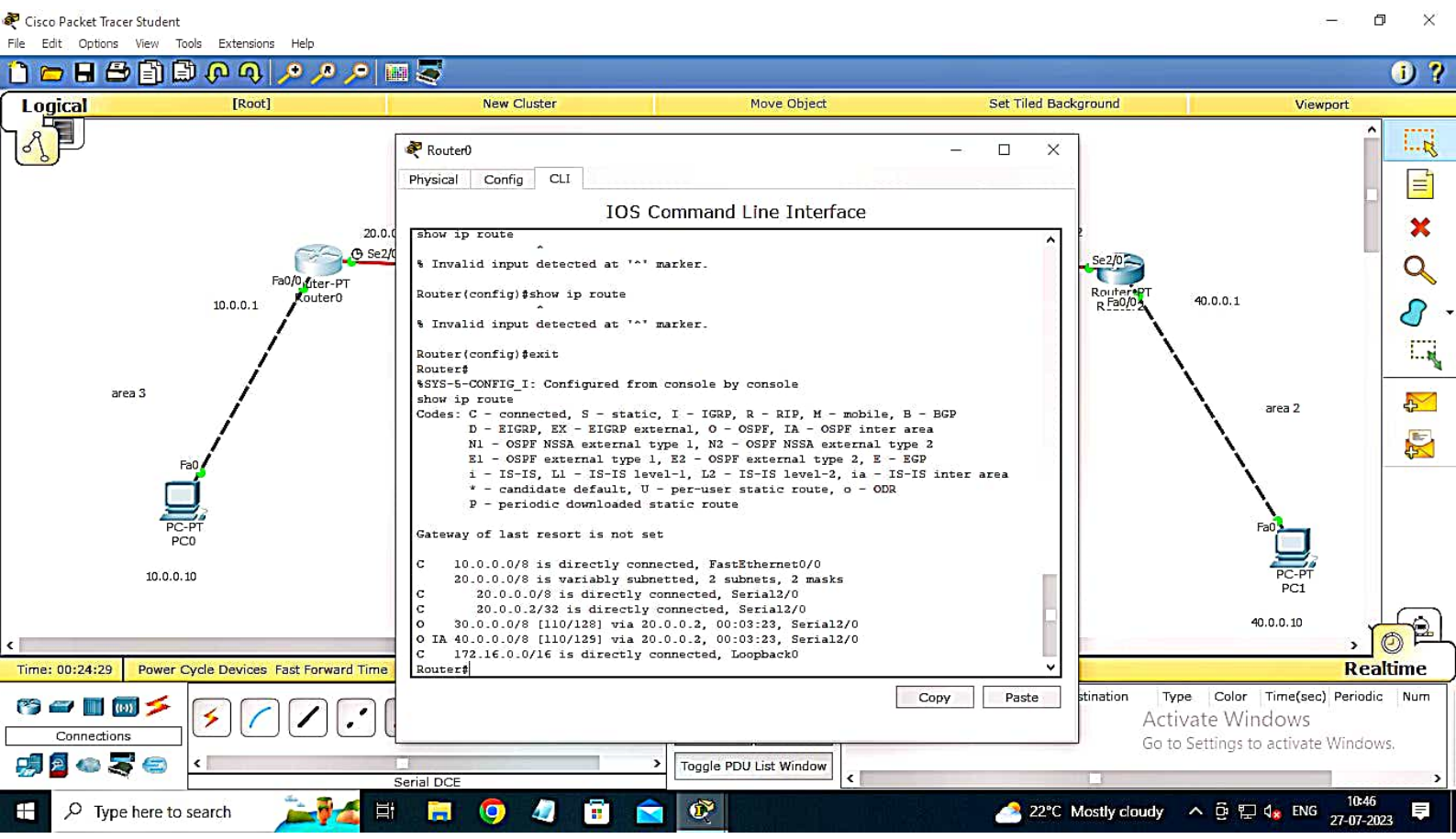
- OSPS (open shortest path first) is a link state routing protocol that is used to find the best path between the source and the destination router using its own shortest path first
- To keep routers active we have to configure the routers using loop back
- OSPF we virtual link to connect to the backbone through a non back bone area

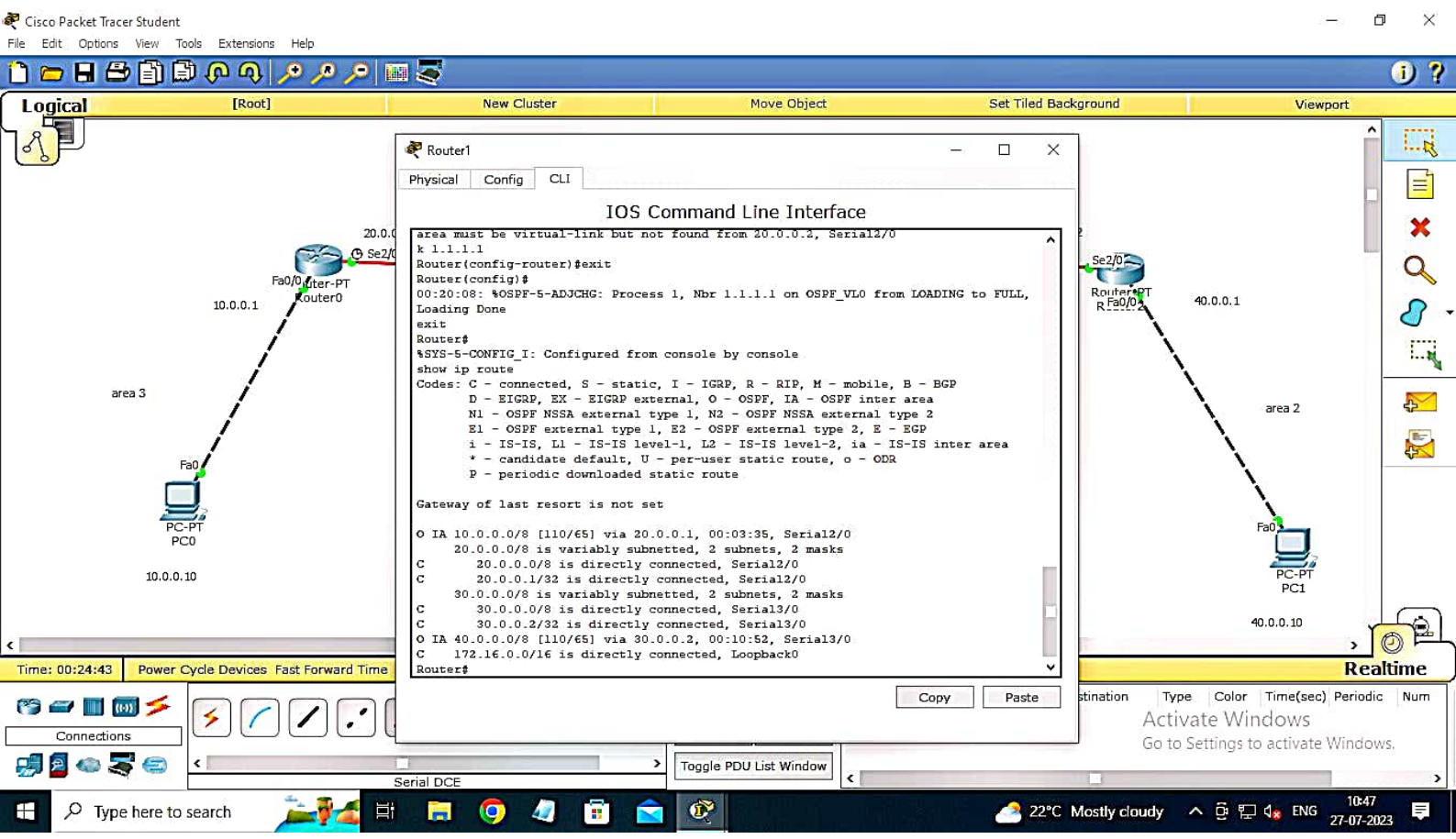

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
area 1
area 0
20.0.0.1
20.0.0.2
30.0.0.2
Se2/0
Se2/0
Se3/0
Se2/0
Fa0/0
Router-PT
Router0
Router-PT
Router1
Router-PT
10.0.0.1
30.0.0.1
40.0.0.1
area 3
area 2
Fa0
PC-PT
PC0
10.0.0.10
Fa0
PC-PT
PC1
40.0.0.10
Time: 00:28:48
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:51
27-07-2023

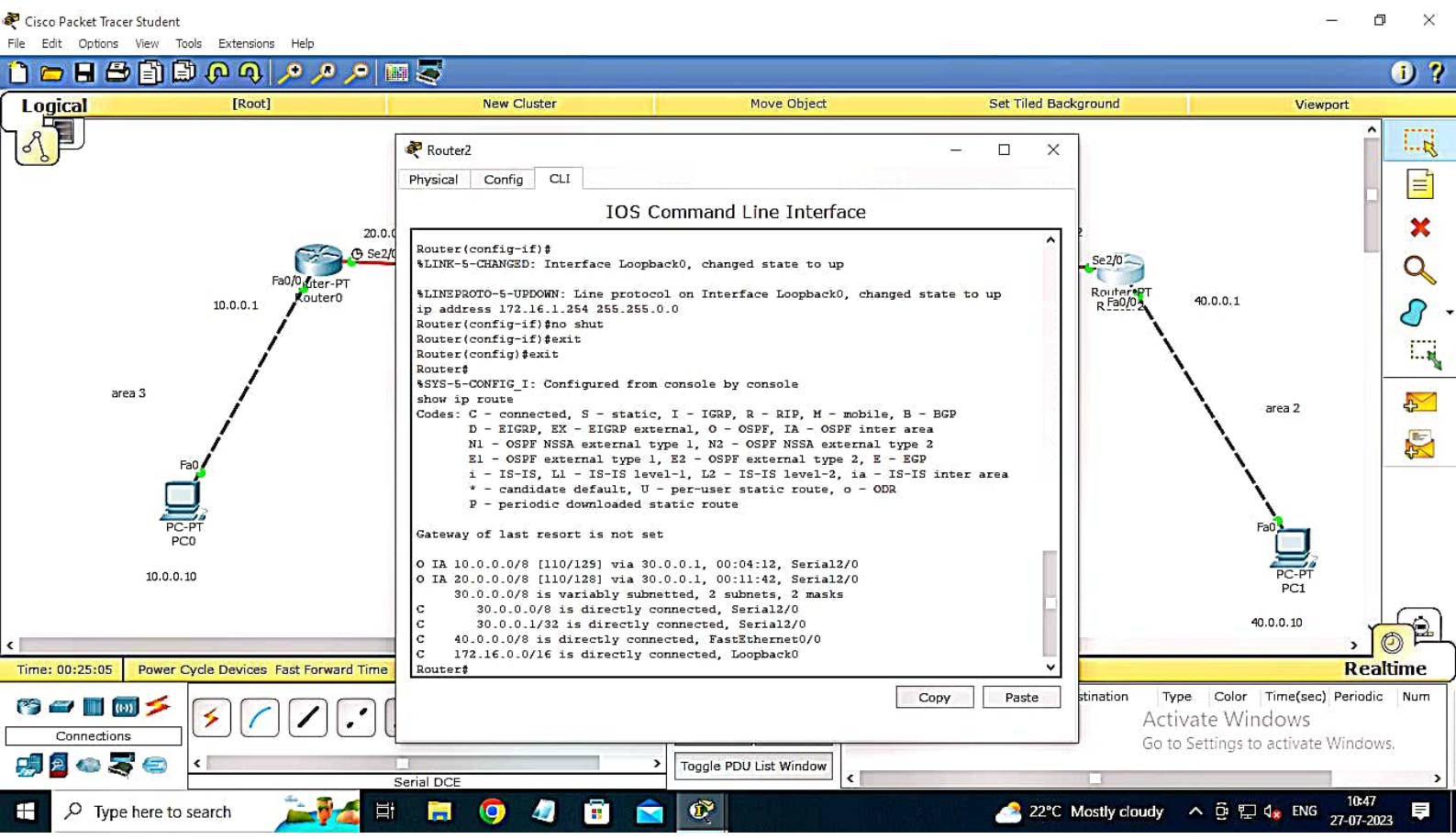

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=3ms TTL=125
Reply from 40.0.0.10: bytes=32 time=22ms TTL=125
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 22ms, Average = 7ms
PC>
Router-PT
Router0
Fa0/0
10.0.0.1
area 3
Fa0
PC-PT
PC0
10.0.0.10
Se2/0
40.0.0.1
area 2
PC-PT
PC1
40.0.0.10
Time: 00:23:38
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:45
27-07-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.10: bytes=32 time=24ms TTL=125
Reply from 10.0.0.10: bytes=32 time=10ms TTL=125
Reply from 10.0.0.10: bytes=32 time=2ms TTL=125
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 24ms, Average = 12ms
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=4ms TTL=125
Reply from 10.0.0.10: bytes=32 time=3ms TTL=125
Reply from 10.0.0.10: bytes=32 time=2ms TTL=125
Reply from 10.0.0.10: bytes=32 time=9ms TTL=125
Ping statistics for 10.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 9ms, Average = 4ms
PC>
Fa0/0
Router-PT
Router0
10.0.0.1
area 3
Fa0
PC-PT
PC0
10.0.0.10
Se2/0
Router-PT
Fa0/0
40.0.0.1
area 2
Fa0
PC-PT
PC1
40.0.0.10
Time: 00:22:51
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:45
27-07-2023


Cisco Packet Tracer Student - D:\1bm21cs021 cn\rip.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 20.0.0.10
Pinging 20.0.0.10 with 32 bytes of data:
Reply from 20.0.0.10: bytes=32 time=0ms TTL=255
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
Ping statistics for 20.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
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=9ms TTL=125
Reply from 40.0.0.1: bytes=32 time=15ms 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 = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 9ms, Maximum = 15ms, Average = 11ms
PC>
Se2/0
Fa0
PC-PT
PC0
Time: 00:02:27
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
27°C Partly sunny
ENG
10:35
20-07-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router0
Physical
Config
CLI
IOS Command Line Interface
show ip route
% Invalid input detected at '^' marker.
Router(config)$show ip route
% Invalid input detected at '^' marker.
Router(config)$exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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 10.0.0.0/8 is directly connected, FastEthernet0/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.2/32 is directly connected, Serial2/0
O 30.0.0.0/8 [110/128] via 20.0.0.2, 00:03:23, Serial2/0
O IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:03:23, Serial2/0
C 172.16.0.0/16 is directly connected, Loopback0
Router#
Copy
Paste
Fa0/0
Router-PT
Router0
10.0.0.1
area 3
Fa0
PC-PT
PC0
10.0.0.10
Se2/0
Router-PT
Fa0/0
40.0.0.1
area 2
Fa0
PC-PT
PC1
40.0.0.10
Time: 00:24:29
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:46
27-07-2023

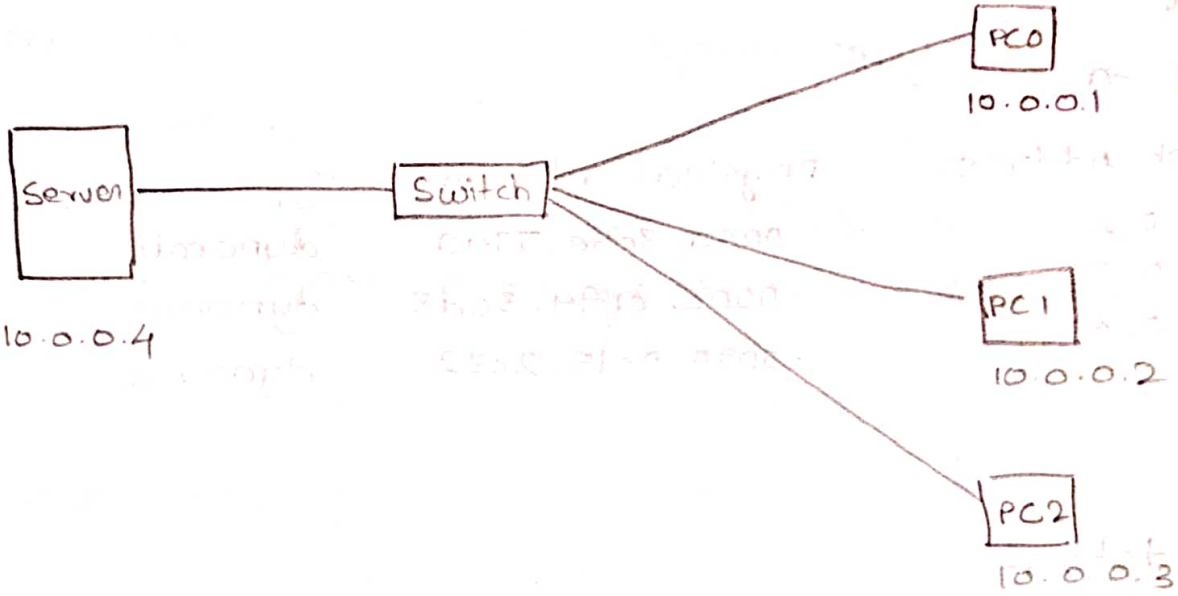

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router1
Physical
Config
CLI
IOS Command Line Interface
area must be virtual-link but not found from 20.0.0.2, Serial2/0
k 1.1.1.1
Router(config-router)#exit
Router(config)#
00:20:08: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on OSPF_VL0 from LOADING to FULL,
Loading Done
exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
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
O IA 10.0.0.0/8 [110/65] via 20.0.0.1, 00:03:35, Serial2/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.1/32 is directly connected, Serial2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.2/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 [110/65] via 30.0.0.2, 00:10:52, Serial3/0
C 172.16.0.0/16 is directly connected, Loopback0
Router#
Copy
Paste
10.0.0.1
area 3
Fa0
PC-PT
PC0
10.0.0.10
Se2/0
Router-PT
Router0
Fa0/0
Se2/0
Router-PT
Fa0/0
40.0.0.1
area 2
Fa0
PC-PT
PC1
40.0.0.10
Time: 00:24:43
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:47
27-07-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router2
Physical
Config
CLI
IOS Command Line Interface
Router(config-if)$
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
ip address 172.16.1.254 255.255.0.0
Router(config-if)$no shut
Router(config-if)$exit
Router(config)$exit
Router$
%SYS-5-CONFIG_I: Configured from console by console
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
O IA 10.0.0.0/8 [110/129] via 30.0.0.1, 00:04:12, Serial2/0
O IA 20.0.0.0/8 [110/128] via 30.0.0.1, 00:11:42, Serial2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial2/0
C 30.0.0.1/32 is directly connected, Serial2/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0
C 172.16.0.0/16 is directly connected, Loopback0
Router$
Copy
Paste
10.0.0.1
area 3
Fa0
PC-PT
PC0
10.0.0.10
Se2/0
Fa0/0
Router-PT
Router0
40.0.0.1
area 2
PC-PT
PC1
40.0.0.10
Time: 00:25:05
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Toggle PDU List Window
Serial DCE
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
22°C Mostly cloudy
ENG
10:47
27-07-2023

Lab 8

Aim: To understand the working of ARP

Topology:



Procedure:

- Connect a server, switch and PCs to form a simple LAN.
- set IP addresses of all the PCs and servers
- Go to inspect and click on ARP table, which will be empty at the beginning.
- In simulation mode, ping the PCs using capture. Make sure that switch gets to know about every IP address by pinging the devices.
- After pinging is completed, we can see that ARP tables are getting updated
- Go to command prompt of PC and give — arp -a

- It'll show the arp table of following PC
- Go to swith > CLI > show mac address-table to get all the addreses.

