VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS LAB

Submitted by

AISHWARYA A G (1BM21CS011)

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

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
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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 "Computer Networks Lab" carried out by **AISHWARYA A G (1BM21CS011),** 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 networks lab - (22CS4PCCON)** work prescribed for the said degree.

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8/6/23

Introduction to cisco packet tracer

Menu bar - The main bar with file and edit options
Main tool bar - It contains shortcut icons, undo, redo and sizing options
Common tools bar - (at the right side)
Provides commonly used tools select, delete, resize, etc

There are two workspaces
- Logical
- Physical

Device-type selection box -
It contains two areas - one containing the end devices like generics, tv, phone, tablets, etc and other containing connection networks like routers, switches, hubs, wireless devices and connection wires

There are two types of modes -
- Simultion mode - It contains event list and power cycle devices and used for simulating through simulation panel.
- Realtime mode - This contains a clock with relative time display and CLI is used for operations

Beside device selection box, there is an user created packet window to discribe the events in simulation mode.

Write req'd cables.

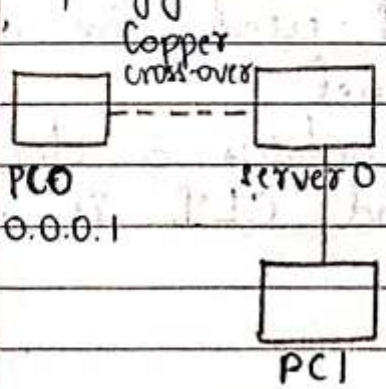
Exp 1 -

Aim - To understand simple PC-PDU configuration

Procedure -

1. Select PC from end devices select generic PC and drop it in workspace Similarly, select generic server.
2. Choose copper-cross-over in the connections and choose fastethernet.
3. Click on server and choose Fastethernet().
4. Click on PC and go to config tab. Set IP address to 10.0.0.1 and click on subnetMask.
5. Repeat same step and set IP address for server.
6. In simulation mode, in edit filters click only ICMP
7. Add a simple PDU from PC to server.
8. Click on autocapture/play.

Topology:



Observation -

1. Packet transfer takes place from PC to server then to the other PC in the autocapture/play.
2. Acknowledgement is sent from second PC to first PC.

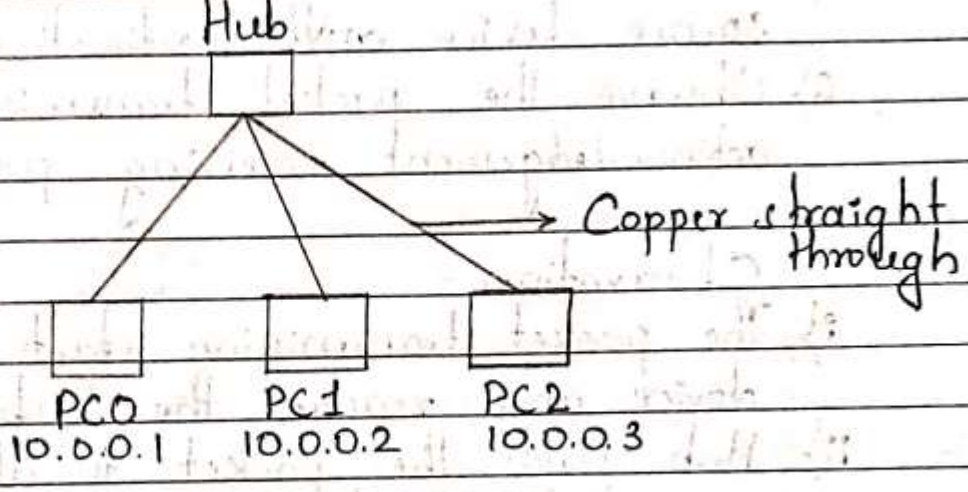
15/6/23

Title - Packet tracer using hub and switch topology

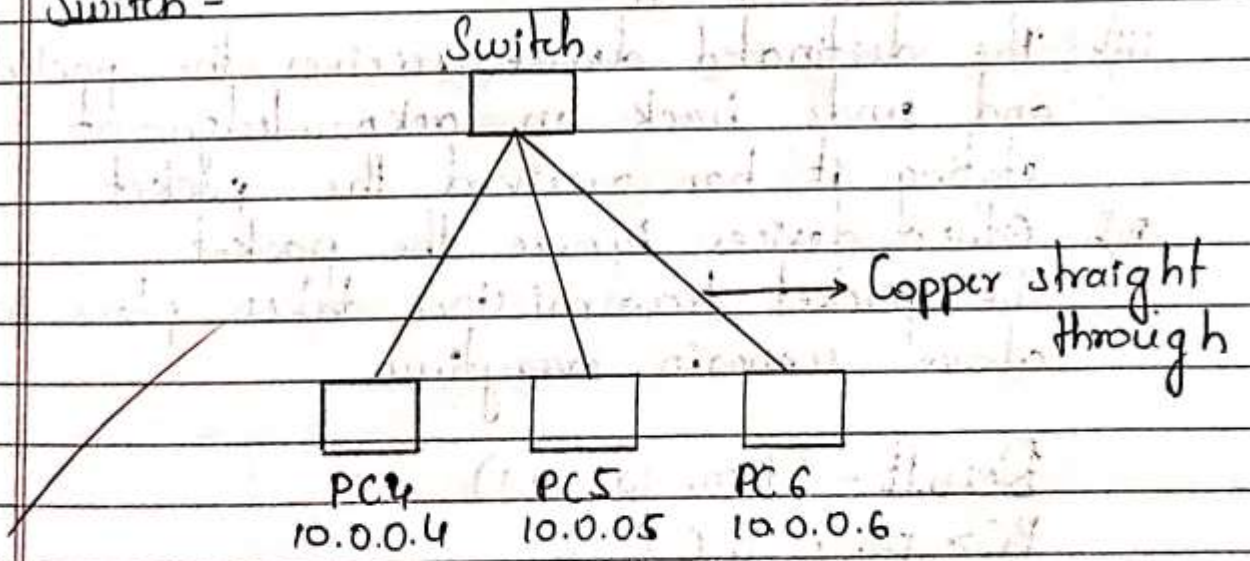
Aim - Create a topology and simulate sending a simple PDU from source to dutination using hub and switch as connecting devices and demonstrate ping message

Topology -

Hub -



Switch -



Hub -

Procedure -

1) Select the end devices and change their IP addresses suitably.
2) Select hub as the connecting device.
3) Select copper straight-through as the connecting wire between end devices and hub.
4) Connect the fastethernet to hub ports.
5) Select the message and first click on source device and destination device.
6) Observe the packet transmission and acknowledgement receiving procedure.

Observation -

i) The packet transmision starts from source device and reaches the hub.
ii) Hub sends the packet to all other devices connected to it.
iii) The destinated device receives the packet and sends back an acknowledgement stating it has received the packet.
iv) Other devices ignore the packet.
v) The packet transmission takes place in the above scenario everytime.

Result - (From 10.0.0.1)

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=8 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
Reply from 10.0.0.2: bytes=32 time=0 ms TTL=128

Ping statistics for 10.0.0.2:
Packets: Sent=4, Received: 4, Lost=0
Approximate round trip times in milli-seconds:
Minimum: 0 ms, Maximum: 8 ms, Average: 2 ms

Switch-

Procedure-

1) Select the end devices and change their IP addresses suitably.
2) Select switch as the connecting device.
3) Select copper straight through as the connecting wire between end devices and hub.
4) Connect the fastethernet to hub ports.
5) Select the message and first click on source device and then dustination device.
6) Observe the packet transmission and acknowledgement receiving procedure.

Observation-

i) The packet transmission starts from source device and reaches the switch.
ii) Switch sends the packet to all devices connected to it.

iii) The destinated device receives the packet and sends an acknowledgement back to switch stating it has received the packet

iv) Switch remembers the device sending the acknowledgement and only communicates with that device for further transmission

v) Other devices do not receive the packet from next transmission

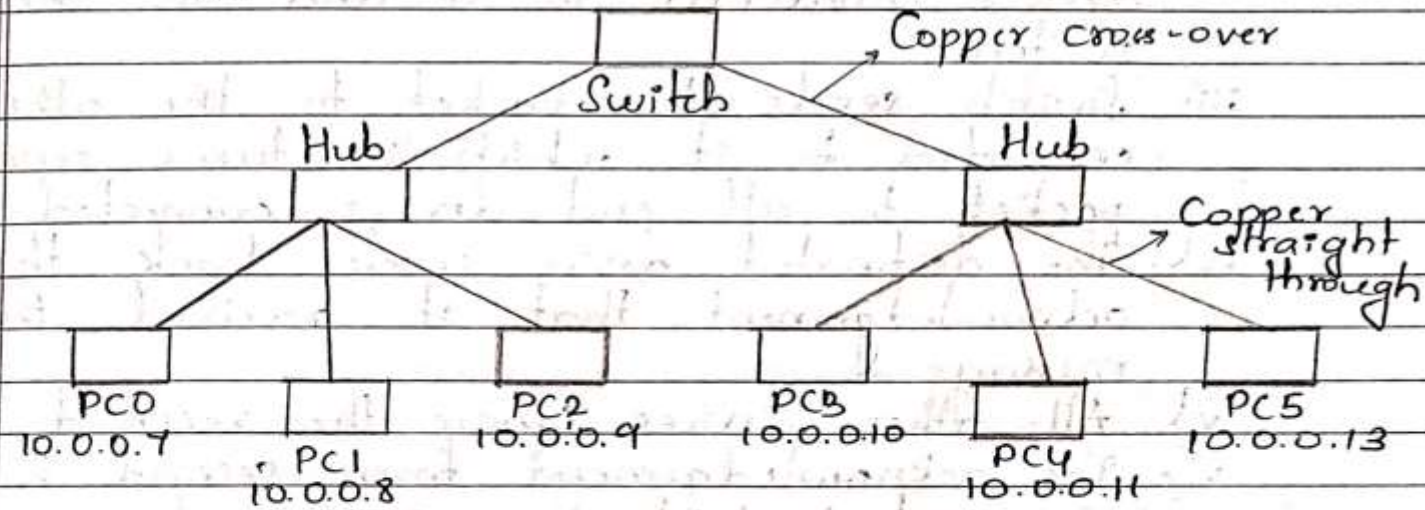
Result - (from 10.0.0.5)

```
PC> ping 10.0.0.3
Reply from 10.0.0.3: bytes: 32  time=6 ms  TTL=12
Reply from 10.0.0.3: bytes: 32  time=0 ms  TTL=12
Reply from 10.0.0.3: bytes: 32  time=0 ms  TTL=12
Reply from 10.0.0.3: bytes: 32  time=0 ms  TTL=12

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0
Approximate round trip time in milli-seconds:
    Minimum = 0 ms, Maximum = 6 ms, Average = 1 ms
```

Aim- Create a topology involving multiple hubs and a switch connecting them to simulate a simple PDU.