Output

arp table of PC0 —

PC > arp -a

Internet Address	Physical address	Type
10.0.0.2	0060.3e5e.7740	dynamic
10.0.0.3	000c.cf94.36d8	dynamic
10.0.0.4	0090.0c15.2c32	dynamic

mac address table —

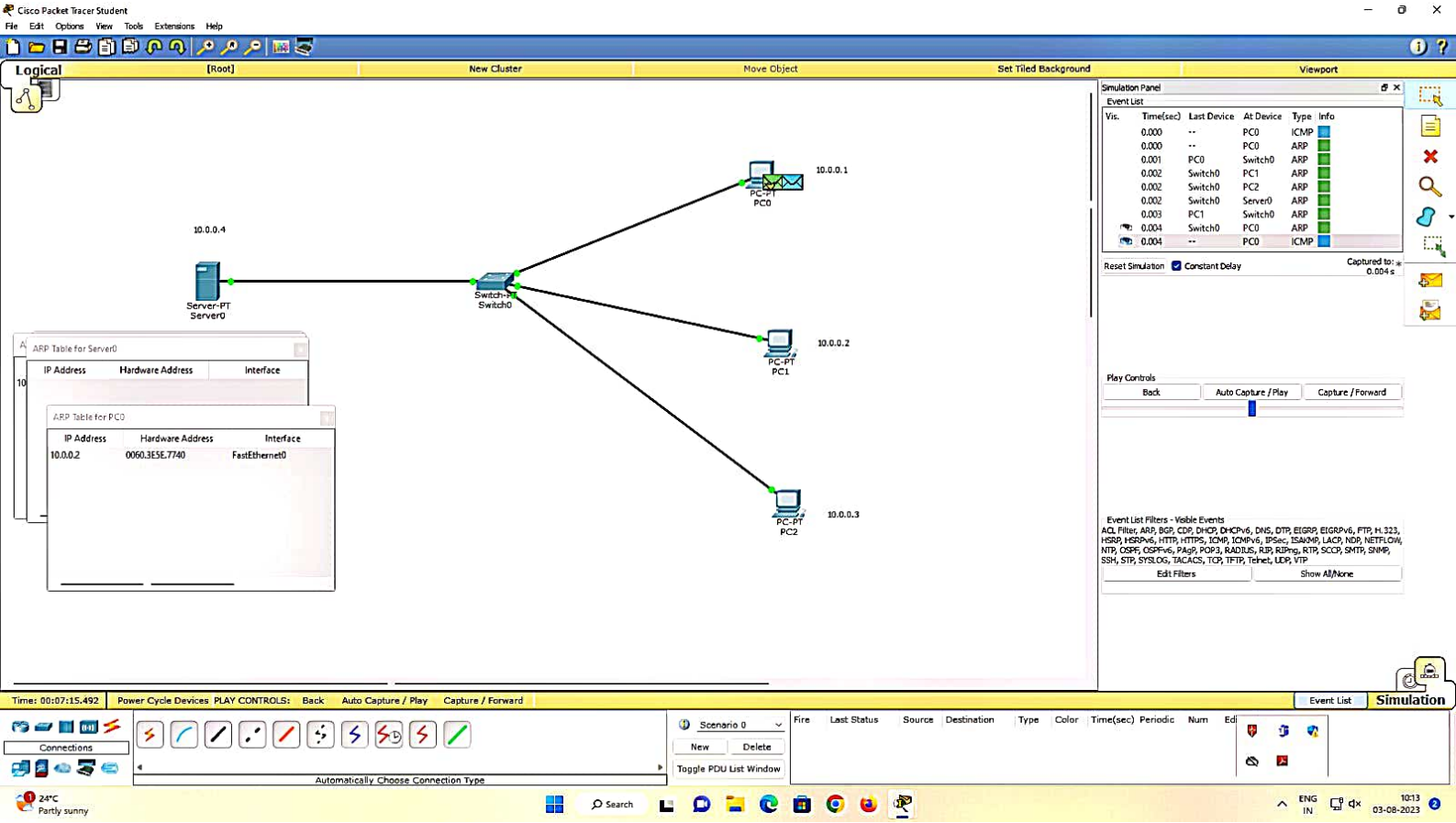
switch > show mac address-table

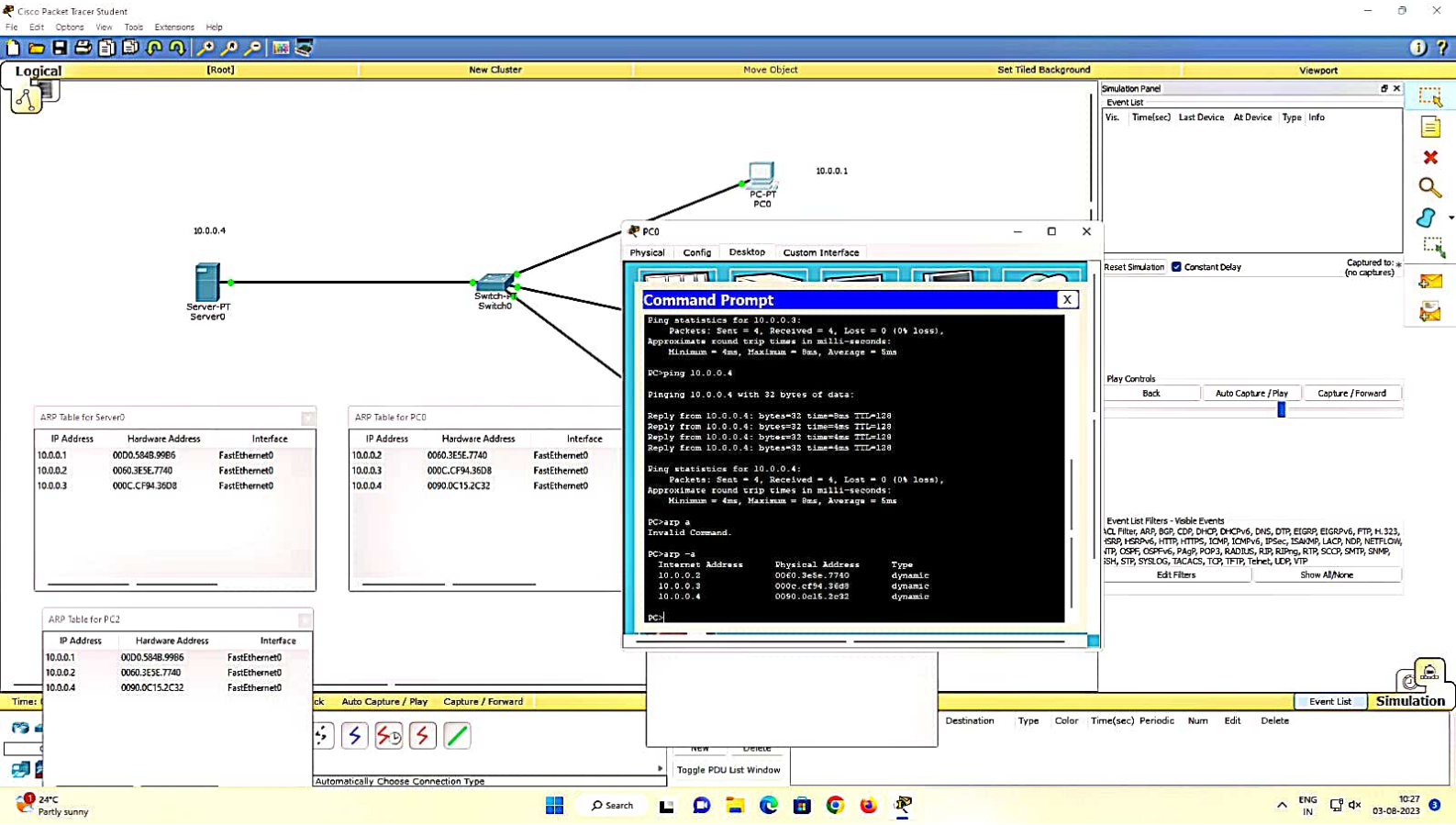
Mac address Table

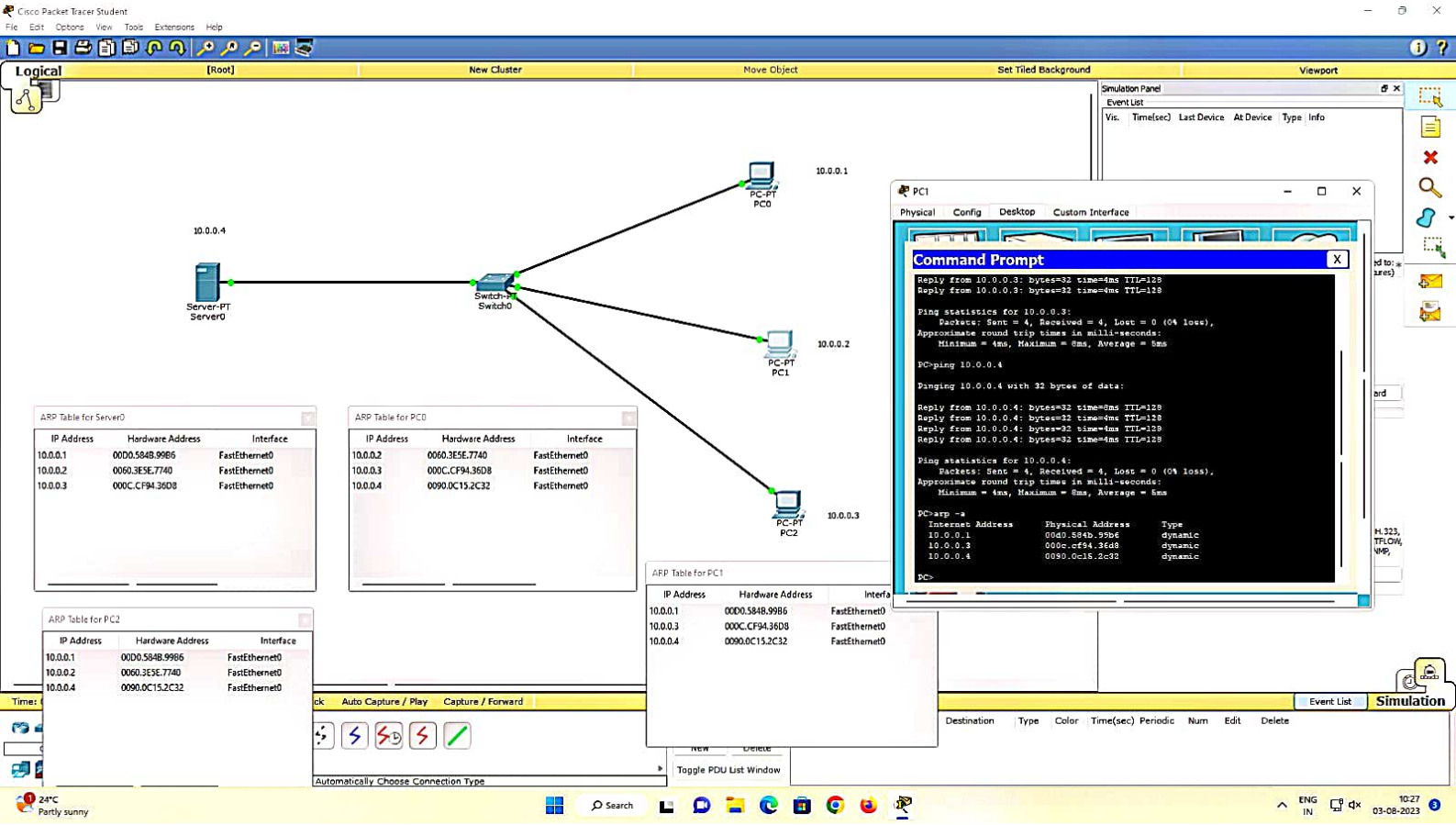
VLAN	Mac Address	Type	Ports
1	000c.cf94.36d8	DYNAMIC	Fa 2/1
1	0060.3e5e.7740	DYNAMIC	Fa 1/1
1	0090.0c15.2c32	DYNAMIC	Fa 3/1
1	00d0.584b.99b6	DYNAMIC	Fa 0/1

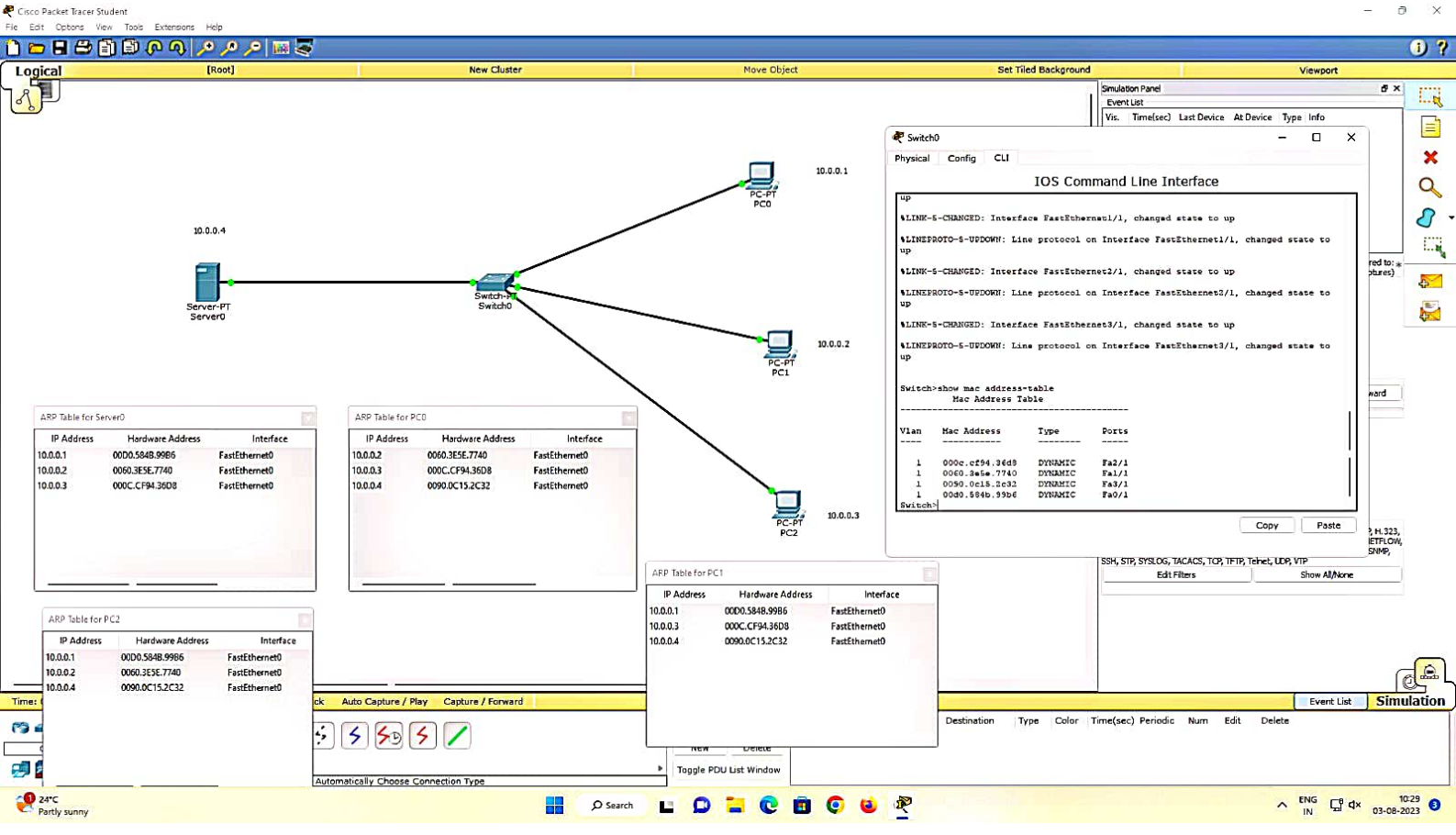
Observation

- ARP (address resolution protocol) is a protocol that connects dynamically changing IP address to a fixed mac address in a LAN.
- As we go on pinging the devices, we observe that ARP table gets updated dynamically.
- when we do show mac address-table, we can observe all device's mac address as we have pinged the devices to get to know about each other