Topology-



Procedure-

1) Select the end devices and connect them to two different separate hubs.
2) Connect the two hubs to a switch.
3) End devices are connected to the hub using copper straight through wire.
4) Hubs are connected to switch using copper cross-over wire.
5) Select the message. Select the source device connected to one hub and destination device connected to another hub.
6) Observe the packet transmission and acknowledgement procedure.

Observation -

i) The packet transmission starts from source device which sends it to the hub connected to it.

ii) This hub sends the packet to all the devices connected to it and to the switch.

iii) Switch sends the packet to the other hub connected to it which in turns sends the packet to all end devices connected to it

iv) The destinated device sends back the acknowledgement that it received the message.

v) All other devices ignore the received packet

vi) The acknowledgement from second hub is sent back to the source device through switch in the same manner

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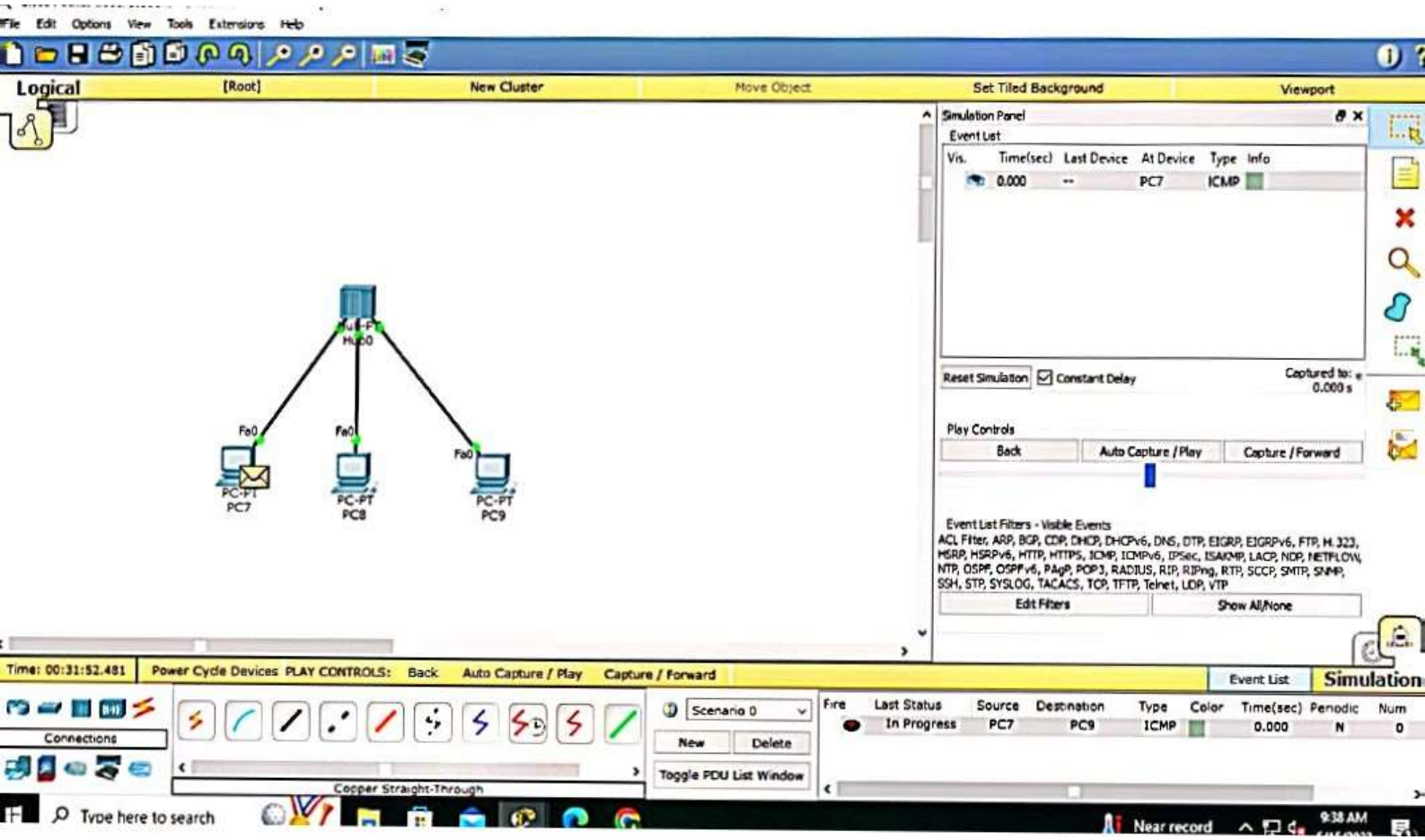
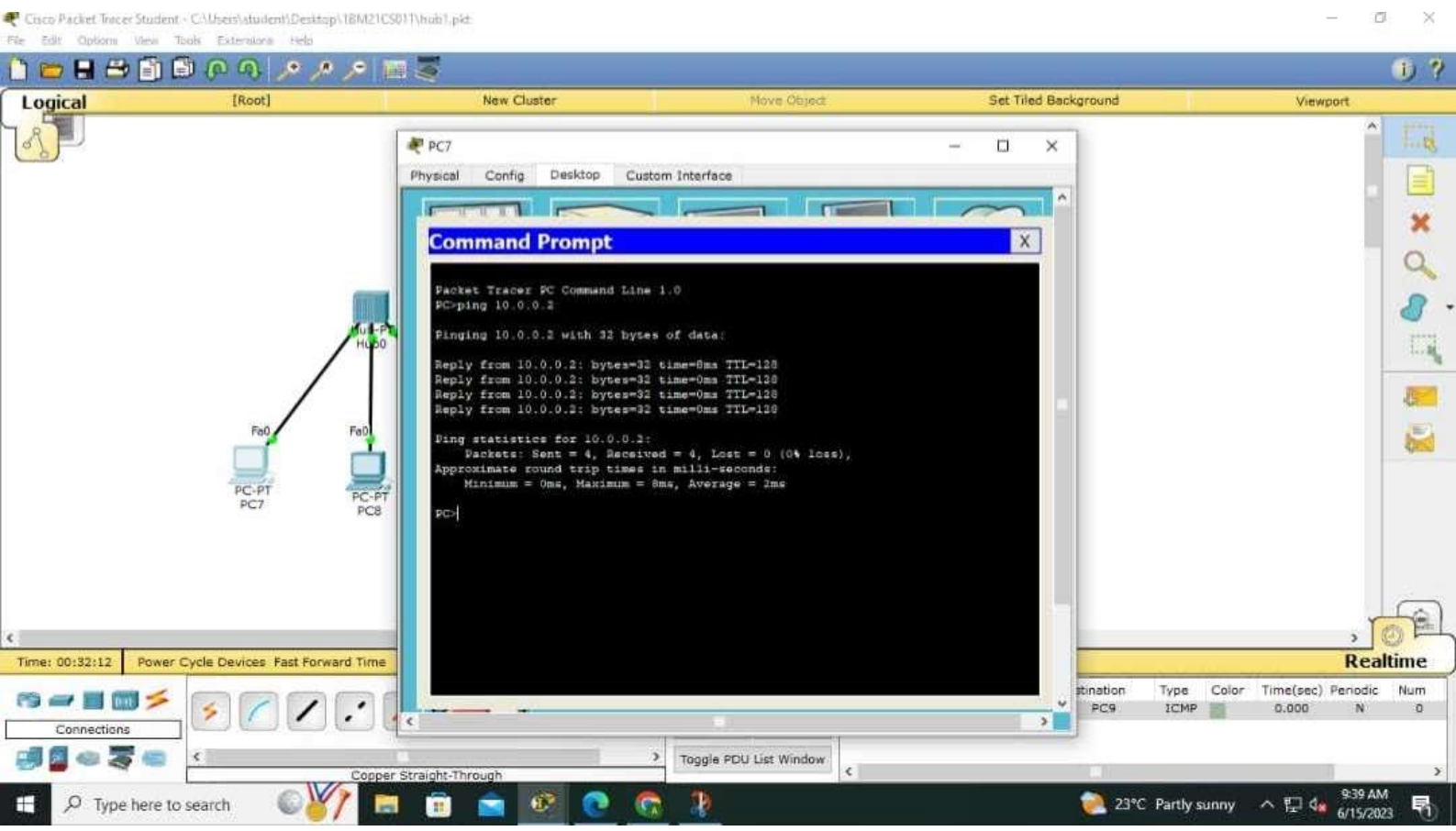
Result - (from 10.0.0.7)