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.4
Server-PT
Server0
Switch-PT
Switch0
10.0.0.1
PC-PT
PC0
10.0.0.2
PC-PT
PC1
10.0.0.3
PC-PT
PC2
ARP Table for Server0
IP Address
Hardware Address
Interface
ARP Table for PC0
IP Address
Hardware Address
Interface
10.0.0.2
0060.3E5E.7740
FastEthernet0
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
Info
0.000 -- PC0 ICMP
0.000 -- PC0 ARP
0.001 PC0 Switch0 ARP
0.002 Switch0 PC1 ARP
0.002 Switch0 PC2 ARP
0.002 Switch0 Server0 ARP
0.003 PC1 Switch0 ARP
0.004 Switch0 PC0 ARP
0.004 -- PC0 ICMP
Reset Simulation
Constant Delay
Captured to:
0.004 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:07:15.492
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
24°C
Partly sunny
Search
ENG
IN
10:13
03-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.1
PC-PT
PC0
10.0.0.4
Server-PT
Server0
Switch-PT
Switch0
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 8ms, Average = 5ms
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 8ms, Average = 5ms
PC>arp a
Invalid Command.
PC>arp -a
Internet Address Physical Address Type
10.0.0.2 0060.3e5e.7740 dynamic
10.0.0.3 000c.cf94.36d8 dynamic
10.0.0.4 0090.0c15.2c32 dynamic
PC>
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
Reset Simulation
Constant Delay
Captured to: (no captures)
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
ARP Table for Server0
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
ARP Table for PC0
IP Address Hardware Address Interface
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
ARP Table for PC2
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.9986 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
Auto Capture / Play
Capture / Forward
Event List
Simulation
Destination Type Color Time(sec) Periodic Num Edit Delete
Toggle PDU List Window
Automatically Choose Connection Type
24°C
Partly sunny
Search
ENG
IN
10:27
03-08-2023

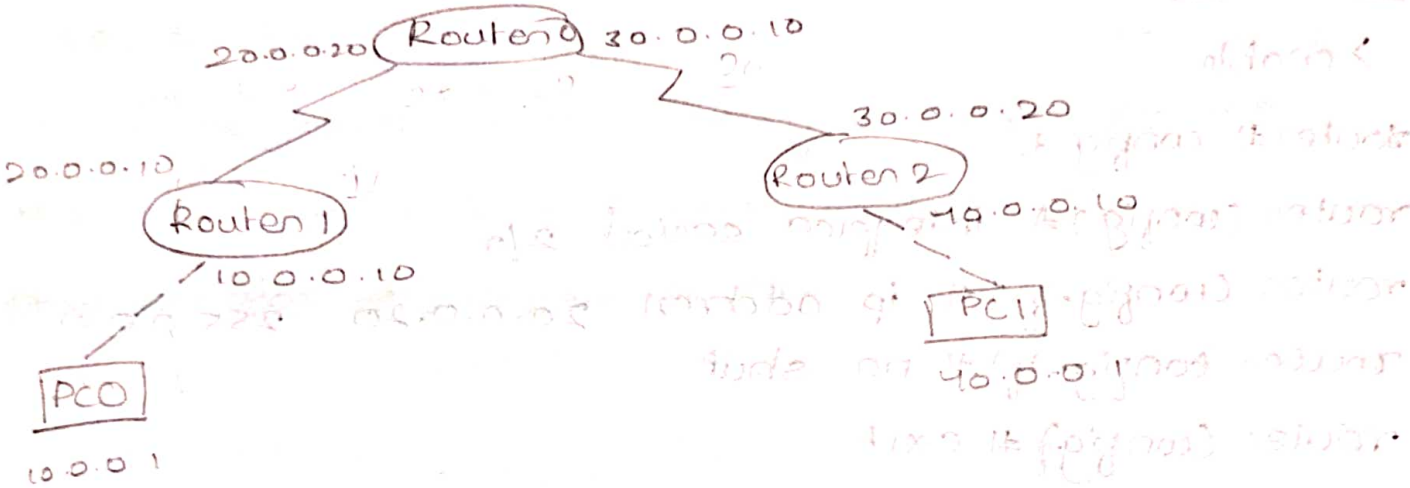

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
10.0.0.1
PC-PT PC0
10.0.0.4
Server-PT Server0
Switch-PT Switch0
10.0.0.2
PC-PT PC1
10.0.0.3
PC-PT PC2
PC1
Physical Config Desktop Custom Interface
Command Prompt
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 8ms, Average = 5ms
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 8ms, Average = 5ms
PC>arp -a
Internet Address Physical Address Type
10.0.0.1 00d0.584b.99b6 dynamic
10.0.0.3 000c.cf94.36d8 dynamic
10.0.0.4 0090.0c15.2c32 dynamic
PC>
ARP Table for Server0
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
ARP Table for PC0
IP Address Hardware Address Interface
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
ARP Table for PC1
IP Address Hardware Address Interfa
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
ARP Table for PC2
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
Time:
Auto Capture / Play
Capture / Forward
Event List
Simulation
Destination Type Color Time(sec) Periodic Num Edit Delete
Toggle PDU List Window
Automatically Choose Connection Type
24°C Partly sunny
Search
ENG IN
10:27 03-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.4
Server-PT
Server0
Switch-PT
Switch0
PC-PT
PC0
10.0.0.1
PC-PT
PC1
10.0.0.2
PC-PT
PC2
10.0.0.3
Switch0
Physical
Config
CLI
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet2/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet3/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up
Switch>show mac address-table
Mac Address Table
Vlan Mac Address Type Ports
1 000c.cf94.36d8 DYNAMIC Fa2/1
1 0060.3e5e.7740 DYNAMIC Fa1/1
1 0090.0c15.2c32 DYNAMIC Fa3/1
1 00d0.584b.99b6 DYNAMIC Fa0/1
Switch>
Copy
Paste
ARP Table for Server0
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
ARP Table for PC0
IP Address Hardware Address Interface
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
ARP Table for PC1
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.99B6 FastEthernet0
10.0.0.3 000C.CF94.36D8 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
ARP Table for PC2
IP Address Hardware Address Interface
10.0.0.1 00D0.584B.9986 FastEthernet0
10.0.0.2 0060.3E5E.7740 FastEthernet0
10.0.0.4 0090.0C15.2C32 FastEthernet0
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
Edit Filters
Show All/None
Auto Capture / Play
Capture / Forward
Event List
Simulation
Destination Type Color Time(sec) Periodic Num Edit Delete
Toggle PDU List Window
Automatically Choose Connection Type
24°C
Partly sunny
Search
ENG
IN
10:29
03-08-2023

Lab 9

Aim - To demonstrate TTL/ life of a packet

Topology:



Procedure

1. Create a 2 PC and 3 router configuration, as shown in the topology
2. Use serial DTE between routers and copper cross over between router and PC.
3. Configure the IP address and gateway of PC and configure all the routers

for router 0

>enable

Router# config t

Router# interfa Router(config)# interface gastethernet 0/0

Router(config-if)# ip address 10.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)# exit

Router(config) # ip route 30.0.0.0 255.0.0.0 20.0.0.20
Router (config)# ip route 40.0.0.0 255.0.0.0 20.0.0.
Router (config) # exit

for router 1

> enable
router # config t
router (config) # interface serial 2/0
router (config-if) # ip address 20.0.0.20 255.0.0.0
router (config-if) # no shut
router (config-if) # exit
router (config)# interface serial 3/0
router (config-if) # ip address 30.0.0.10 255.0.0.0
router (config-if) # no shut
router (config-if) # exit
router (config) # ip routes 10.0.0.0 255.0.0.0 20.0.0.10
router (config) # ip route 40.0.0.0 255.0.0.0 30.0.0.20
router (config)# exit

Similar commands for router 2.

4) Select simulation mode. select simple PDU and select source & destination PCs.

5) Click on capture button to send PDU, and acknowledgement from PC to router and router to PC.

6) Click on PDU during every transfer to see the inbound and outbound PDU details observe the difference in TTL.