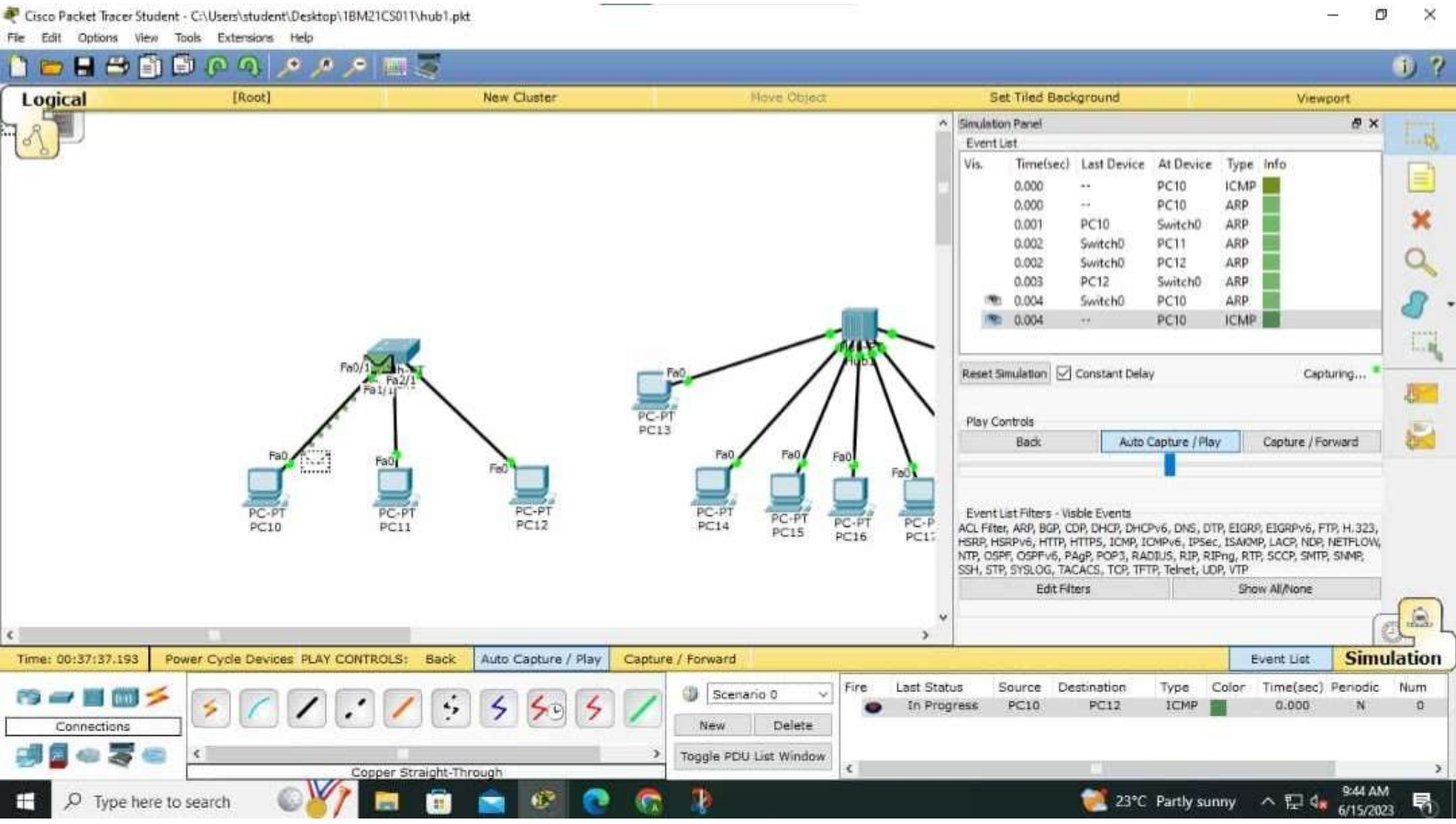
PC> ping 10.0.0.13

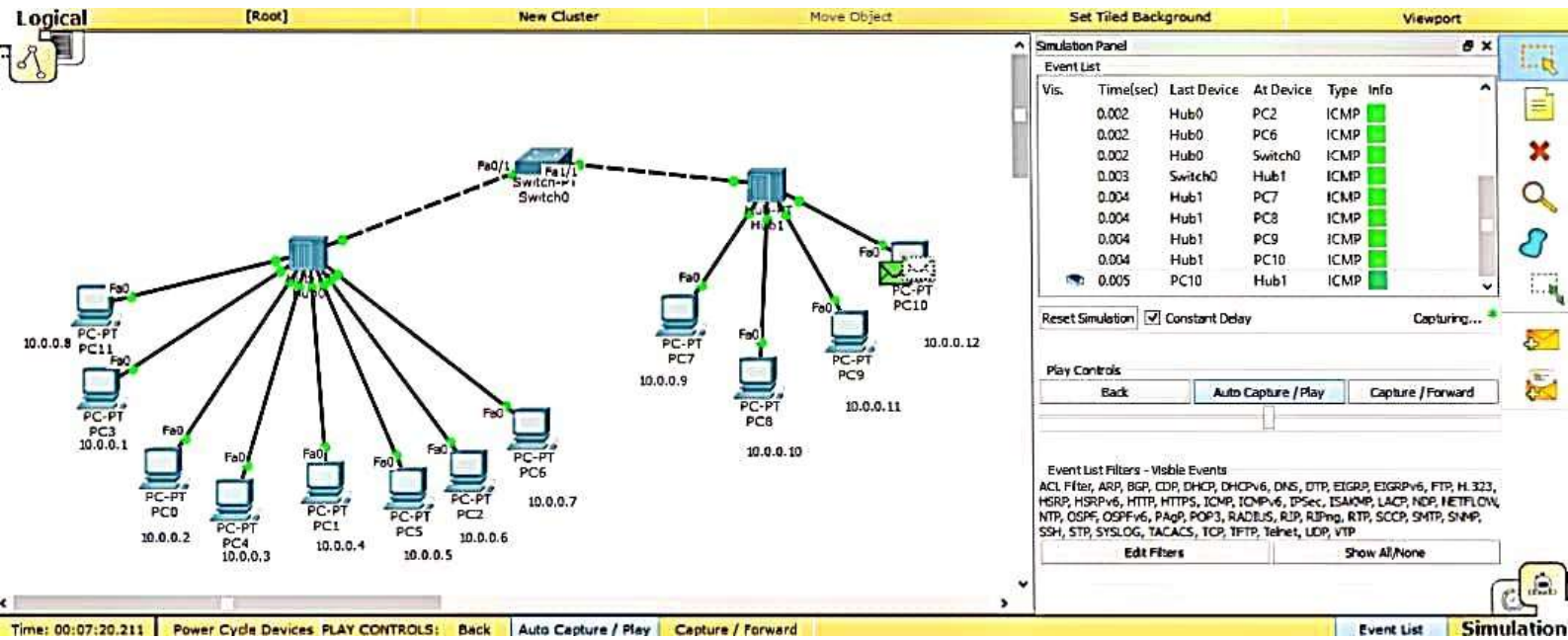
Reply from 10.0.0.13: bytes:32 time:0 ms TTL=128
Reply from 10.0.0.13: bytes:32 time:1 ms TTL=128
Reply from 10.0.0.13: bytes:32 time:0 ms TTL=128
Reply from 10.0.0.13: bytes:32 time:1 ms TTL=128

Ping statistics for 10.0.0.13:
Packets: Sent = 4, Received = 4, Lost = 0
Approximate round trip times in milli-seconds:
Minimum = 0 ms, Maximum = 1 ms, Average = 0 ms


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
0.000 -- PC7 ICMP
Reset Simulation
Constant Delay
Captured to:
0.000 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
Fa0
PC-PT PC7
PC-PT PC8
PC-PT PC9
Time: 00:31:52.481
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(sec) Periodic Num
In Progress PC7 PC9 ICMP 0.000 N 0
Type here to search
Near record
9:38 AM


Cisco Packet Tracer Student - C:\Users\student\Desktop\18M21CS011\hub1.pkt
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 10.0.0.2
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 statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Fe0
Fe0
PC-PT PC7
PC-PT PC8
Time: 00:32:12
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Copper Straight-Through
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
PC9
ICMP
0.000
N
0
Type here to search
23°C Partly sunny
9:39 AM
6/15/2023


Cisco Packet Tracer Student - C:\Users\student\Desktop\1BM21CS011\hub1.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 Device At Device Type Info
0.000 -- PC10 ICMP
0.000 -- PC10 ARP
0.001 PC10 Switch0 ARP
0.002 Switch0 PC11 ARP
0.002 Switch0 PC12 ARP
0.003 PC12 Switch0 ARP
0.004 Switch0 PC10 ARP
0.004 -- PC10 ICMP
Reset Simulation
Constant Delay
Capturing...
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
Hub1
Fa0/1
Fa1/1
Fa2/1
Fa0
PC-PT PC10
PC-PT PC11
PC-PT PC12
PC-PT PC13
PC-PT PC14
PC-PT PC15
PC-PT PC16
Time: 00:37:37.193
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(sec) Periodic Num
In Progress PC10 PC12 ICMP 0.000 N 0
Type here to search
23°C Partly sunny
9:44 AM
6/15/2023