Result

at PC0

Outbound PDU details: TTL=255

At router0

Inbound PDU details : TTL = 255

Outbound PDU details : TTL = 254

at router1

Inbound PDU details : TTL = 254

Outbound PDU details : TTL = 253

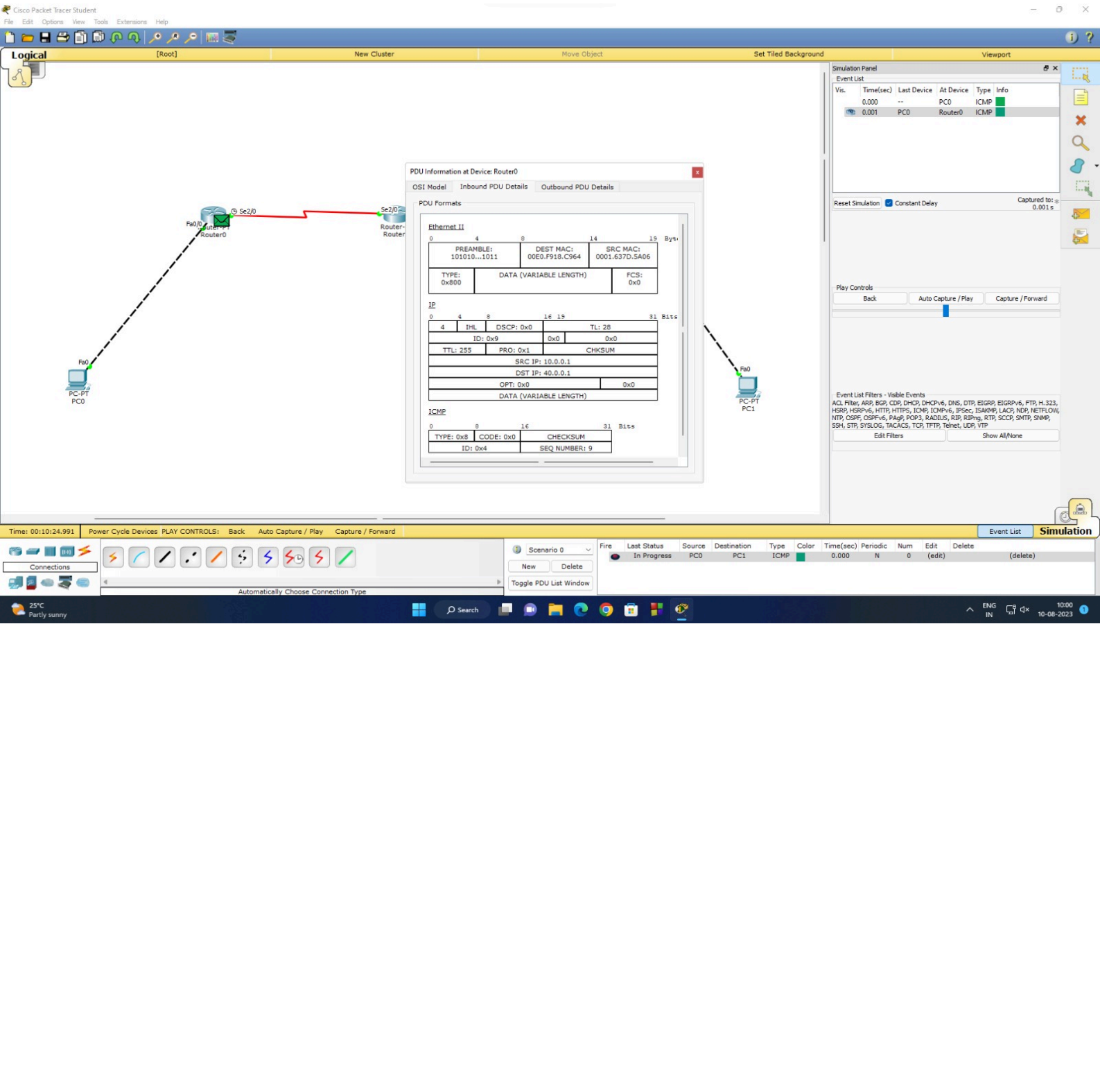
at router2

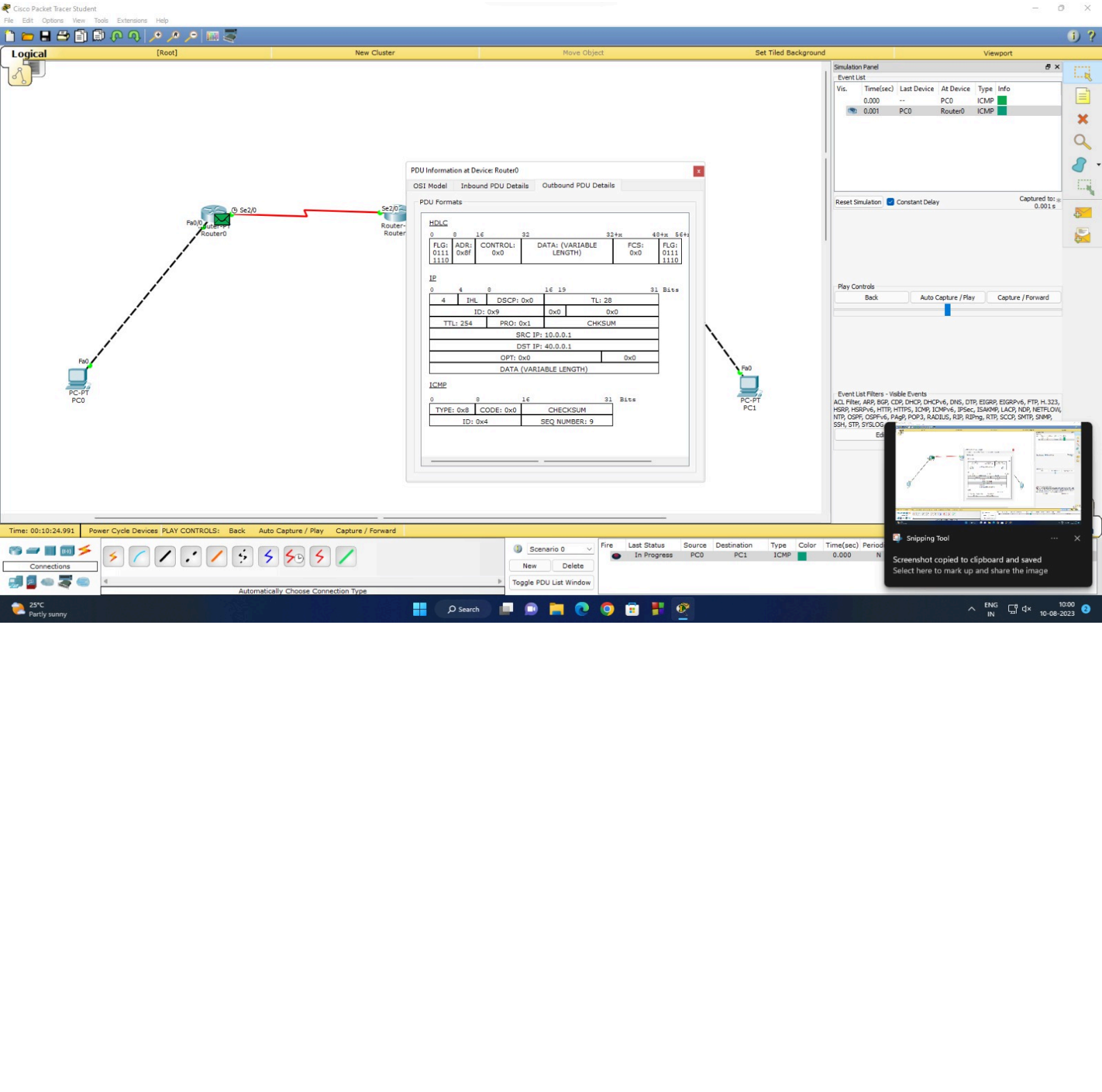
Inbound PDU details : TTL = 253

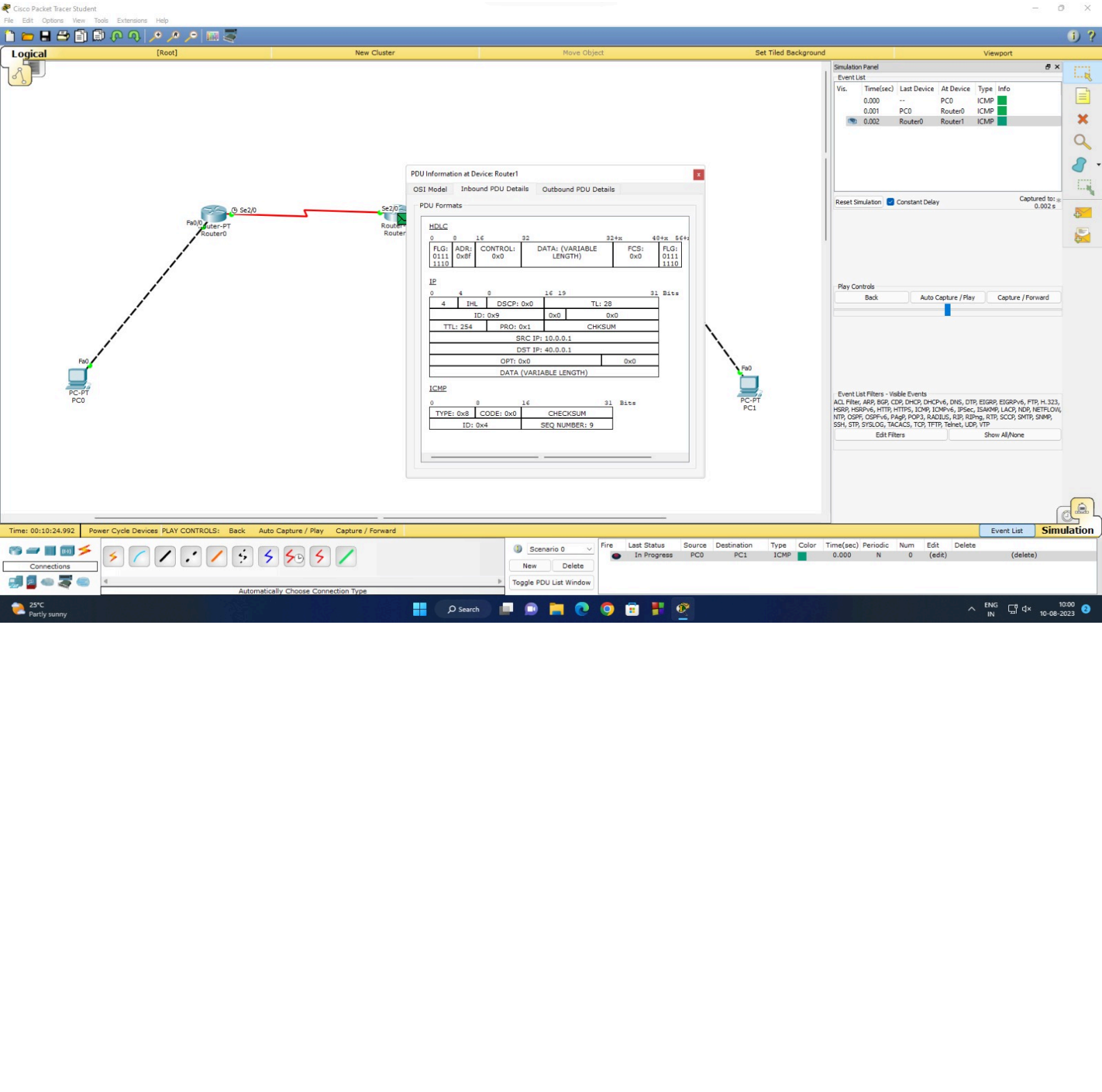
Outbound PDU details : TTL = 252

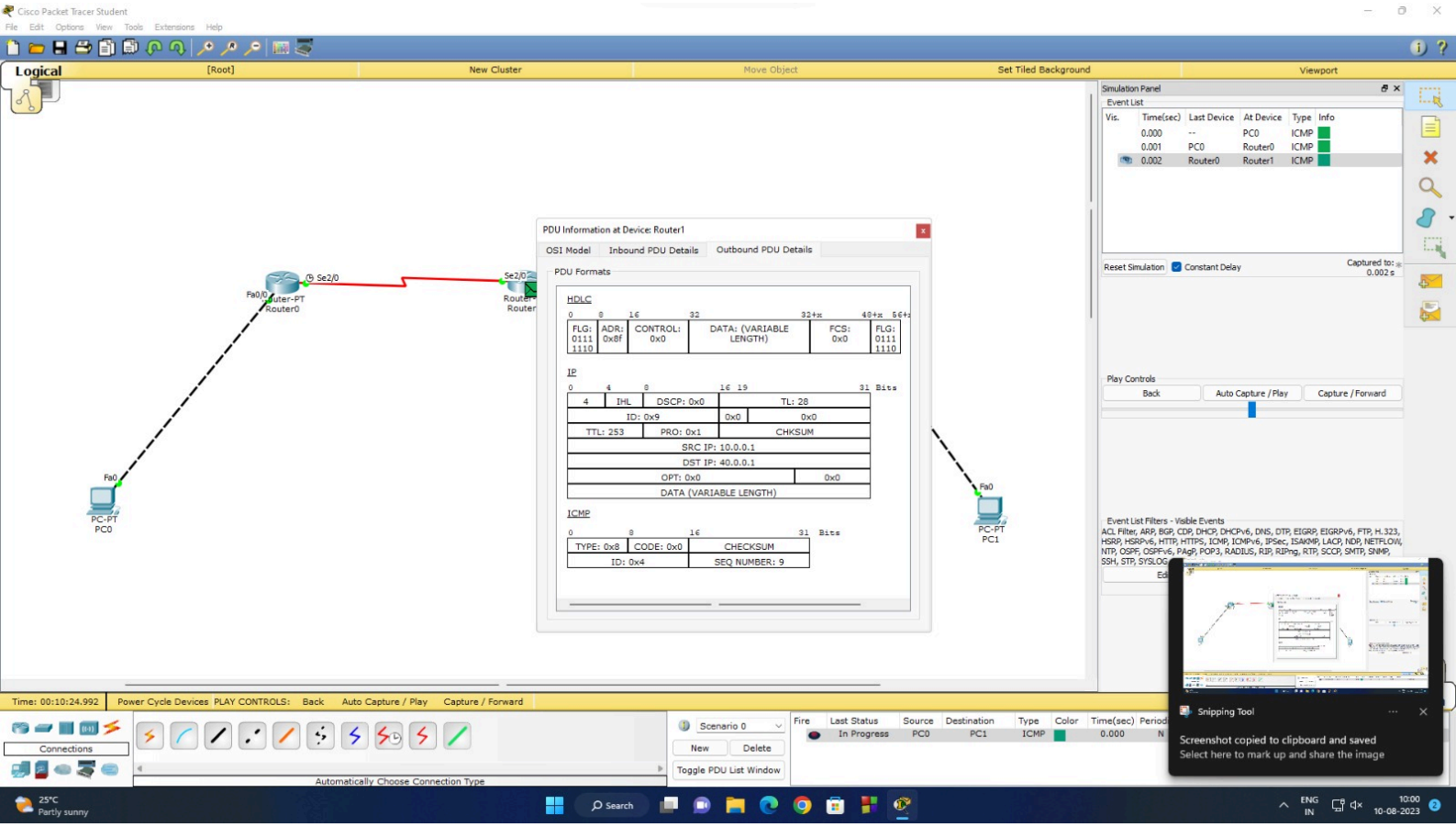
Observation

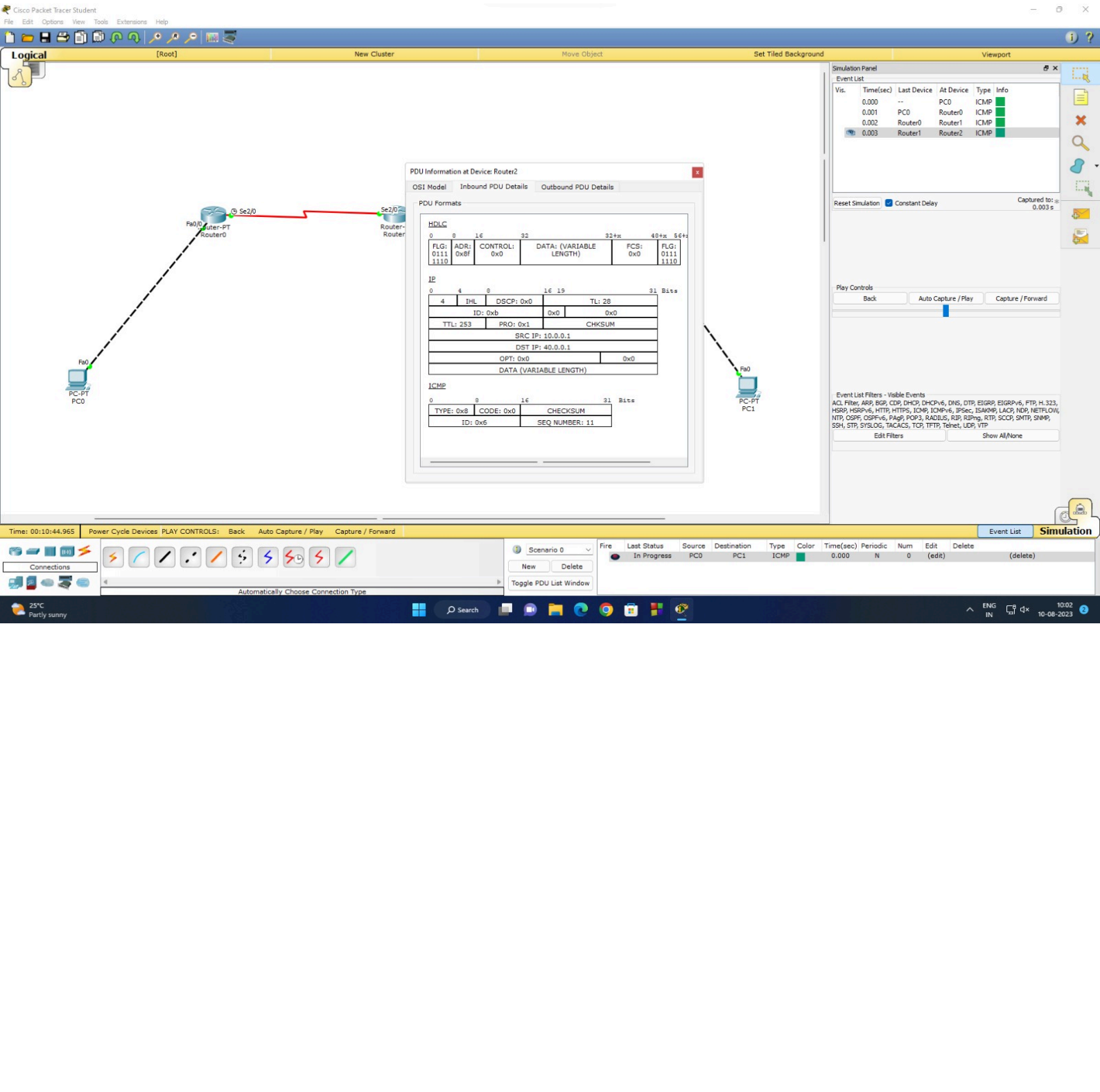
- The TTL is reduced by 1 in every routers
- TTL is a mechanism which limits the number of hops between source and destination
- When TTL becomes 0 it means it can't do another hop.

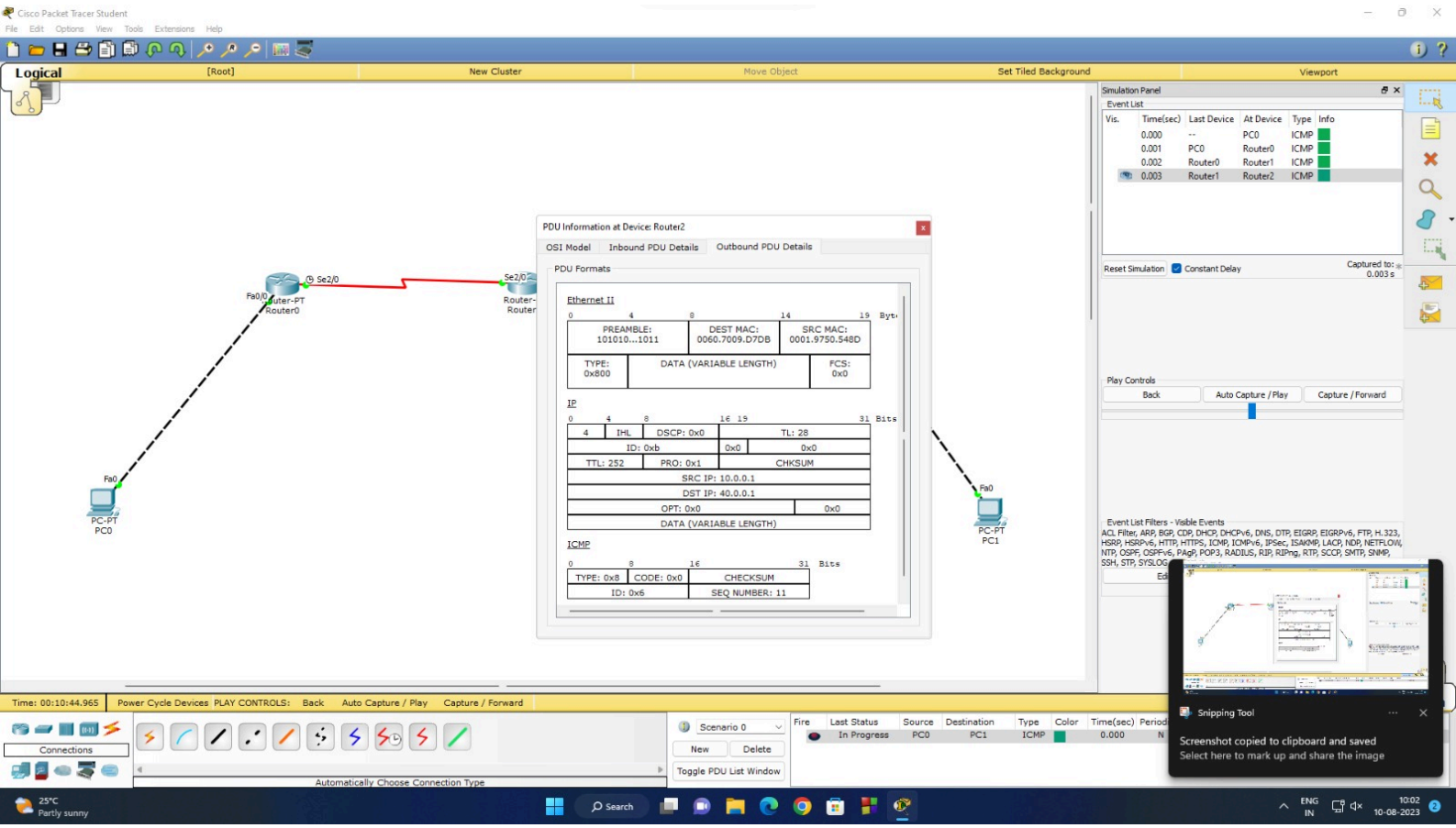

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 00E0.F918.C964
SRC MAC: 0001.637D.5A06
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
4 IHL DSCP: 0x0 TL: 28
ID: 0x9 0x0 0x0
TTL: 255 PRO: 0x1 CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8 CODE: 0x0 CHECKSUM
ID: 0x4 SEQ NUMBER: 9
Router0
Router-PT
Router1
Se2/0
Fa0/0
Fa0
PC-PT PC0
PC-PT PC1
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.001 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:10:24.991
Power Cycle Devices
PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
In Progress PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
25°C Partly sunny
Search
ENG IN
10:00 10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
4
IHL
DSCP: 0x0
TL: 28
ID: 0x9
0x0
0x0
TTL: 254
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 9
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.001 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG
Router0
Router1
Se2/0
Fa0/0
Fa0
PC-PT PC0
PC-PT PC1
Time: 00:10:24.991
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Period
In Progress PC0 PC1 ICMP 0.000
Snipping Tool
Screenshot copied to clipboard and saved
Select here to mark up and share the image
25°C Partly sunny
Search
ENG IN
10:00 10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
4
IHL
DSCP: 0x0
TL: 28
ID: 0x9
0x0
0x0
TTL: 254
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 9
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
Reset Simulation
Constant Delay
Captured to: 0.002 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Fa0/0
Se2/0
Router-PT Router0
Fa0
PC-PT PC0
PC-PT PC1
Time: 00:10:24.992
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
In Progress PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
25°C
Partly sunny
Search
ENG
IN
10:00
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
4
IHL
DSCP: 0x0
TL: 28
ID: 0x9
0x0
0x0
TTL: 253
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 9
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Time: 00:10:24.992
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec)
In Progress PC0 PC1 ICMP 0.000
Snipping Tool
Screenshot copied to clipboard and saved
Select here to mark up and share the image
25°C
Partly sunny
Search
ENG
IN
10:00
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLG: 0111 1110
ADR: 0x8f
CONTROL: 0x0
DATA (VARIABLE LENGTH)
FCS: 0x0
FLG: 0111 1110
IP
4
IHL
DSCP: 0x0
TL: 28
ID: 0xb
0x0
0x0
TTL: 253
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x6
SEQ NUMBER: 11
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 Router2 ICMP
Reset Simulation
Constant Delay
Captured to: 0.003 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Router-PT Router0
Router-PT
PC-PT PC0
PC-PT PC1
Time: 00:10:44.965
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
In Progress PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
25°C
Partly sunny
Search
ENG
IN
10:02
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0060.7009.D7DB
SRC MAC: 0001.9750.548D
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
4 IHL DSCP: 0x0 TL: 28
ID: 0xb 0x0 0x0
TTL: 252 PRO: 0x1 CHKSUM
SRC IP: 10.0.0.1
DST IP: 40.0.0.1
OPT: 0x0 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8 CODE: 0x0 CHECKSUM
ID: 0x6 SEQ NUMBER: 11
Router-PT Router0
Router-PT Router
PC-PT PC0
PC-PT PC1
Fa0/0
Se2/0
Fa0
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 Router2 ICMP
Reset Simulation
Constant Delay
Captured to: 0.003 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Time: 00:10:44.965
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Period
In Progress PC0 PC1 ICMP 0.000
Snipping Tool
Screenshot copied to clipboard and saved
Select here to mark up and share the image
25°C Partly sunny
Search
ENG IN
10:02 10-08-2023

Lab 9

Aim : To understand the operation of TELNET by accessing the routers in server room from a PC in IT office.