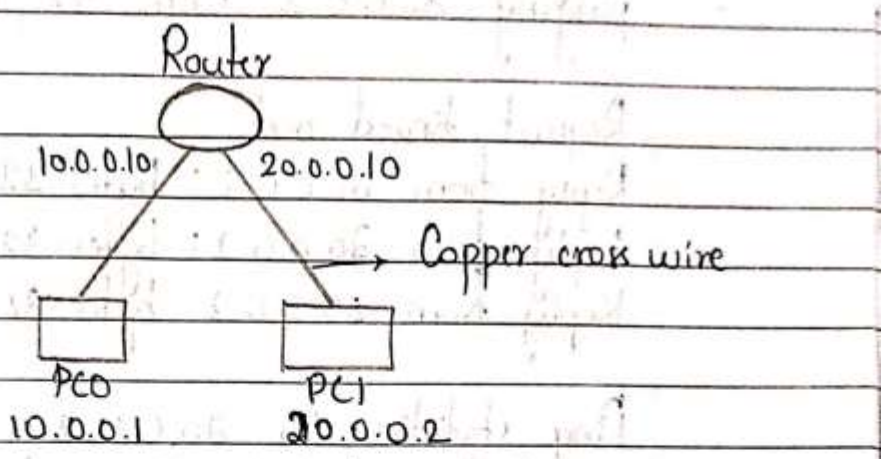

Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch0
Hub0
Hub1
PC-PT PC11
PC-PT PC3
10.0.0.1
PC-PT PC0
10.0.0.2
PC-PT PC4
10.0.0.3
PC-PT PC1
10.0.0.4
PC-PT PC5
10.0.0.5
PC-PT PC2
10.0.0.6
PC-PT PC6
10.0.0.7
PC-PT PC7
10.0.0.9
PC-PT PC8
10.0.0.10
PC-PT PC9
10.0.0.11
PC-PT PC10
10.0.0.12
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
0.002 Hub0 PC2 ICMP
0.002 Hub0 PC6 ICMP
0.002 Hub0 Switch0 ICMP
0.003 Switch0 Hub1 ICMP
0.004 Hub1 PC7 ICMP
0.004 Hub1 PC8 ICMP
0.004 Hub1 PC9 ICMP
0.004 Hub1 PC10 ICMP
0.005 PC10 Hub1 ICMP
Reset Simulation
Constant Delay
Capturing...
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: 00:07:20.211
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation

22/6/23

Title - Packet tracing using Router as the connection device.

a) Aim - Configuring default route, static route to the router.

Topology -



Procedure -

1) Select a generic router and two PC as end devices and connect them with copper cross-wire.
2) Set the IP addresses of the PCs with different network IDs.
3) Set gateway in the settings for the two PCs
4) Now, we need to connect router networks with PC gateways.
5) To set network in CLI of router, follow the following steps -
   No → Enable → Config t
   → interface fastethernet 0/0
   → ip address 10.0.0.10 255.0.0.0
   → No shut → Exit
6) Follow the same steps for other PC.
7) To confirm connection, give show ip route command.

8) Now, in command prompt of PC0 ping the second PC PC1

Result -

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=0 ms TTL=12

Reply from 20.0.0.2: bytes=32 time=0ms TTL=12

Reply from 20.0.0.2: bytes=32 time=0ms TTL=12

Ping statistics for 20.0.0.2:

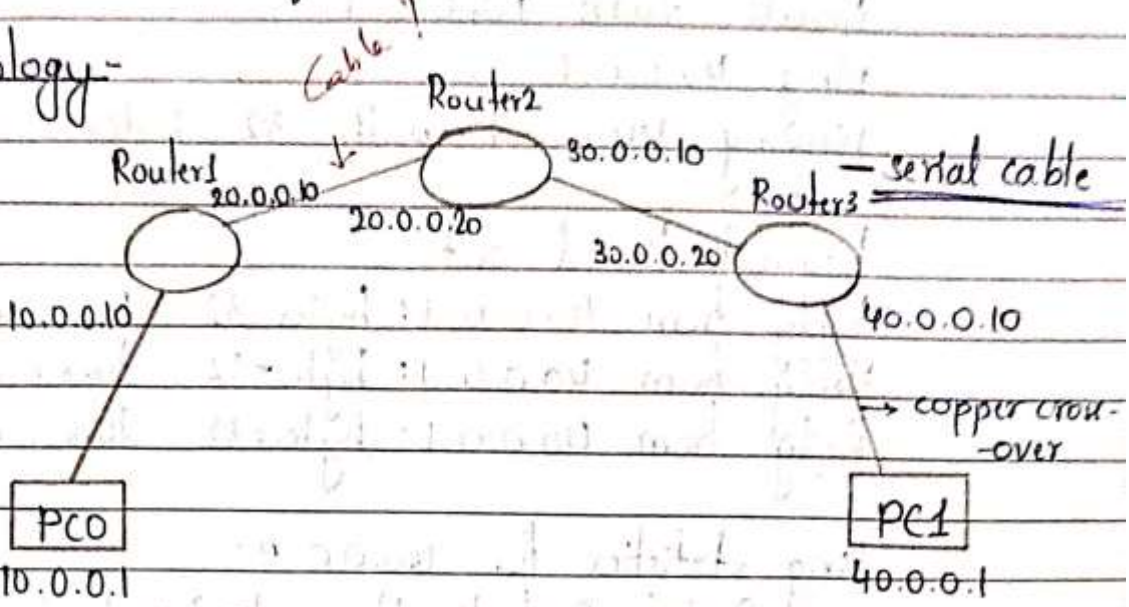
Packets: Sent=4, Received=3, Lost=1

Approximate round trip times in milli-seconds:

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

b) Aim: Configuring default route, static route to a connection of routers.

Topology -



config steps ?

Procedure -

1) Select 3 generic routers and two PC's as end devices. Connect the PC's to different routers with copper cross over and connect both routers to main router with serial cables.
2) Set the IP addresses of PC and gateways.
3) Set the gateway addresses in all the routers taking interface as fastethernet for the PCs and serial for routers.
4) Now, connect the interfaces from other routers with following steps -
   config_t → ip_route 30.0.0.0 255.0.0.0 20.0.0.20
   ip_route 40.0.0.0 255.0.0.0 20.0.0.20
5) Similarly, connect the other PC to interfaces.
6) Check the network connections with show ip route command.

7) Now ping 40.0.0.1 from 10.0.0.1

Result - from 10.0.0.1
ping 40.0.0.1
pinging 40.0.0.1 with 32 bytes:

Request timed out
Reply from 40.0.0.1: bytes=32 time=0 ms TTL=127
Reply from 40.0.0.1: bytes=32 time=0 ms TTL=127
Reply from 40.0.0.1: bytes=32 time=0 ms TTL=127

Ping statistics for 40.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1
Approximate round trip time in milli-seconds:
Minimum = 0 ms, Maximum = 0 ms, Average = 0 ms

incomplete
show ip route?

9/2 Config-steps -
>enable
#config t
#interface fdstethernet 0/0
#IP address 10.0.0.10 225.0.0.0
#no shut
#exit
#Interface serial 2/0
#IP address 20.0.0.10 255.0.0.0
#no shut
#exit
show IP route
similarly for router1
>enable

config t
interface serial 2/0
IP address 20.0.0.20 255.0.0.0
no shut
exit
interface serial 3/0
IP address 30.0.0.10 255.0.0.0
no shut
exit

similarly for router-2

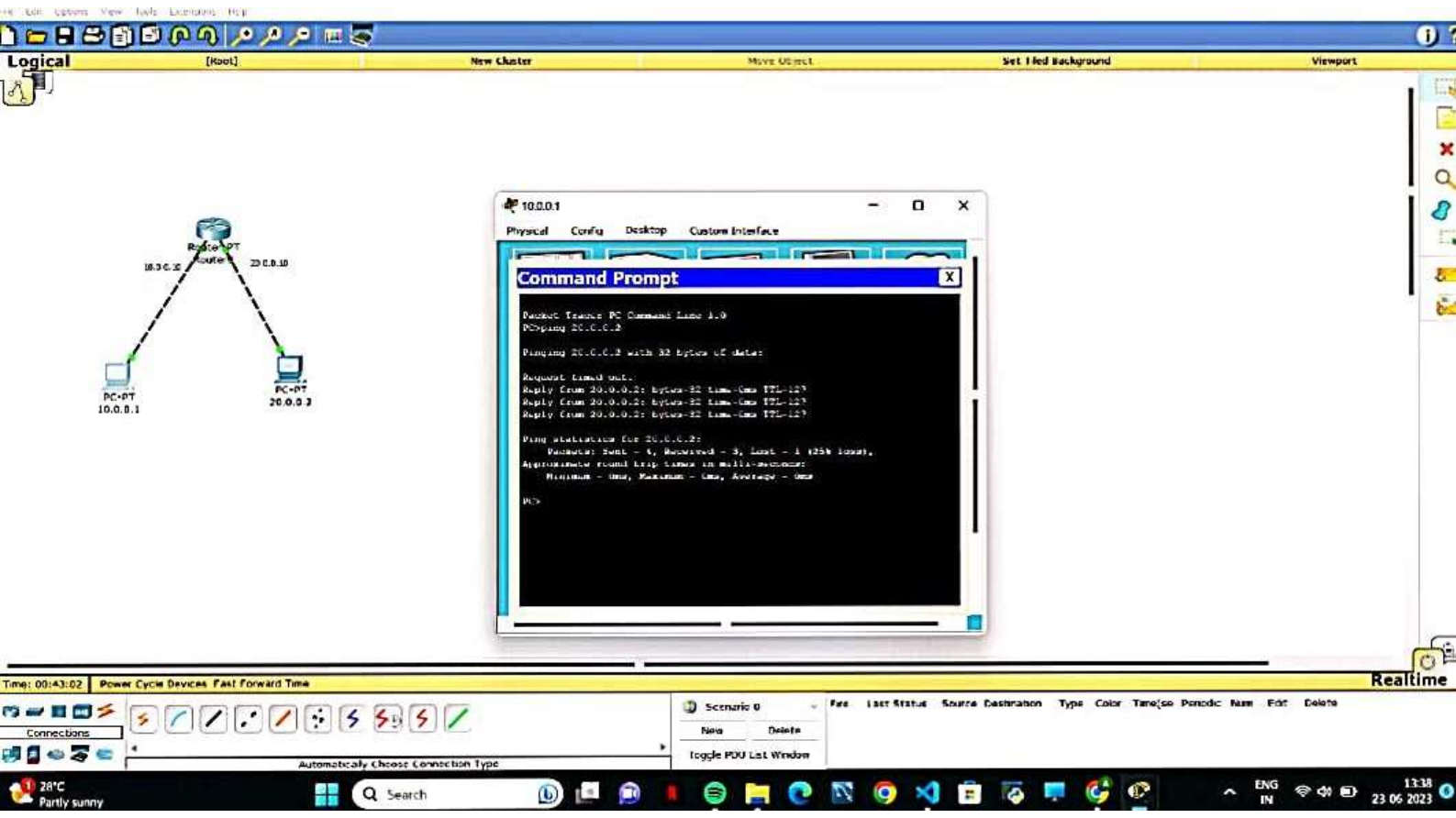
> enable
config t
interface serial 2/0
IP address 30.0.0.20 255.0.0.0
no shut
exit
interface fastethernet 0/0
IP address 40.0.0.10 255.0.0.0
no shut
exit
show IP route