Topology :

Procedure -

1) Connect the devices as shown in topology above.
2) Configure IP address and set IP and gateway for PC.
3) Router CLI

```
router > enable
router # config t
router (config) # hostname r1
r1 (config) # enable secret p1
r1 (config) # interface fastethernet 0/0
r1 (config-if) # ip address 10.0.0.1 255.0.0.0
r1 (config-if) # no shut
r1 (config-if) # line vty 0 5
r1 (config-line) # login
```

```
r1(config-line)# password p0
r1(config-line)# exit
r1# wr
Building configuration...
```

Result

In PC0

```
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 = 21 ms TTL=255
Reply from 10.0.0.1 : bytes=32 time = 13 ms TTL = 255
Reply from 10.0.0.1 : bytes= 32 time = 6 ms TTL=255
Reply from 10.0.0.1 : bytes= 32 time = 0 ms TTL=255

Ping statics from 10.0.0.1:

    Packets : sent = 4, Received= 4, lost =0

Approximate roundtrip time in milliseconds:

    Minimum= 6ms Maximum = 21 ms Average=12ms
```

PC> telnet 10.0.0.1

Trying 10.0.0.1 ... open

User access verification

Password: (Type P0)

r1 >enable

Password: (Type P1)

r1 # show ip route

code:

gateway of last resort not set

C 10.0.0.0/8 is directly connected, fastethernet0/0

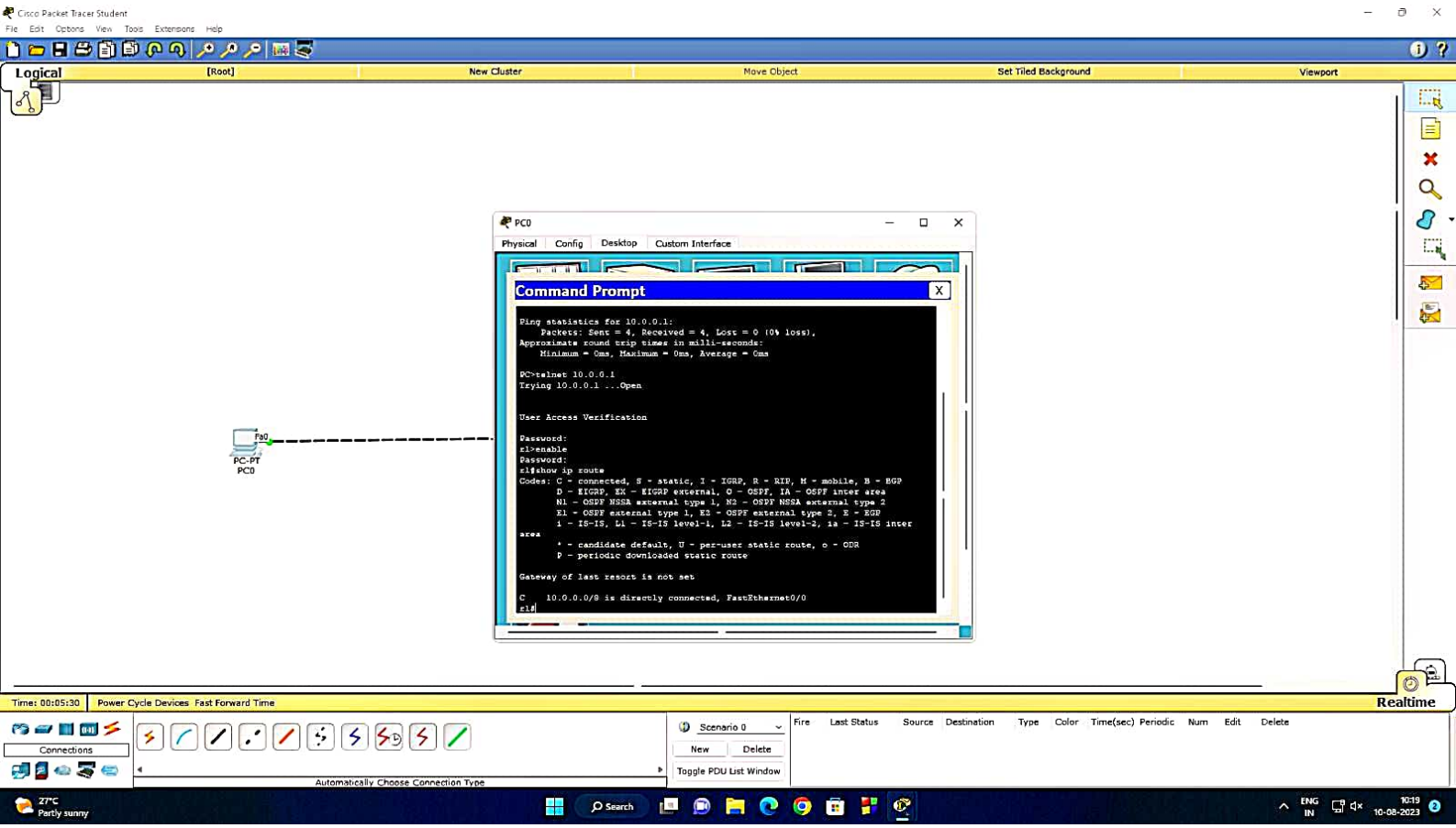
r1#

observation

1) Telnet - used by terminal emulation programs that allow you to log into a remote host

2) we logged into 10.0.0.1 IP devices through 10.0.0.2 IP device

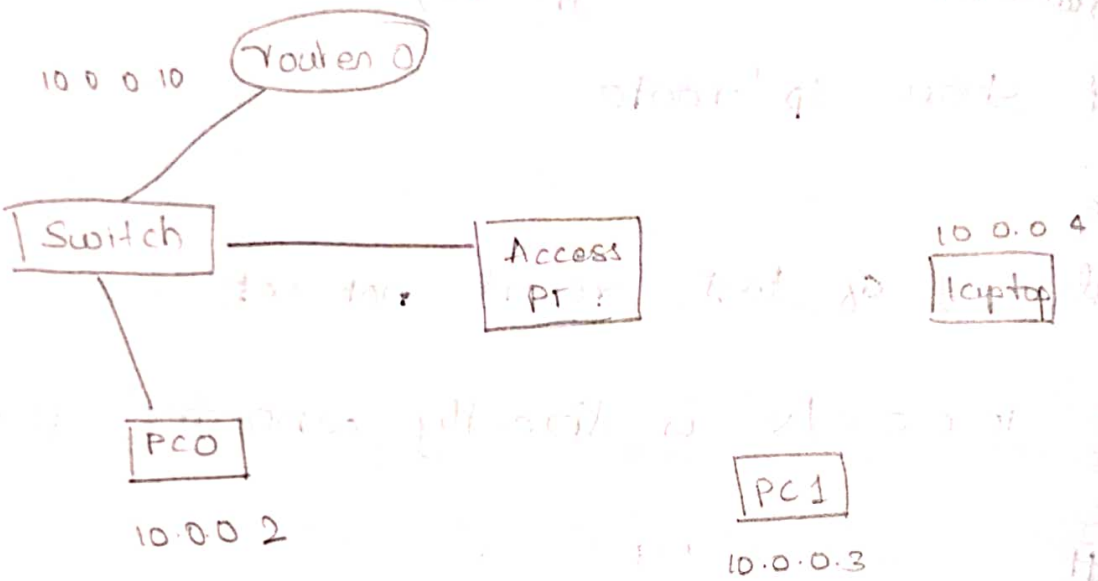
3) The password typed is not visible.


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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 = 0ms, Average = 0ms
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
rl>enable
Password:
rl#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 10.0.0.0/8 is directly connected, FastEthernet0/0
rl#
Fa0
PC-PT
PC0
Time: 00:05:30
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
27°C
Partly sunny
Search
ENG
IN
10:19
10-08-2023

Lab 9

Aim : To connect a WLAN and make the nodes communicate wirelessly

Topology:



Procedure

1) Construct the above topology

2) Set the IP of PC connected with wire and configure router 0

3) Configure access-point 1 → port 1 → SSID name → WLAN

Select WEP and give 10 digit key (here 1234567890)

4) To configure PC 0 and laptop wirelessly, switch off the device

Drag the existing PT-HOST-NM-1AM to the components list in the LHS

Drag WMP300N wireless interface to the empty port and switch on the device.

5) Now, in the config tab, a new wireless interface would have been added.

Configure SSID, WEP, WEP key, IP address & gateway to the device

6) router > enable

config t

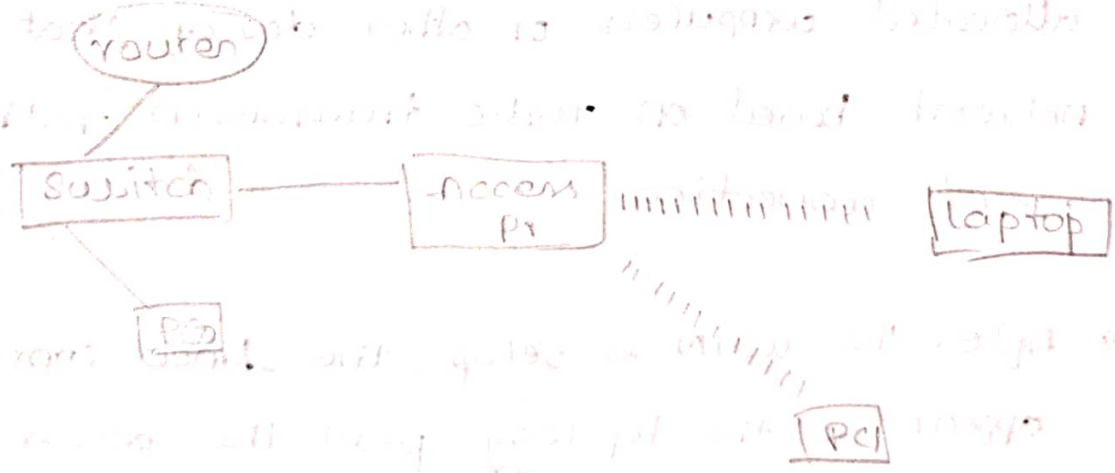
interface fastethernet 0/0

ip address 10.0.0.0 255.0.0.0

no shut

Result

Topology :



At PC 0

PC > ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3 : bytes = 32 time = 21 ms TTL = 12
Reply from 10.0.0.3 : bytes = 32 time = 13 ms TTL = 128
Reply from 10.0.0.3 : bytes = 32 time = 6 ms TTL = 128
Reply from 10.0.0.3 : bytes = 32 time = 0 ms TTL = 128

Ping statics for 10.0.0.3

Packets sent = 4, Received = 4, Lost = 0

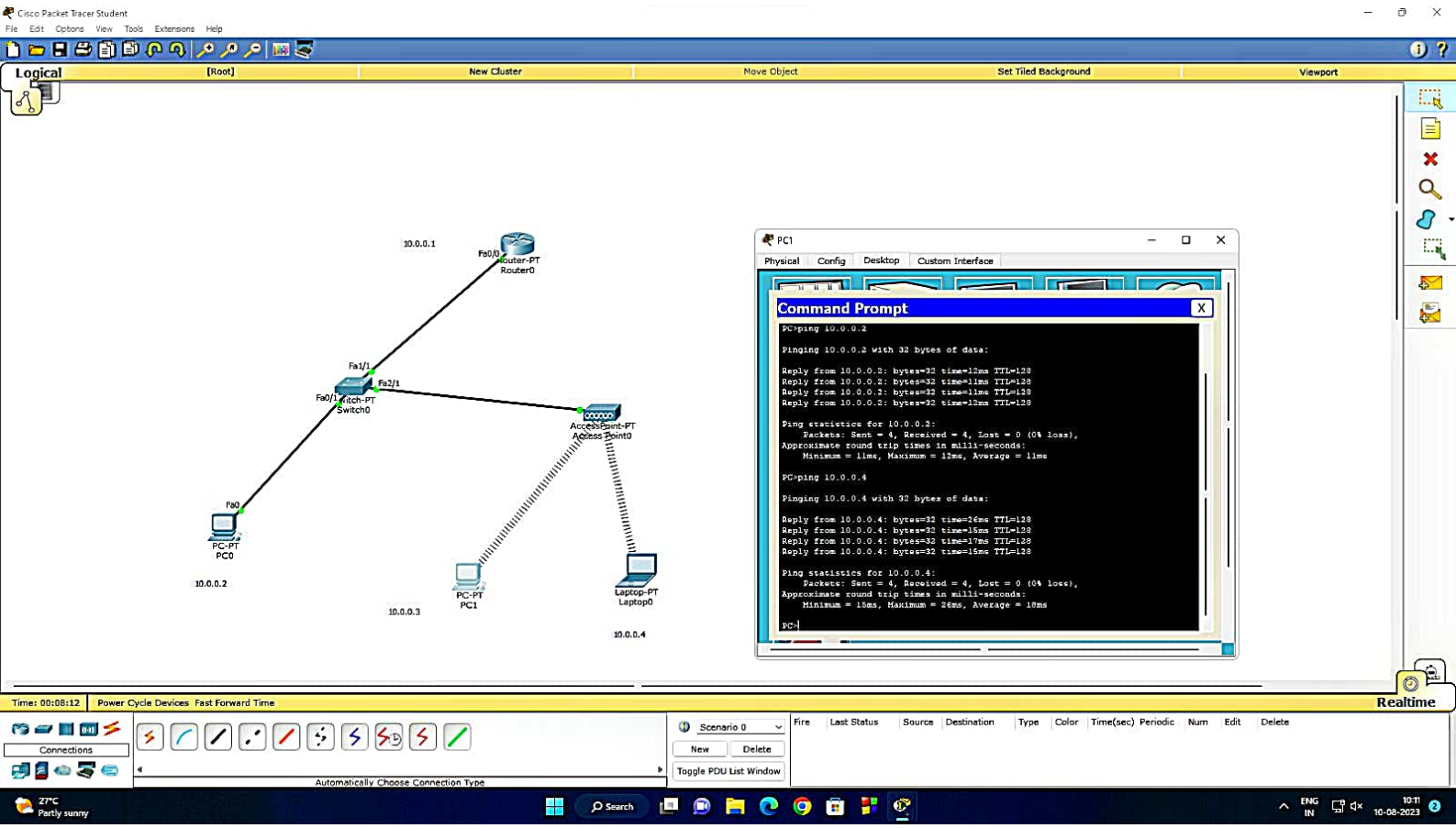
Approximate roundtrip time in millisecond

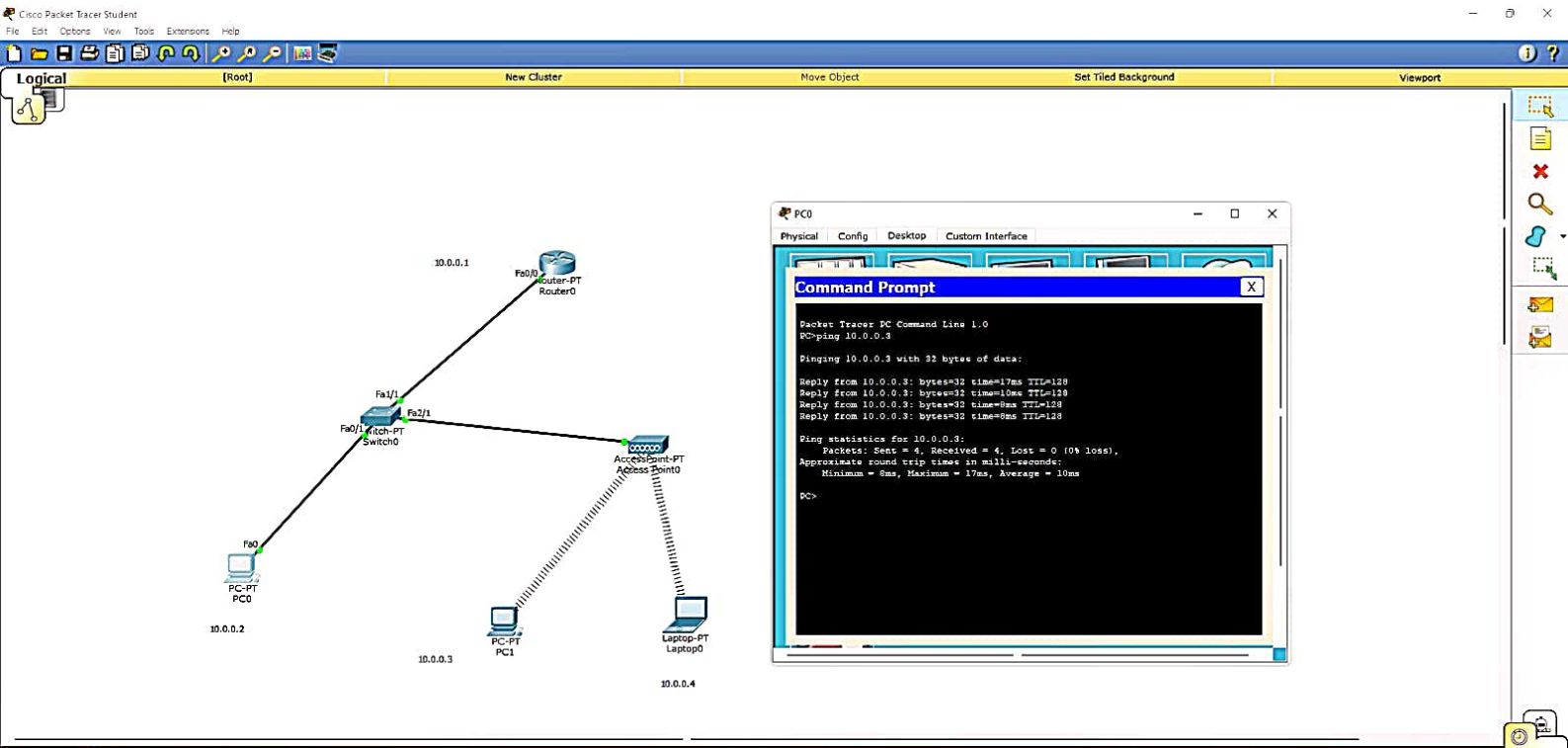
minimum = 6 ms, Maximum = 21 ms, Average =

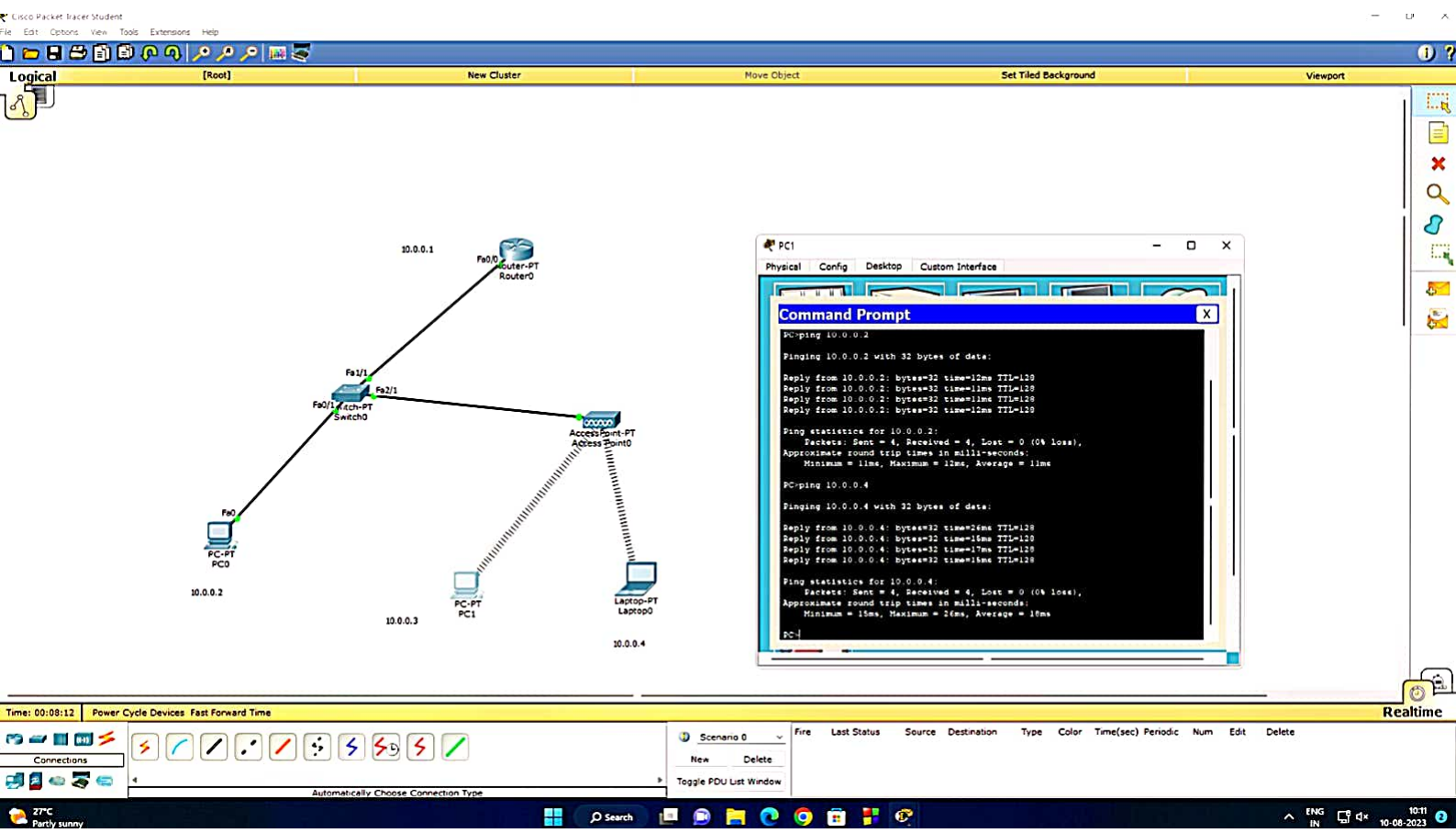
Observation :

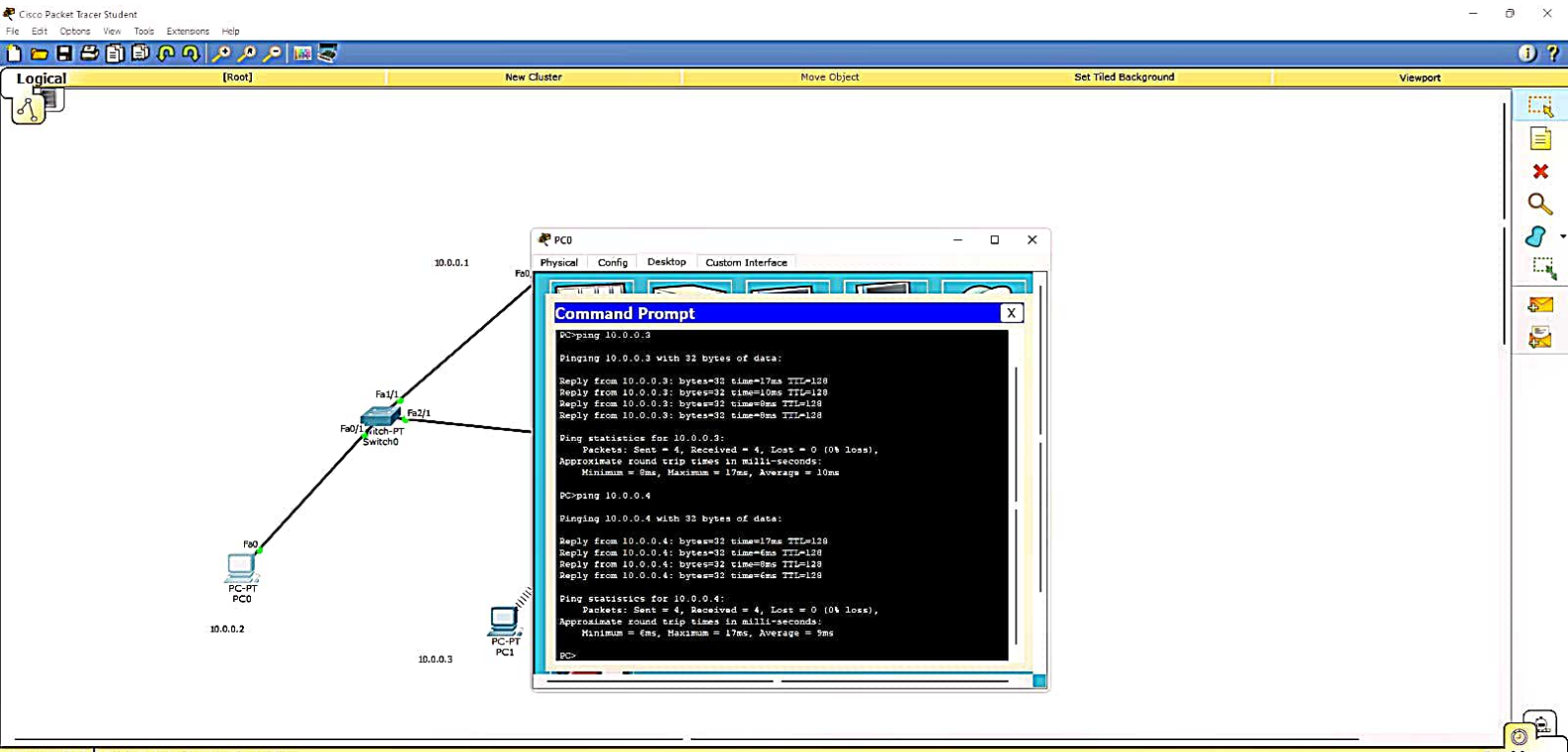
- Wireless local area network WLAN is a group of allocated computers or other devices that form a network based on radio transmission rather than wired connections.

- After the WLAN is setup, the lined connection appears in the topology from the access point.


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.1
Router-PT
Router0
Fa0/0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
Access-Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC1
10.0.0.3
Laptop-PT
Laptop0
10.0.0.4
PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
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=12ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=12ms TTL=128
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 11ms, Maximum = 12ms, Average = 11ms
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=24ms TTL=128
Reply from 10.0.0.4: bytes=32 time=15ms TTL=128
Reply from 10.0.0.4: bytes=32 time=17ms TTL=128
Reply from 10.0.0.4: bytes=32 time=15ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 15ms, Maximum = 24ms, Average = 18ms
PC>
Time: 00:08:12
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
27°C
Partly sunny
Search
ENG
IN
10:11
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
Access Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC1
10.0.0.3
Laptop-PT
Laptop0
10.0.0.4
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=17ms TTL=128
Reply from 10.0.0.3: bytes=32 time=10ms TTL=128
Reply from 10.0.0.3: bytes=32 time=8ms TTL=128
Reply from 10.0.0.3: bytes=32 time=8ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 17ms, Average = 10ms
PC>
Time: 00:07:18
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
25°C
Partly sunny
Search
ENG
IN
10:10
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
10.0.0.1
Router-PT
Router0
Fa0/0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
Access Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC1
10.0.0.3
Laptop-PT
Laptop0
10.0.0.4
PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
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=12ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=11ms TTL=128
Reply from 10.0.0.2: bytes=32 time=12ms TTL=128
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 11ms, Maximum = 12ms, Average = 11ms
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=26ms TTL=128
Reply from 10.0.0.4: bytes=32 time=15ms TTL=128
Reply from 10.0.0.4: bytes=32 time=17ms TTL=128
Reply from 10.0.0.4: bytes=32 time=15ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 15ms, Maximum = 26ms, Average = 18ms
PC>
Time: 00:08:12
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
27°C
Partly sunny
Search
ENG
IN
10:11
10-08-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=17ms TTL=128
Reply from 10.0.0.3: bytes=32 time=10ms TTL=128
Reply from 10.0.0.3: bytes=32 time=8ms TTL=128
Reply from 10.0.0.3: bytes=32 time=8ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 17ms, Average = 10ms
PC>ping 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=17ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Reply from 10.0.0.4: bytes=32 time=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 17ms, Average = 9ms
PC>
10.0.0.1
Fa0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC1
10.0.0.3
Time: 00:07:40
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
27°C
Partly sunny
Search
ENG
IN
10:11
10-08-2023

CRC code:

```
#include<stdio.h>
#include<string.h>
#define N strlen(divisor)
char data[28];
char rem[28];
char divisor[10];
int dlength,i,j;

void XOR(){
  for(j=1; j<N; j++)
  rem[j]=((rem[j]==divisor[j]?'0':'1');
  }

void receiver(){
  printf("Enter the received data");
  scanf("%s",data);
  printf("\n\n");
  printf("Data received: %s",data);
  crc();
  for(i=0;(i<N-1)&&(rem[i]!='1');i++);
    if(i<N-1)
      printf("\n Error detected\n\n");
    else
      printf("\n No error detected\n\n");
```

```
void crc(){
  for (i=0; i<N; i++)
    rem[i] = data[i];
  do {
    if (rem[0] == '1')
      XOR();

    for (j=0; j<N-1; j++)
      rem[j] = rem[j+1]

    rem[j] = data[i++];
  }

  while (i <= dlength + 16);
 }

int main()
{
  int c=0;
  printf("\n Enter data to be transmitted :");
   scanf("%s", data);
   printf("\n Enter the Divisor :");
   scanf("%s", divisor);

   dlength = strlen(data);
   for (i = dlength; i < dlength + 16; i++)
        data[i] = '0';
    printf("\n");
```

```
printf("\n Data padded with n-1 zeros : %d",
  data);
printf("\n");
crc();
printf("\n CRC or Check value is : %s", rem);
printf("\n rem strlen is : %d", strlen(rem));
  {
    printf("\n %s", data);
     data[i] = rem[c++];
  }
  printf("\n");
  printf("\n Final data to be sent : %s",
    data);
printf("\n\n");
receiver();
  return 0;
}
```

main.c | Output

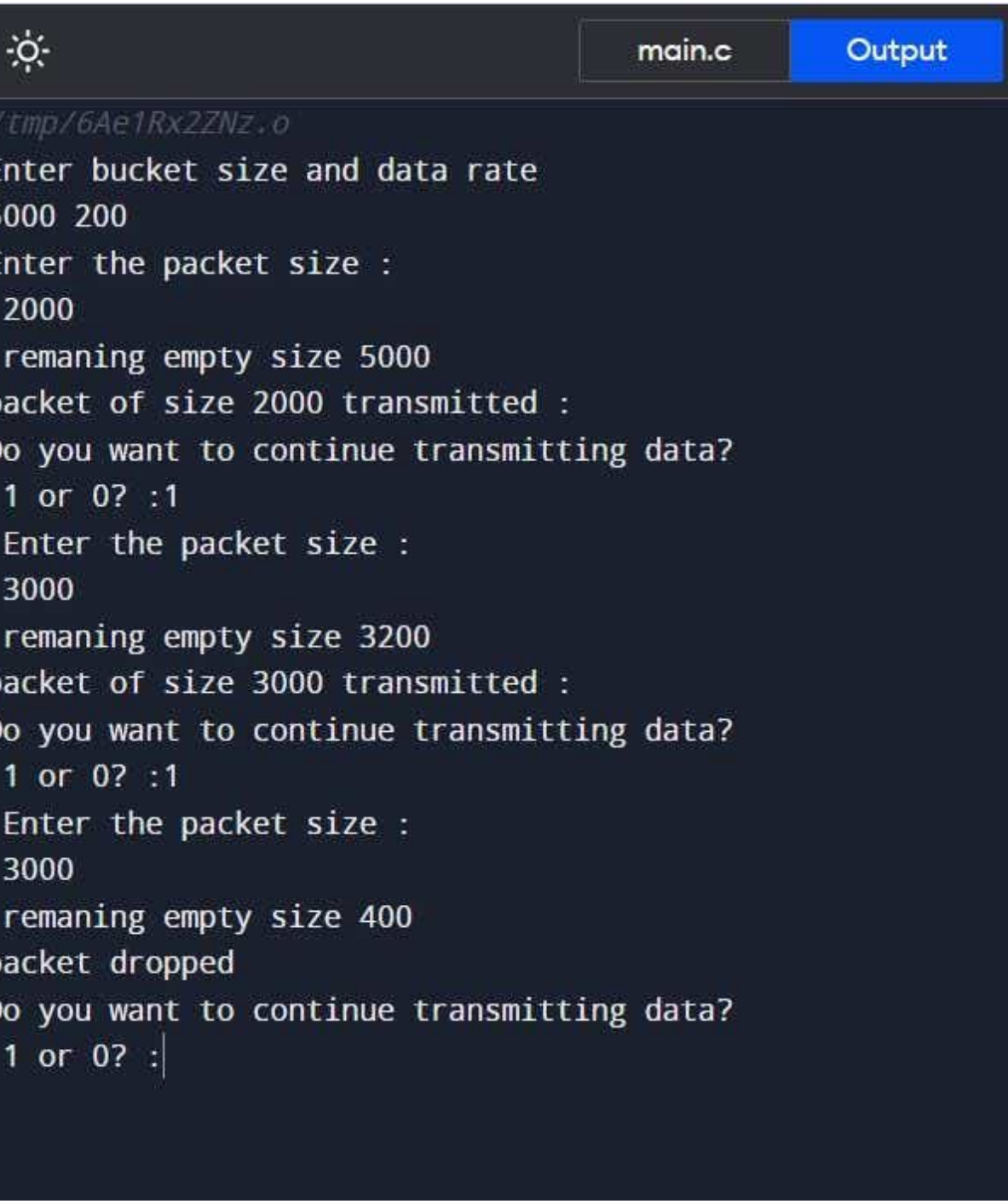
```
/tmp/vqkx6zRWxE.o
Enter data to be transmitted: 110101
Enter the Divisor: 1011
Data padded with n-1 zeros : 11010100000000000000

CRC or Check value is : 110
 rem strlen is : 3
 11010100000000000000
 11010100000000000100
 11010100000000000110

 Final data to be sent : 11010100000000000110

Enter the received data: 110101
Data received: 110101
No error detected
```