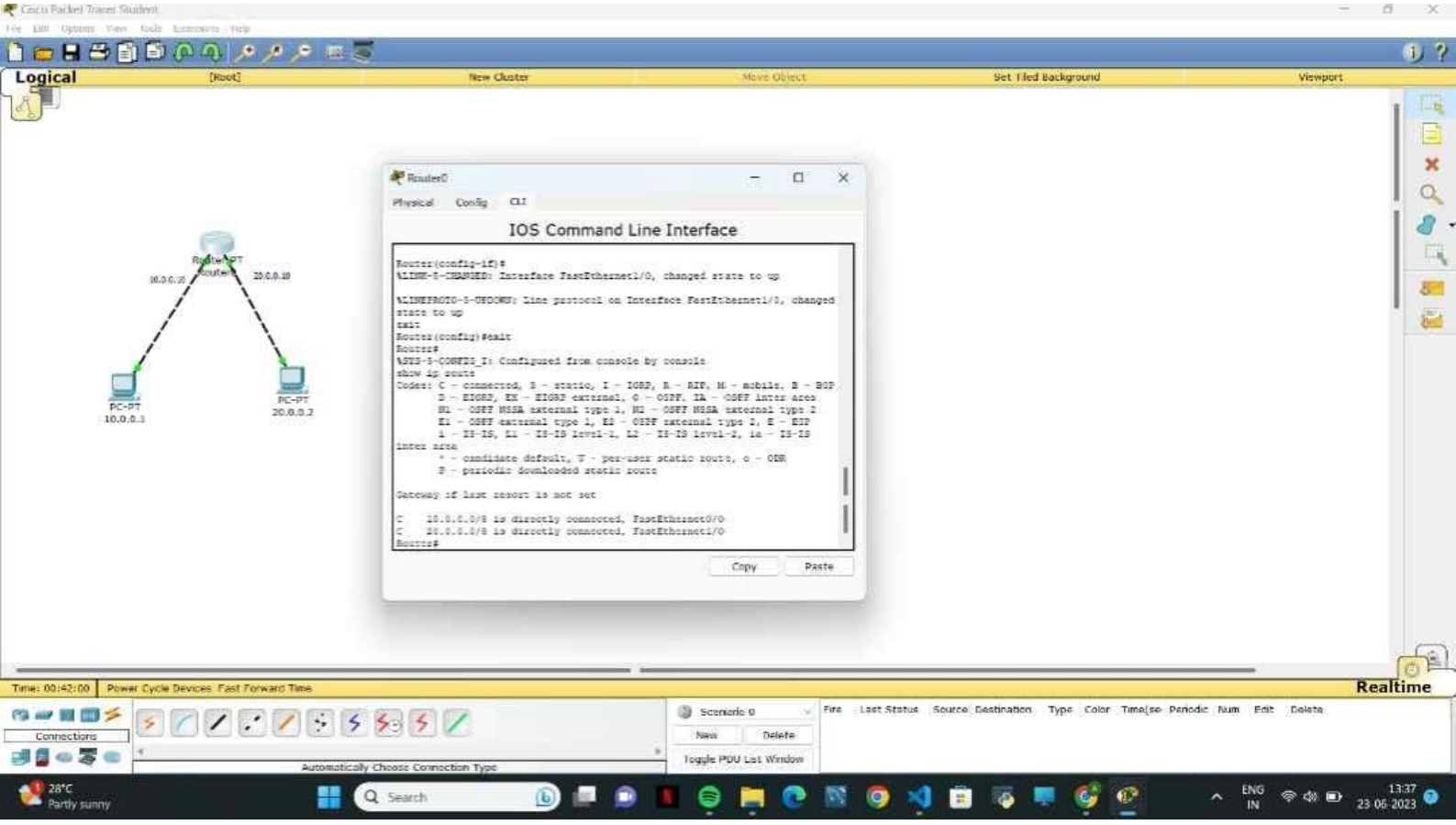
now select PC0 end device
desktop → command prompt
PC>ping 40.0.0.1

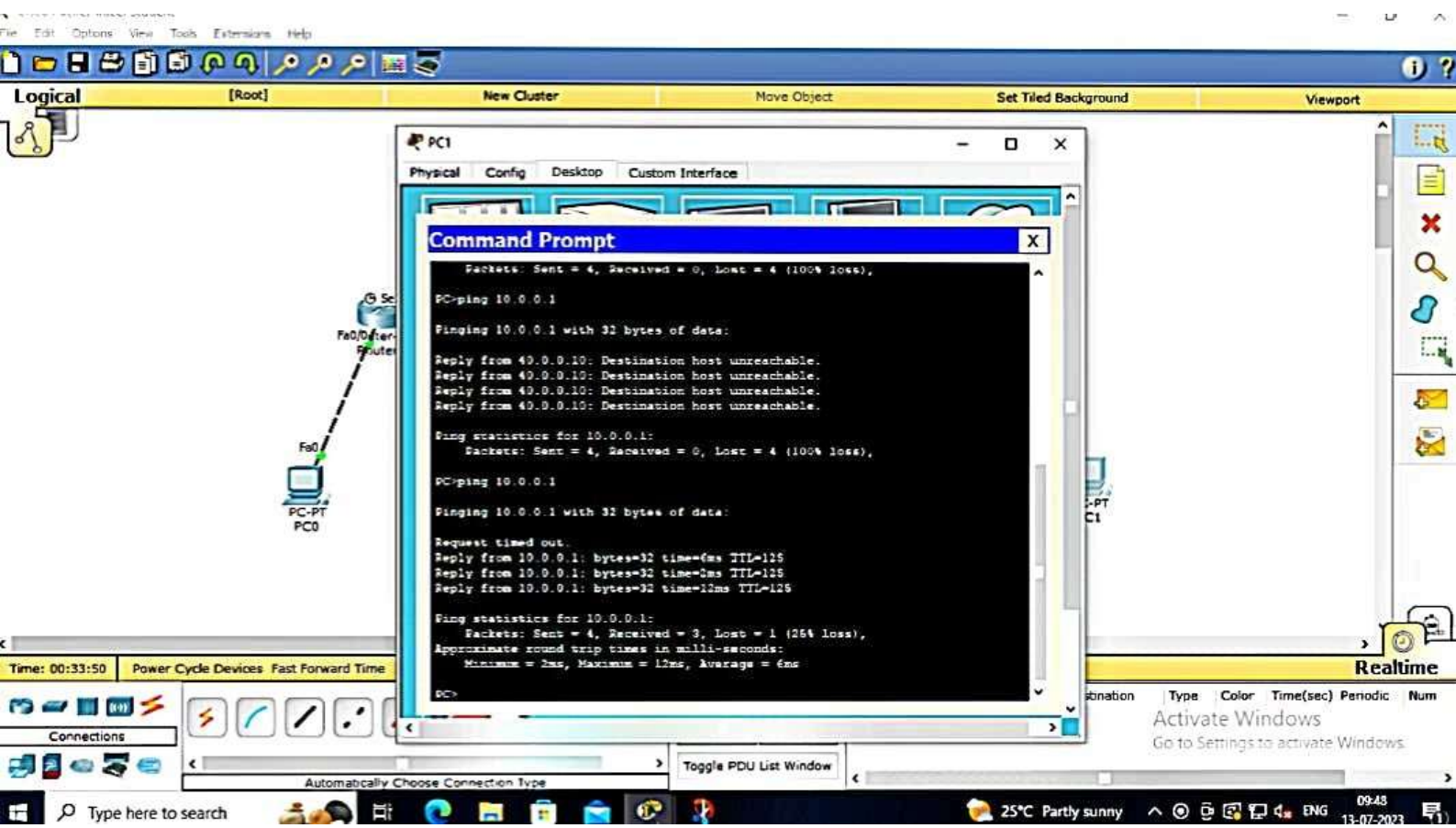
will be unable to ping to interface configuration
→ CLI
config t
IP route 30.0.0.0 255.0.0.0 20.0.0.20
IP route 40.0.0.0 255.0.0.0 20.0.0.20
exit
show IP route