Leaky bucket

Code :

```
#include<stdio.h>
#include<conio.h>

void main(){
    int bucket_size;
    int dr;
    printf("Enter bucket size and data rate\n");
    scanf("%d", &bucket_size);
    scanf("%d", &dr);
    int emp = bucket_size;
    while(1)
    {
      int ch;
      int ps;
      printf("Enter the packet size :\n");
      scanf("%d", &ps);
      printf("remaining empty size %d \n", emp);
    if(ps <= bucket_size)
    {
      if(ps <= emp)
      {
        printf("packet of size %d transmitted
          :\n", ps);
      }
```

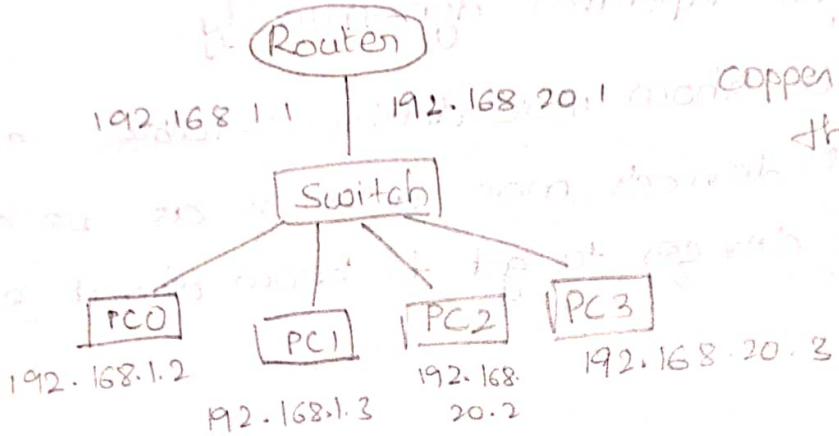
```
else
 {
   printf ("packet dropped : \n");

      }
 }
 else
 {
  printf ("packet dropped \n");
  }
printf (" Do you want to continue transmitting
data ? \n 1 or 0? : ");
scanf ("%d", &ch);
  if (ch==0)
    {
     break;
    }
  emp = emp - ps + dr;
  }
}
```


main.c
Output
/tmp/6Ae1Rx2ZNz.o
Enter bucket size and data rate
5000 200
Enter the packet size :
2000
remaning empty size 5000
packet of size 2000 transmitted :
Do you want to continue transmitting data?
1 or 0? :1
Enter the packet size :
3000
remaning empty size 3200
packet of size 3000 transmitted :
Do you want to continue transmitting data?
1 or 0? :1
Enter the packet size :
3000
remaning empty size 400
packet dropped
Do you want to continue transmitting data?
1 or 0? :

Lab - 8

Aim :- to construct a VLAN and make the PC's communicate among a VLAN

Topology:



Procedure:

1) Set up the topology as shown above, use 1891 router
2) Add an extra router-port to the switch as its needed
3) Use copper straight through wire. Set the IP address & gateway
4) In switch → config → VLAN Database, give any VLAN numbers, here 20, and VLAN name, here → VLAN
5) select add select the interface (here - ge 4/1) (nearest to the switch from router) and make it trunk.

6) Look into fe 2/1 and 3/1 and change VLAN1 to 20: VLAN

7) In router, select VLAN Database, enter the number and name of the VLAN created

In CLI of router

Router (vlan) # exit

Apply completed

Exiting

Router # config t

Router (config) # interface fastethernet 0/0

Router (config-if) # ip address 192.168.1.1 255.255.255.0

Router (config-if) # no shut

Router (config) # interface fastethernet 0/0.1

Router (config subif) # encapsulation dot1q 20

Router (config -subif) # ip address 192.168.20.1 255.255.255.0

Router (config-subif) # no shut

Router (config-subif) # exit

Result

(in PC0)

PC> ping 192.168.20.3

pinging 192.168.20.3 with 32 bytes of data

Reply from 192.168.20.3: bytes = 32 time = 1ms TTL = 128

Reply from 192.168.20.3: bytes = 32 time = 1ms TTL = 128

Reply from 192.168.20.3: bytes = 32 time = 0ms TTL = 128

Reply from 192.168.20.3: bytes = 32 time = 0ms TTL = 128

Ping statics for 192.168.20.3

Packet: sent = 4, Received = 4, Lost = 0

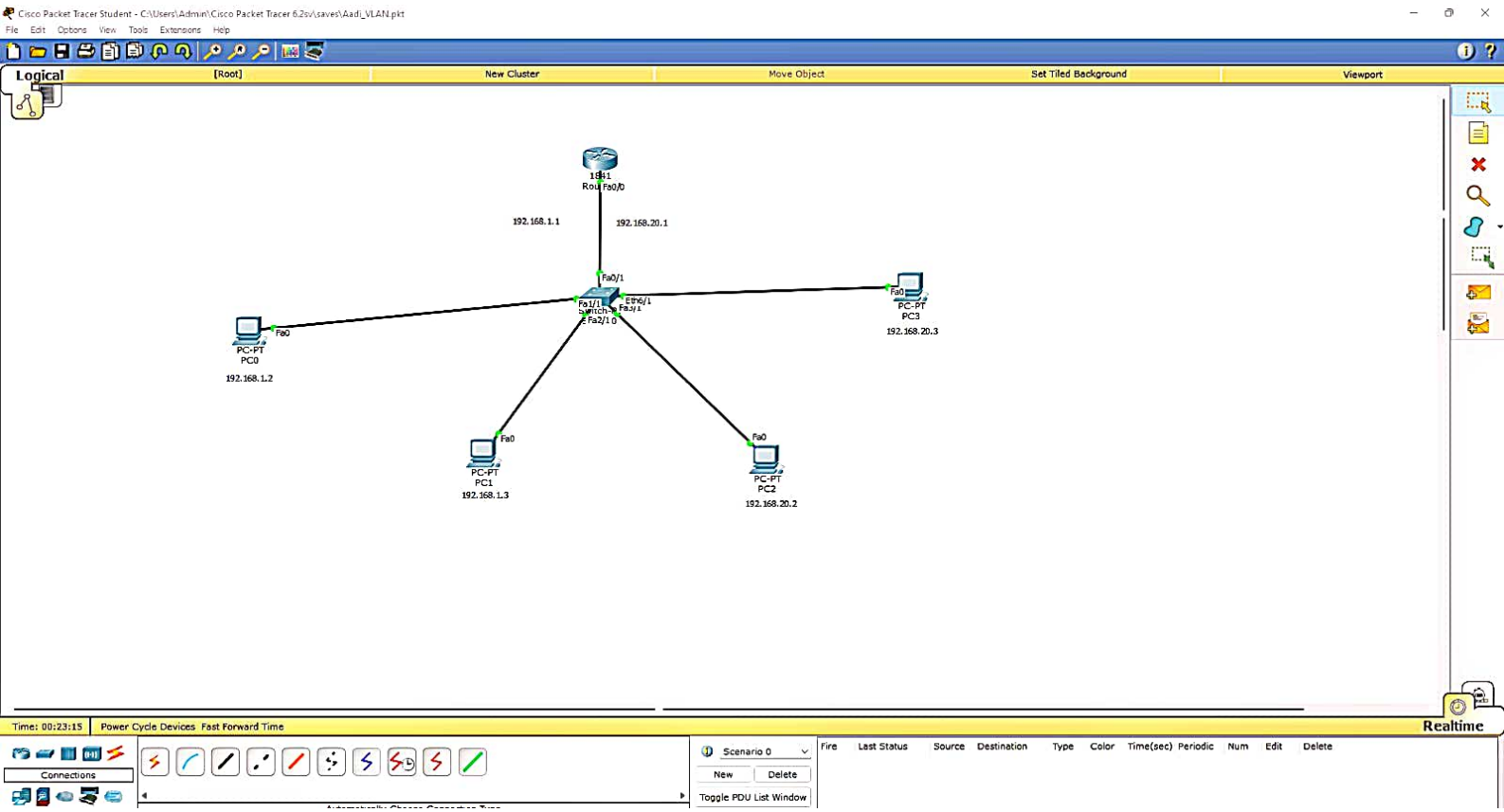
Approximate round trip time in milliseconds

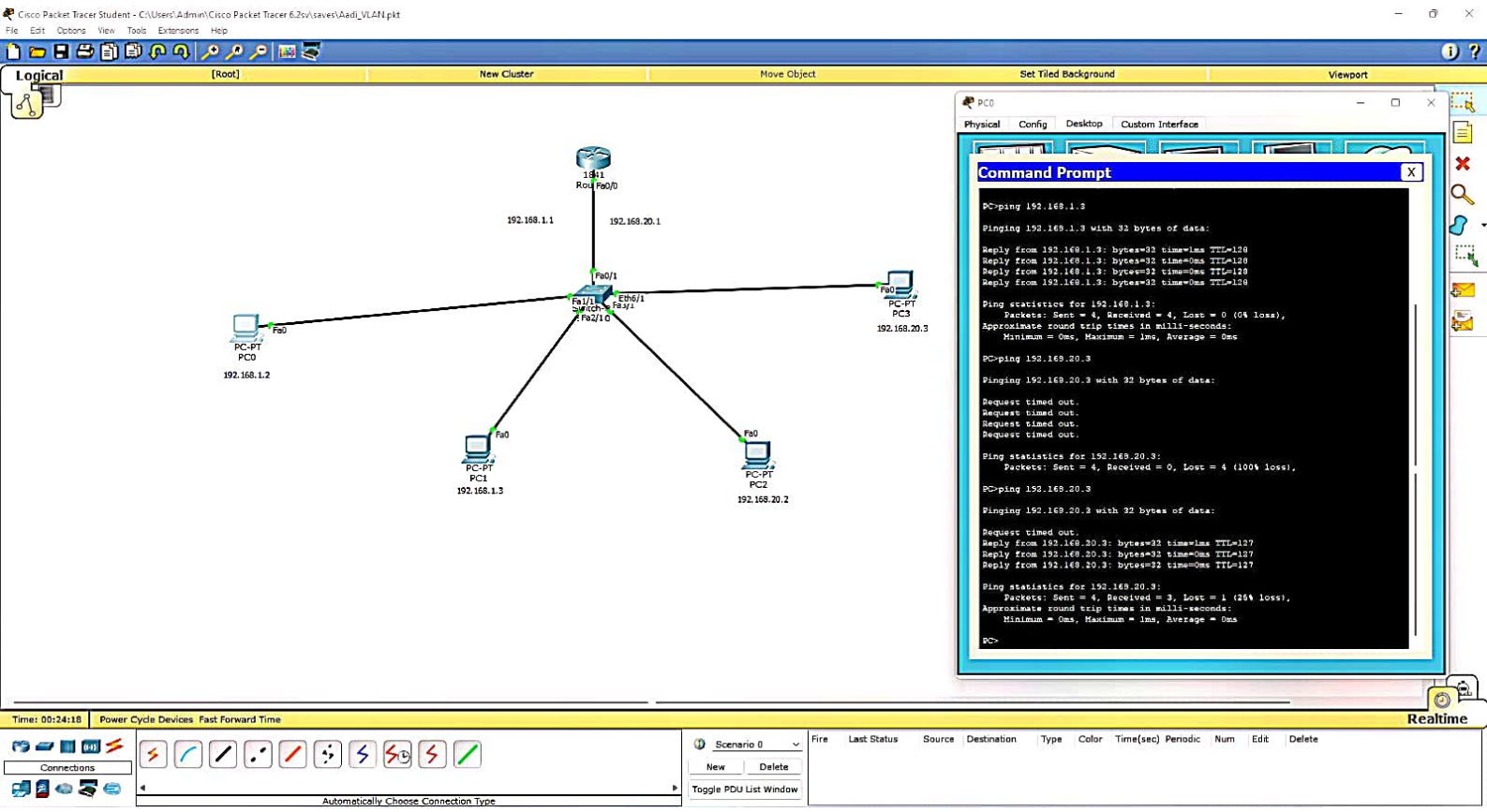
Minimum = 0 ms, Maximum = 1 ms, Average = 0ms

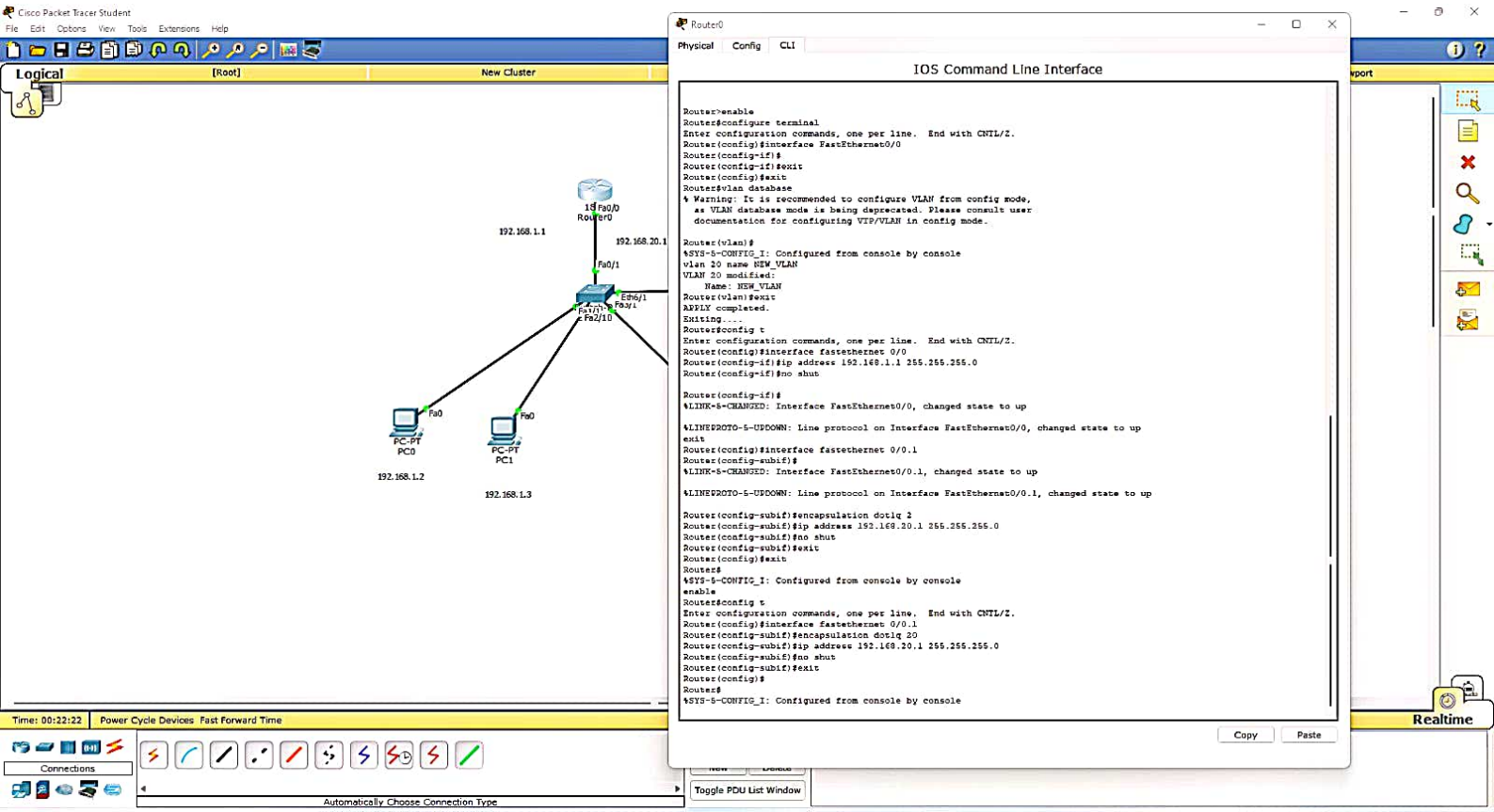
Observation

* VLAN - Virtual local area network is any broadcast domain that is partitioned and isolated in a completed network at the data link layer