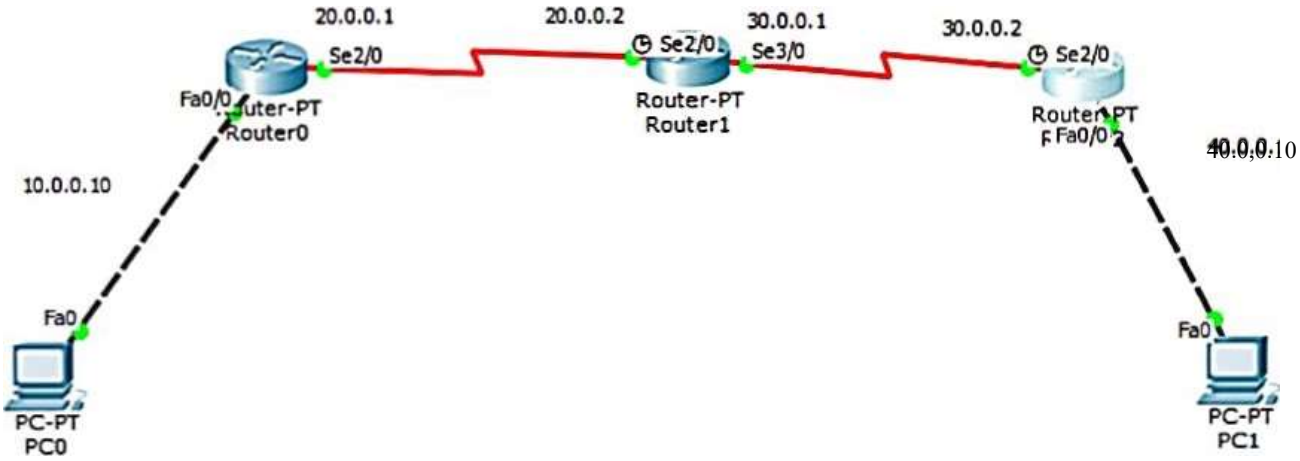
similarly for Router-1
config t
IP route 10.0.0.0 255.0.0.0 20.0.0.10
IP route 40.0.0.0 255.0.0.0 30.0.0.20
exit
show IP route
similarly for Router-2
config t
IP route 10.0.0.0 255.0.0.0 30.0.0.10
IP route 20.0.0.0 255.0.0.0 30.0.0.10
exit

IP Route
for router-0
show IP route
codes: C-connected, S-static, I-IGRP, R-RIP
M-Mobile, B-BGP
D-EIGRP, EX-EIGRP external, O-OSPF, A. OSPF inter area
N1-OSPF NSSA external type1, N2-OSPF NSSA external type2
1-OSPF external type 2, E2-OSPF external type2, 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, Fast ethernet


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
10.0.0.10
20.0.0.10
PC-PT
10.0.0.1
PC-PT
20.0.0.2
10.0.0.1
Physical
Config
Desktop
Custom Interface
Command Prompt
Cisco 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<1ms TTL=127
Reply from 20.0.0.2: bytes=32 time<1ms TTL=127
Reply from 20.0.0.2: bytes=32 time<1ms TTL=127
Ping statistics for 20.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Time: 00:43:02
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
28°C
Partly sunny
Search
ENG
IN
13:38
23-06-2023


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router0
Physical
Config
CLI
IOS Command Line Interface
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
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
C 10.0.0.0/8 is directly connected, FastEthernet0/0
C 20.0.0.0/8 is directly connected, FastEthernet1/0
Router#
Copy
Paste
10.0.0.10
20.0.0.10
PC-PT
10.0.0.1
PC-PT
20.0.0.2
Time: 00:42:00
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(se
Periodic
Num
Edit
Delete
28°C
Partly sunny
Search
ENG
IN
13:37
23-06-2023


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.1: bytes=32 time=6ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=12ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 12ms, Average = 6ms
PC>
Fa0
PC-PT
PC0
Time: 00:33:50
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
25°C Partly sunny
ENG
09:48
13-07-2023

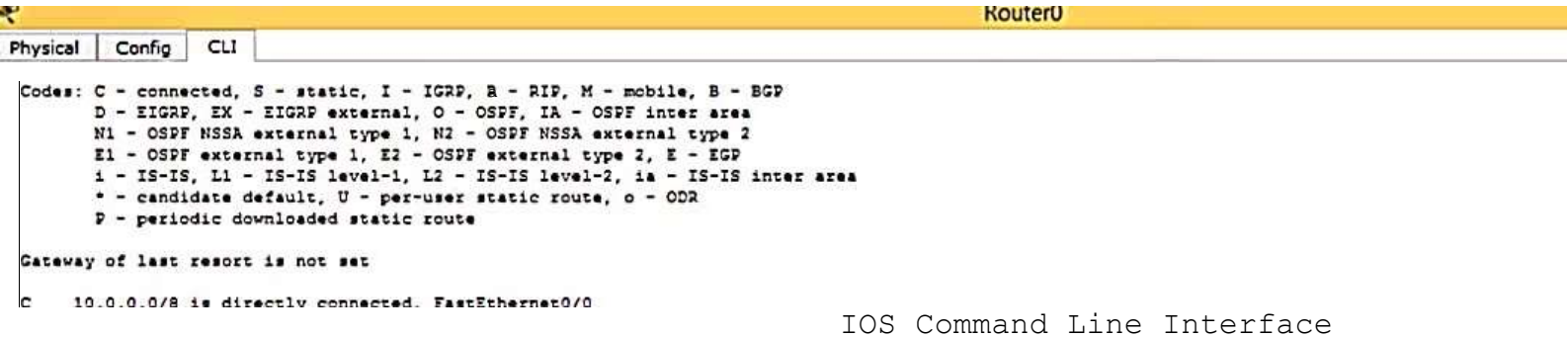

20.0.0.1
20.0.0.2
30.0.0.1
30.0.0.2
Se2/0
Se2/0
Se3/0
Se2/0
Fa0/0
Router-PT
Router0
Router-PT
Router1
Router-PT
Fa0/0
10.0.0.10
Fa0
Fa0
PC-PT
PC0
PC-PT
PC1

10.0.0.1

4).0.0.1

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastethernet0/0
Router(config-if)#ip address 10.0.0.10 255.0.0.0
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

Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

aout•zt.hav ip raus.



IOS Command Line Interface

physicalConfig CLI

IOS Command Line Interface

Rout e r *enable

Enter configuration car—ands, one per line. End with
Router (config) *Interface serial 2/0
_ 2 2SS-O-O-O
20u%er (config—if) shut

SLINK-S-CHANÆD: Interface changed state to up

Route: eonEig—i E) *exit

changed state

Routerl up

Router (config) $intexfaee serial 3/0

(config—if) Shut

Changed to
Route: (ecnEig—iE)
Router config)

•sys-S—CONFIG 1: Configured Exam console by eon-ole

Enter configuration one per line. End With CUTE/ Z. i 0-0_0-0
ZSS-O_O-0 20-0 -O - i
40.0.0.0 ass-o.o.o SO-0.0.2
Router config) *exit

•sys-s—CONFIG 1: Configured eon-ole by eon-ole

zoute codes: C — connected, S — Static. — IGRP. - RIP, u
— mobile, B - BGP O — IA — OSPF osps type 1. — OSPF type 2
— OSPF external type — OSPF external type 2, E — EGP
— IS-IS. — IS—IS level-I. — IS—IS — IS—IS
• — candidate default, U — per—user static route, o — ODR
Gateway Of last resort not set

physicalConfig CLI

IOS Command Line Interface

address 20.0.0.2 2SS.O.O.O
Router config—if) shut

Router (config—
if)
changed up

Router config)

Changed State up

Router (eonEig) "ntezEaee serial 3/0
30 - O -O
Router (config—if) shut

Interface SeziaIS/O, changed state to dawn
config—if) Route: eonEig)

i l: Configured by

Enter configuration one per line. End With CWTL/Z.
10 _ O _ O _ 0 _ O _ 0 20 _ O _
_ i route 40.0.0.0 ass.o.o.0 30.0.0.2

Physical | Config | Routers

CLI

Configured by

Codes: C — eonnected, S — Static, I — IG2P, - u - mobile, B — — EIGRP,
EX - ZIG2P external, O — OSPF, 1k — OSPF inter
OSPF NSSA external type 1, - external type 2
- OSPF external type 1. — OSPF external type 2, E — EGP
— IS—IS, — IS-IS level—I, L2 — IS-IS level—2, — IS—IS
— candidate default, — per—user route. o — ODR periodic

20-0-o_i c
20.0.0.0/8 is directly eonneeted, Serial
2/0

IOS Command Line Interface

acuteztcannng c
Enter ccnftguz.zicn ecrmand', one pez line. End with CyrL/Z.
acuter tintez2aee ä/O
addre.. 30.0.O.Z
ZSS.O.O.O
Route: eno shut

(config—if)
'LINK-S-CHÄNGZD: SexiA12/O, changed state to up

acuter *exit acuter
'LINZPROIO-S-UPDOWN: on Intez:aee sezia12/0, changed 'tate to up

(config) *interface fa'teZheznetO/O
Route: ZSS.O.O.O
•hut

Router ulttX-S-CHXNCZD: IntezE.ce FutEtheznecO/O, changed state
co up

```
%LIEtznoro-s-UPDOWH: Line         on                              changed         up

acuter (canng—iZ) *exit
      ( config)
Router*
             I: Configured fram eanBOIe by

Routez$eon±ig c
Enter configuration ane per line _ End vich CNTL/ZRouter
(config) tip route 0-0-0-0 0-0-0-0 30-0-0-1 Router (config)
*exit
Rout ez$
             I: Configured             by

Routez$.hov ip toute
Code': C — connected. S —                                       B - BGP
                    — EIG2P external, O — OSVF. 1k - OSPF inter area NSSA
           external type 1, N2 - ospr NSSA external type Z ospE external C me
           I, EZ — Osps external cype Z, E — EGP rs-rs, Li IS-IS level-I, IS—
           IS level—2. — IS—IS inter Area
```

Router2

Physical | Config | CLI

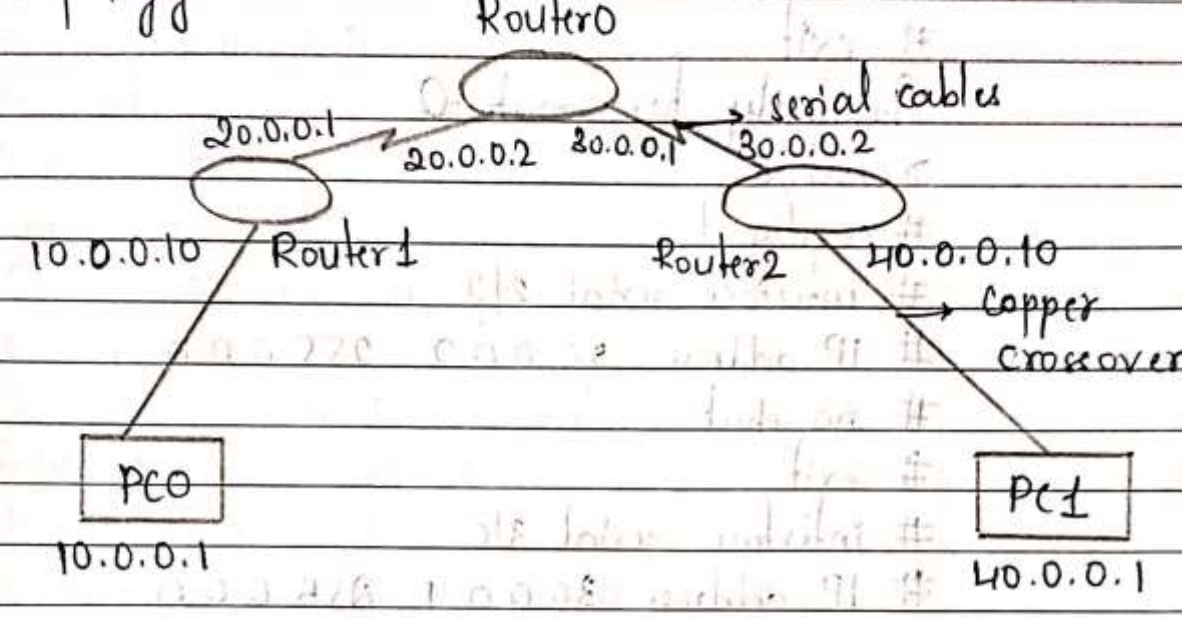
IOS Command Line Interface

```
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#interface fastethernet0/0
Router(config-if)#ip address 40.0.0.10 255.0.0.0
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

Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 30.0.0.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 30.0.0.1 to network 0.0.0.0

C    30.0.0.0/8 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 [1/0] via 30.0.0.1
Router#
```

14/7/23

Aim - Configure default and static route for a connection of routers.

Topology -



Procedure -

1) Select 3 generic routers and two PC's as end devices. Connect the PCs to different routers with copper cross over and connect both the routers to main router with serial cables.
2) Set the IP addresses of PC and gateways.
3) Set the gateway addresses in all the routers taking interface as fastethernet for the PCs and serial for routers.
4) Connect the PCs to the interfaces
5) config-steps -

>enable (router 1)
config t
interface fastethernet 0/0
IP address 10.0.0.10 255.0.0.0
no shut

exit
interface serial 2/0
IP address 20.0.0.1 255.0.0.0
no shut
exit

Similarly for router-2

>enable
config t
interface serial 2/0
IP address 20.0.0.2 255.0.0.0
no shut
exit
interface serial 3/0
IP address 30.0.0.1 255.0.0.0
noshut
exit

For router-2

>enable
config t
interface fastethernet 0/0
IP address 40.0.0.10 255.0.0.0
no shut
exit
interface serial 2/0
IP address 30.0.0.2 255.0.0.0
no shut
exit

6) We need to set IP routes for all routes via routers.
For router-1 & router-2, we do default

routing and for router-0, static routing is done.

For router-1
config t
ip route 0.0.0.0 0.0.0.0 20.0.0.2
#noshat
exit
show ip rout
C 10.0.0.0/8 is directly connected, FastEthernet 0/0
C 20.0.0.0/8 is directly connected, Serial 2/0
S* 0.0.0.0/0 [1/0] via 20.0.0.2

Similarly for router-2 :
config t
ip route 0.0.0.0 0.0.0.0 30.0.0.1
exit
show ip rout

For router-0 (Static routing)
config t
ip rout 10.0.0.0 255.00.0 20.0.0.0
ip rout 40.0.0.0 255.0.0.0 30.0.0.0
exit
show ip rout
S 10.0.0.0/8 [1/0] via 20.0.0.0
C 20.0.0.0/8 is directly connected, Serial 2/0
C 30.0.0.0/8 is directly connected, Serial 3/0
S 40.0.0.0/8 [1/0] via 30.0.0.0