* It is a virtualised connection that converts multiple devices and network nodes from different LANs into one local/


Cisco Packet Tracer Student - C:\Users\Admin\Cisco Packet Tracer 6.2sv\saves\Aadi_VLAN.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
1841
Rou
Fa0/0
192.168.1.1
192.168.20.1
Fa0/1
Fa1/1
Fa2/1
Fa0
PC-PT
PC0
192.168.1.2
Fa0
PC-PT
PC1
192.168.1.3
Fa0
PC-PT
PC2
192.168.20.2
Fa0
PC-PT
PC3
192.168.20.3
Time: 00:23:15
Power Cycle Devices Fast Forward Time
Realtime
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


Cisco Packet Tracer Student - C:\Users\Admin\Cisco Packet Tracer 6.2sv\saves\Aadi_VLAN.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
1841
Fa0/0
192.168.1.1
192.168.20.1
Fa0/1
Fa1/1
Eth6/1
Fa3/1
Fa2/10
PC-PT
PC0
Fa0
192.168.1.2
PC-PT
PC1
Fa0
192.168.1.3
PC-PT
PC2
Fa0
192.168.20.2
PC-PT
PC3
Fa0
192.168.20.3
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 192.168.1.3
Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
Ping statistics for 192.168.1.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=1ms TTL=127
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>
Time: 00:24:18
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Router0
Physical
Config
CLI
IOS Command Line Interface
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#exit
Router#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.
Router(vlan)#
%SYS-5-CONFIG_I: Configured from console by console
vlan 20 name NEW_VLAN
VLAN 20 modified:
Name: NEW_VLAN
Router(vlan)#exit
APPLY completed.
Exiting....
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut
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 fastethernet 0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up
Router(config-subif)#encapsulation dot1q 2
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0.1
Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console
Copy
Paste
192.168.1.1
192.168.20.1
Fa0/0
Fa0/1
Eth6/1
Fa3/1
Fa2/10
Fa0
PC-PT
PC0
PC1
192.168.1.2
192.168.1.3
Time: 00:22:22
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Toggle PDU List Window

Experiment - 13

Aim: Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

Client program:

clientTCP.py

```
from socket import *
serverName = '127.0.0.1'
serverport = 12000
clientSocket = socket (AE_INET, SOCK_STREAM)
clientSocket.connect ((serverName, serverPort))
sentence = input ("\n Enter file name :")

clientSocket.send (sentence.encode())
filecontents = clientSocket.recv (1024).decode()
print ("\n from Server : \n")
print (filcontents)
clientSocket.close()
```

Server program:

ServerTCP.py

```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
serverSocket = socket (AF_INET, SOCK_STREAM)
serverSocket.bind ((serverName, serverPort))
serverSocket.listen (1)

while 1:
print (" The server is ready to receive")
 connectionSocket, addr = serverSocket.accept()
 sentence = connectionSocket.recv (1024).decode
 file = open (sentence, "r")
  l = file.read (1024)

  connectionSocket.send (l.encode())
  print ("In sent contents of " + sentence)
  file.close ()

  connectionSocket.close()
```

Output

Server side:

The server is ready to receive

Client side:

Enter file name: ServerTCP.py

From server:

from Socket import *

⋮

(ServerTCP.py is printed)

server side:

The server is ready to receive

sent contents of serverTCP.py

The server is ready to receive.

*ServerTCP.py - C:/Users/Student/AppData/Local/Programs/Python/Py...

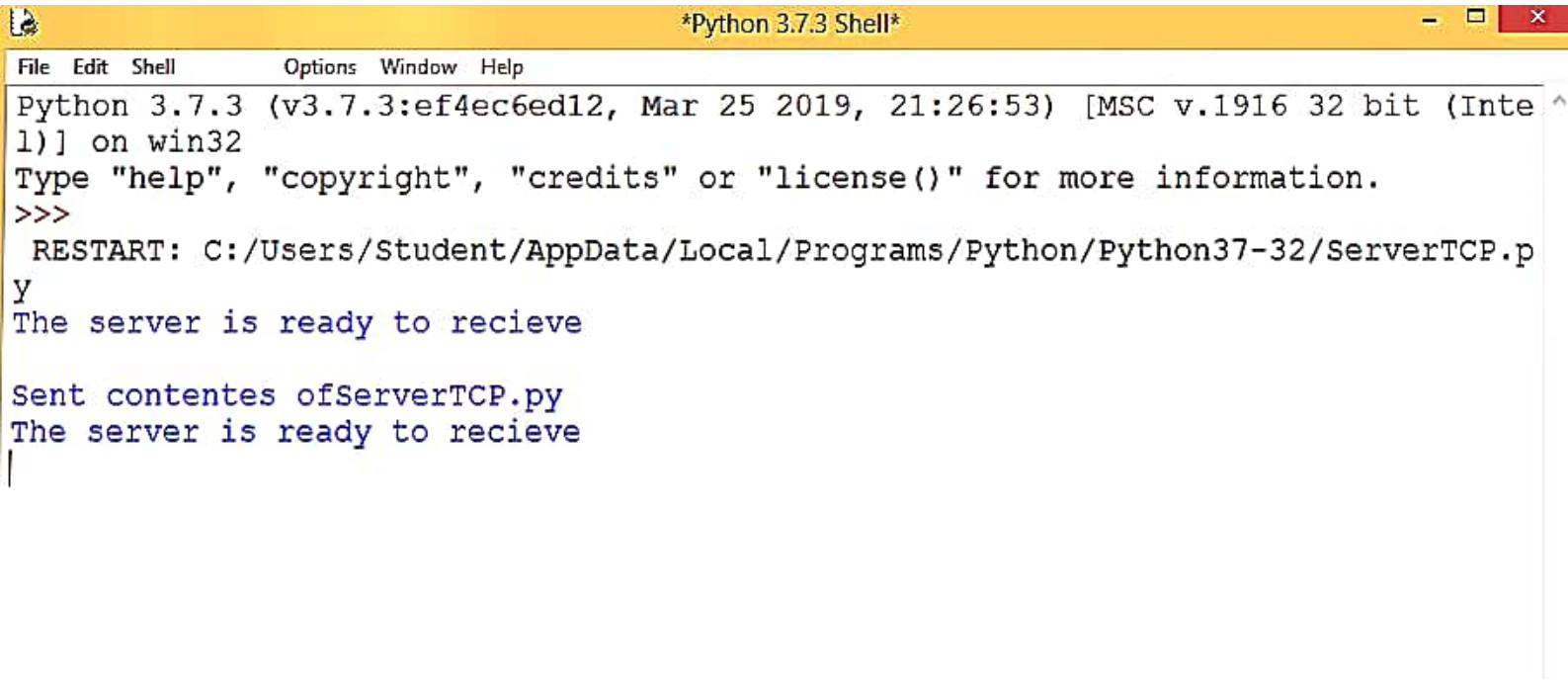
File Edit Format Run Options Window Help

```
from socket import *
serverName="127.0.0.1"
serverPort =12000
serverSocket =socket(AF_INET, SOCK_STREAM)
serverSocket.bind((serverName, serverPort))
serverSocket.listen(1)
while 1:
    print("The server is ready to recieve")
    connectionSocket, addr =serverSocket.accept()
    sentence= connectionSocket.recv(1024).decode()
    file= open(sentence, "r")
    l=file.read(1024)
    connectionSocket.send(l.encode())
S    print('\nSent contentes of' + sentence)
    file.close()
    connectionSocket.close()
```

*ClientTCP.py - C:/Users/Student/AppData/Local/Programs/Python/Python37-32/ClientT

File Edit Format Run Options Window Help

```
from socket import*
serverNamSSe ='127.0.0.1'
serverPort =12000
clientSocket =socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
sentence=input("\nEnter file name: ")
clientSocket.send(sentence.encode())
filecontents=clientSocket.recv(1024).decode()
print('\nFrom server:\n')
print(filecontents)
clientSocket.close()
```


Python 3.7.3 Shell
File Edit Shell Options Window Help
Python 3.7.3 (v3.7.3:ef4ec6ed12, Mar 25 2019, 21:26:53) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/Student/AppData/Local/Programs/Python/Python37-32/ServerTCP.py
The server is ready to recieve
Sent contentes ofServerTCP.py
The server is ready to recieve

Python 3.7.3 Shell

File Edit Shell Debug Options Window Help

```
Type "help", "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:/Users/Student/AppData/Local/Programs/Python/Python37-32/Cl
Traceback (most recent call last):
  File "C:/Users/Student/AppData/Local/Programs/Python/Python37-32/Clie
    clientSocket.connect((serverName, serverPort))
NameError: name 'clientSocket' is not defined
>>>
 RESTART: C:/Users/Student/AppData/Local/Programs/Python/Python37-32/Cl

Enter file name: ServerTCP.py

From server:

from socket import *
serverName="127.0.0.1"
serverPort =12000
serverSocket =socket(AF_INET, SOCK_STREAM)
serverSocket.bind((serverName, serverPort))
serverSocket.listen(1)
while 1:
    print("The server is ready to recieve")
    connectionSocket, addr =serverSocket.accept()
    sentence= connectionSocket.recv(1024).decode()
    file= open(sentence, "r")
    l=file.read(1024)
    connectionSocket.send(l.encode())
    print('\nSent contentes of' + sentence)
    file.close()
    connectionSocket.close()

>>>
```

Experiment - 14

Aim : Using UDP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

Solution

Client side program:

ClientUDP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket (AF_INET, SOCK_DGRAM)
sentence = input ("\n Enter file name:")
clientSocket.sendto (bytes (sentence, "utf-8"),
 (serverName, serverPort)

fileContents, serverAddress = clientSocket.recvfrom (2048
print ("\n Reply from server: \n")
print (Filecontents.decode ("UTF-8"))
```

```
for i in filecontentents:
    print (str(i), end = ' ')

clientSocket.close()

clientSocket.close()
```

server side program:

serverUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket (AF_INET, SOCK_DGRAM)
serverSocket.bind (("127.0.0.1", serverPort))
print ("The server is ready to receive")

while 1:
sentence, clientAddress = serverSocket.recvfrom (2048)
sentence = sentence.decode ("utf-8")
file = open (sentence, "r")
con = file.read (2048)
serverSocket.sendto (bytes (con, "utf-8"), clientAddress)
print ("In Sent contents of", end = 1)
print (sentence)
for i in sentence:
    print (str(i), end = '')
file.close()
```

Output:

Server side

The server is ready to receive

Client side:

Enter the file name: serverUDP.py

Reply from server:

from socket import*

:

(serverUDP.py program)

Server side:

sent contents of serverUDP.py

The server is ready to receive

clientUDP.py - C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/clientUDP.p...

File Edit Format Run Options Window Help

```
from socket import *
servername="127.0.0.1"
serverPort=12000
clientSocket=socket(AF_INET, SOCK_DGRAM)
sentence=input("\nEnter file name")
clientSocket.sendto(bytes(sentence,"utf-8"),(serverName,serverPort))

filecontents,serverAddress=clientSocket.recvform(2048)
print("\nReply from server:\n")
print(filecontents.decode("utf-8"))
clientSocket.close()
```

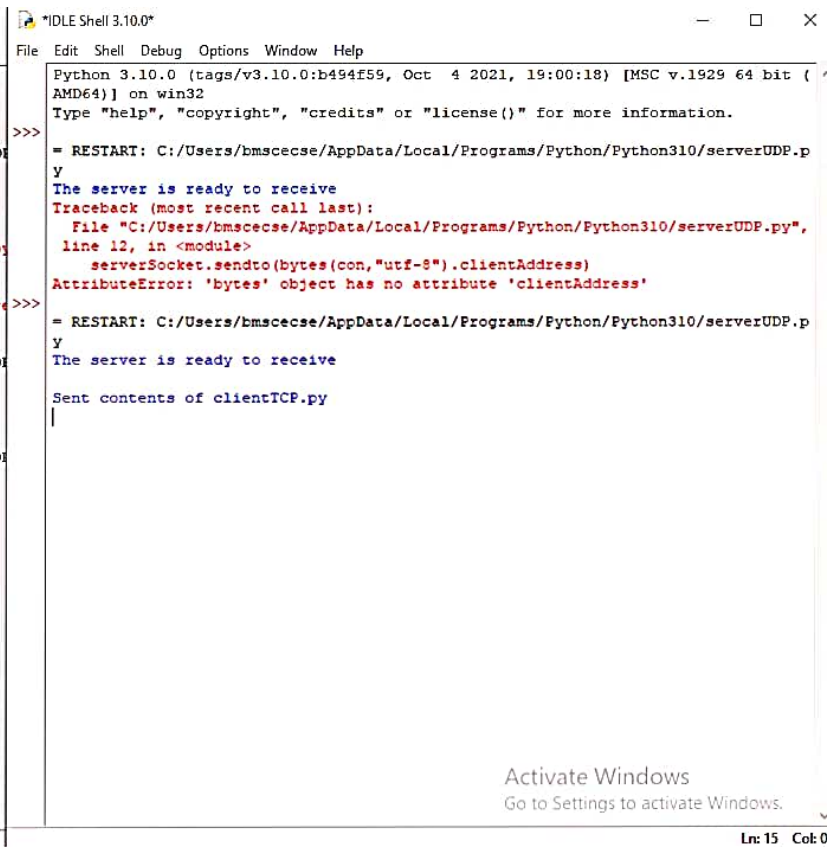
Ln: 12 Col: 0

serverUDP.py - C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/serverUDP....

File Edit Format Run Options Window Help

```
from socket import *
serverPort=12000
serverSocket=socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1",serverPort))
print("The server is ready to receive")
while1:
    sentence,clientAddress = serverSocket.recvfrom(2048)
    sentence=sentence.decode("utf-8")
    file=open(sentence,"r")
    con=file.read(2048)

    serverSocket.sendto(bytes(con,"utf-8").clientAddress)

    print("\nSent contents of",end=' ')
    print(sentence)
    file.close()
```


IDLE Shell 3.10.0
ile Edit Shell Debug Options Window Help
line 6, in <module>
clientSocket.sendto(bytes(sentence,"utf-8"),(serverName,serverPort))
NameError: name 'serverName' is not defined. Did you mean: 'servername'?
>>
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/clientUDI
y
Enter file nameclientTCP.py
Traceback (most recent call last):
File "C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/clientUDP.py
line 8, in <module>
filecontents,serverAddress=clientSocket.recvform(2048)
AttributeError: 'socket' object has no attribute 'recvform'. Did you mean: 're
from'?
>>
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/clientUDI
y
Enter file nameclientTCP.py
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/clientUDI
y
Enter file nameclientTCP.py
Reply from server:
from socket import*
serverName="127.0.0.1"
serverPort=12000
clientSocket=socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence=input("\nEnter the file name:")
clientSocket.send(sentence.encode())
filecontents=clientSocket.recv(1024).decode()
print("\nFrom server:\n")
print(filecontents)
clientSocket.close()
>>
Ln: 42


IDLE Shell 3.10.0
File Edit Shell Debug Options Window Help
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/serverUDP.p
y
The server is ready to receive
Traceback (most recent call last):
File "C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/serverUDP.py",
line 12, in <module>
serverSocket.sendto(bytes(con,"utf-8").clientAddress)
AttributeError: 'bytes' object has no attribute 'clientAddress'
>>>
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/serverUDP.p
y
The server is ready to receive
Sent contents of clientTCP.py
Activate Windows
Go to Settings to activate Windows.
Ln: 15 Col: 0

Wireshark Demonstration

Aim: To observe data packets in real time and analyse them using wireshark

Procedure:

- Select one or more networks, then select Capture
- 3 panes will appear in captured data interface.
  - packet list pane (top section)
  - packet bytes pane (right section)
  - packet details pane (left section)
- Observe the packets with ARP, UDP etc protocols
- Observe the details.
- Press on ARP packet or UDP or any protocol to observe, source, destination, ttl, checksum and other details.
- Check IP of your system and observe which are the packets being sent through your side.

Observation:

→ In the details pane when captured a packe protocols and protocols fields of the selected packed could be seen.

→ In the bytes pane, raw data of selected packet in a hexadecimal view could be seen. Data which couldn't be printed were shown as a dot.

→ when right clicked on the hexadecimal data they were shown as bits.

Result for ARP packets –

Hardware type: Ethernet

Protocol type: IPv4 (0x0800)

Hardware size: 6

Protocol size: 4

opcode: request (1)

Sender MAC address: ExtremeN_7d:bf:69 (00:04:96:7b:bf:

Sender IP address: 10.124.0.9

Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)

Target IP address: 10.124.10.201

No., time, source, destination, protocol, length info about a packet can be seen and analysed.