7) Now, we ping 10.0.0.1 from the command prompt of 40.0.0.1

Result -

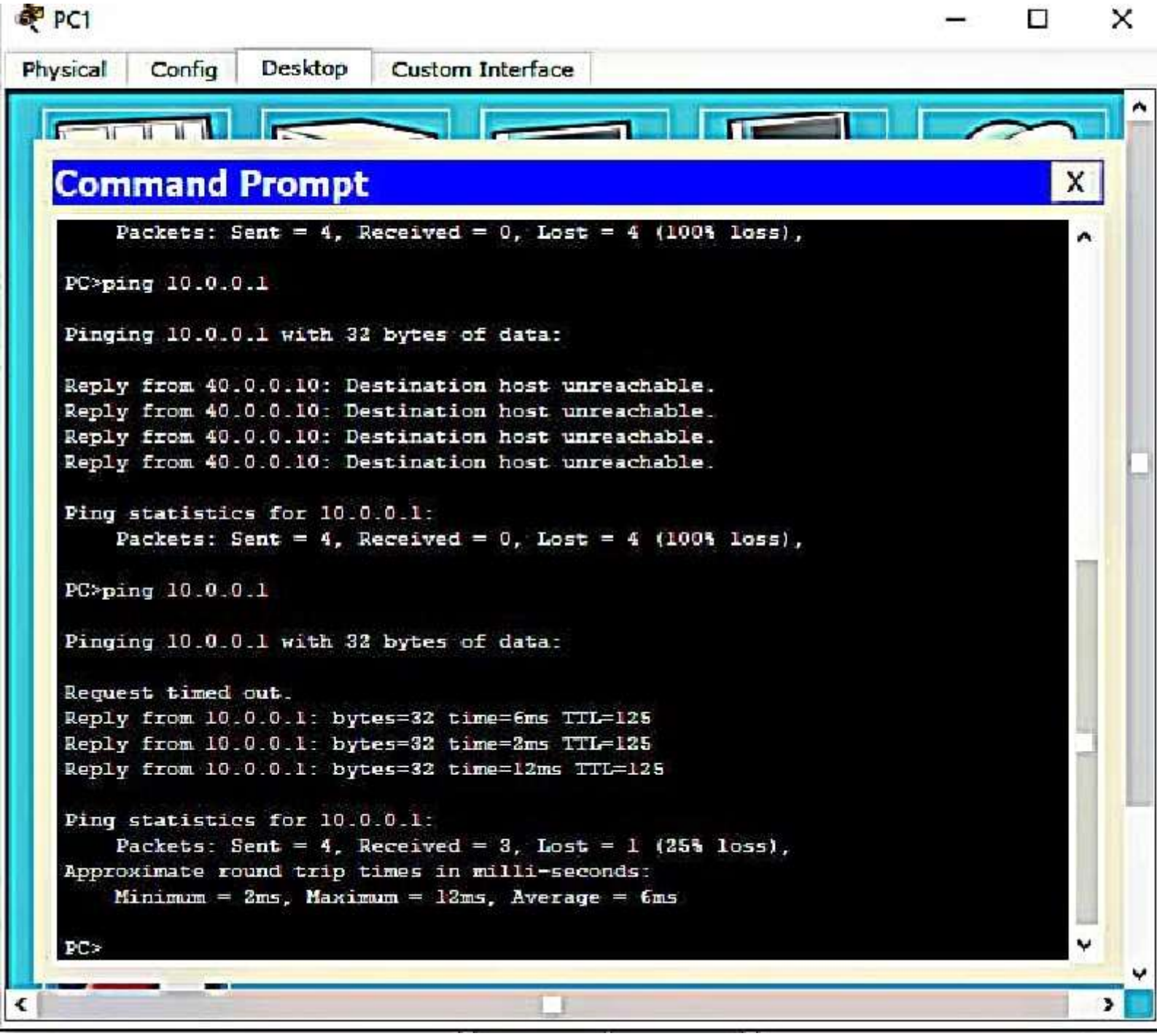
PC> ping 10.0.0.1

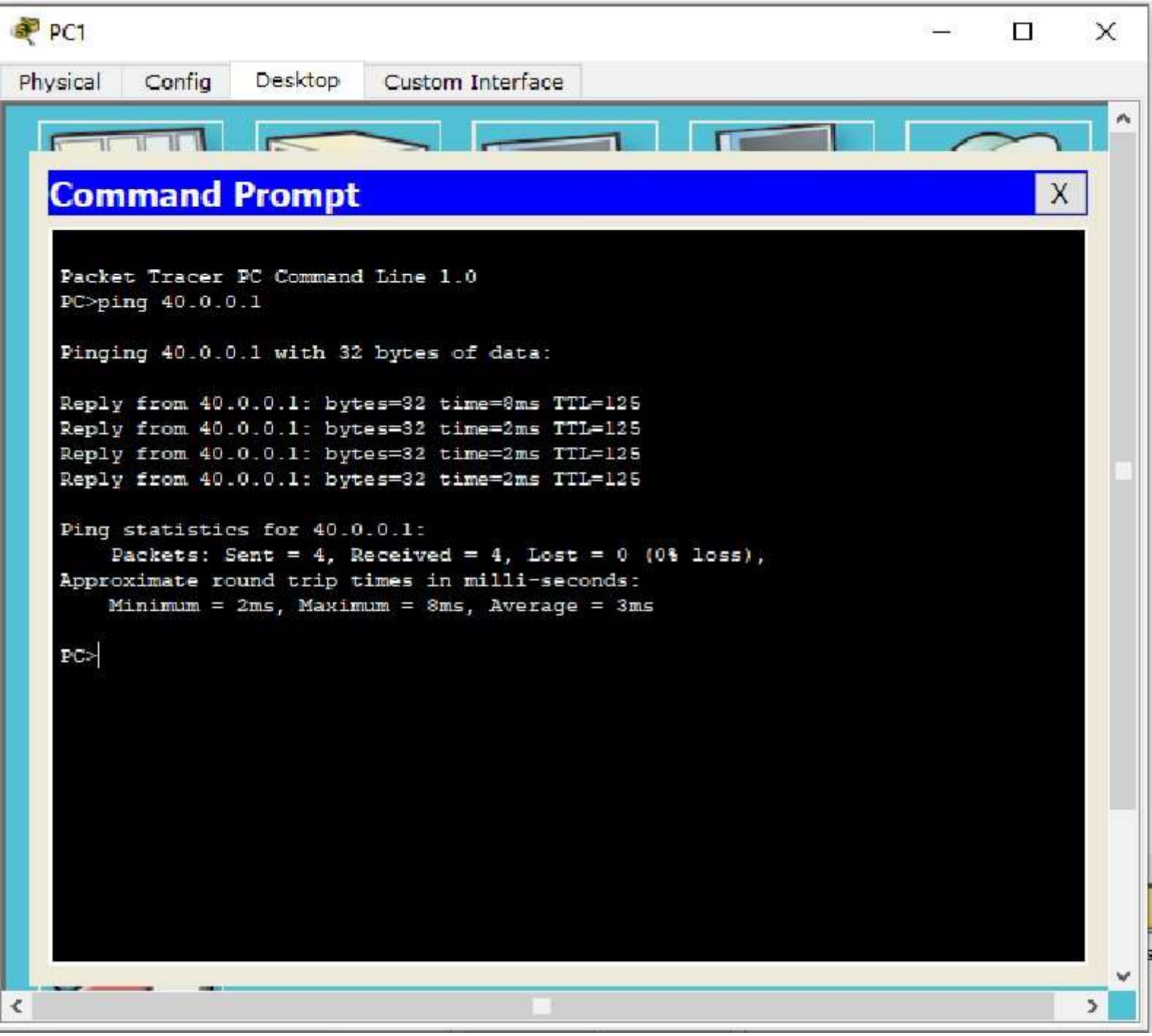
Pinging 10.0.0.1 with 32 bytes of data:

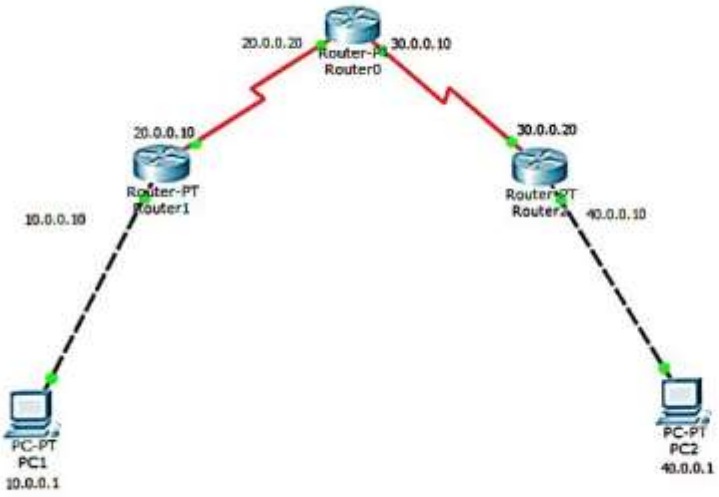
Request timed out
Reply from 10.0.0.1: bytes=32 time=6 ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2 ms TTL=125
Reply from 10.0.0.1: bytes=32 time=12 ms TTL=125

Ping statistics for 10.0.0.1:
Packets: Sent=4, Received=3, Lost=1
Approximate round trip time in milli-seconds:
Minimum=2 ms, Maximum=12 ms, Average=6 ms

10/10 16/3/23


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.1: bytes=32 time=6ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=12ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 12ms, Average = 6ms
PC>


PC1
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=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 3ms
PC>


20.0.0.20
Router-PT
Router0
30.0.0.10
20.0.0.10
Router-PT
Router1
30.0.0.20
Router-PT
Router2
10.0.0.10
40.0.0.10
PC-PT
PC1
10.0.0.1
PC-PT
PC2
40.0.0.1

Cisco Packet Tracer Student

Automaticallv p Type here to search

Edit Options Vie"' Tools Extensions

New Cluster | Move Object | Set Tiled Background | Viewport

Router2

L ogical [Root]

Physica Config CLI

IOS Command Line Interface

cute z state to up

Line on state to up

Ente z f ion s one pe z line _ End with INTL/ Z _

Route z f ig) # ip O _ O _ 0.0

Route z ig) shut

input at '

FaO/O ter

Route z

Acute z

Con by show ip c static, I - IGRP, - RIP, M - mbile, B - BGP D EIGRP,

EX. - O - OSPF, IA - OSPF inter area OSPF NSSA type 1 , - OSPF NSSA type 2

OSPF type 1, 22 OSPF type 2, E IS-IS, LI - IS-IS level-I, L2 — IS—IS — IS—IS default, U

— per—user static o — ODR

P — periodic static

of last is 20 _ O _ O _ 2 to O _ O _ O _ O

pc-PT

is directly cted , is

directly cted ,

20.0 0 2

Acute z

Re altime

ination Type Color Time sec) Periodic Num

Activate Windows

Go to Settings to activate Windows.

Toggle POLI List Window Chccse

Time: 00:21 : 55 Power Cycle Devices Fast Forward Time Ccnnecticn

Connections

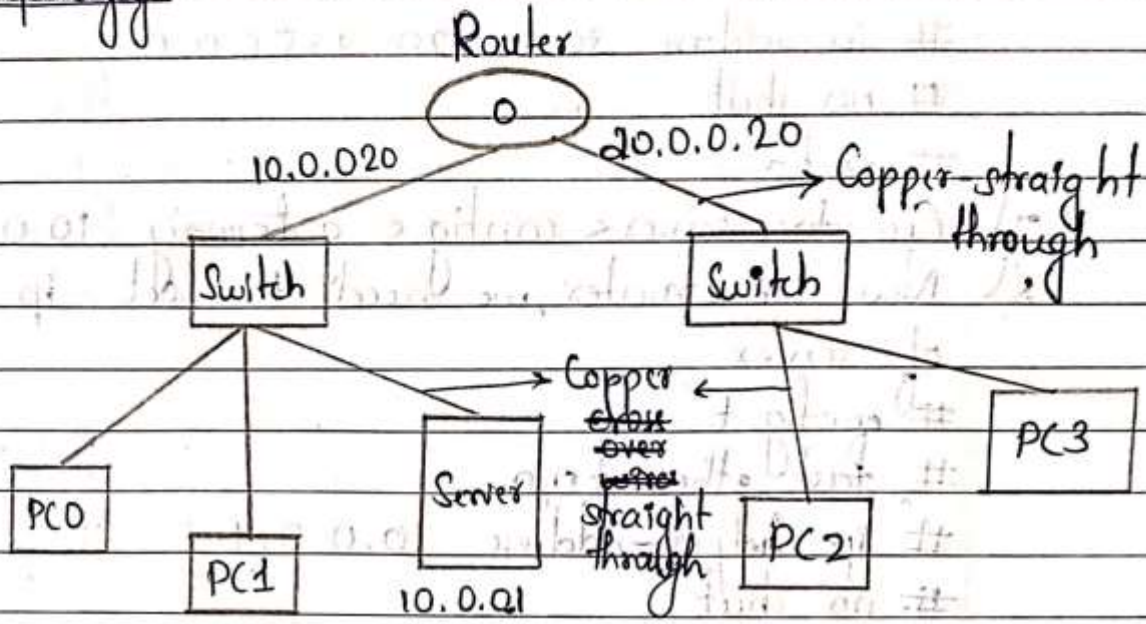
230c Partly sunny A @

13-07-2023

14/7/23

Aim - Connection of server LAN within and outside the network using switches and routers.

Topology -



Procedure -

1) Select two or more PC and a server connecting to switch and another network with only end devices and switch.
2) Connect both switches to router.
3) Set IP address of server as 10.0.0.1
4) Now, go to services < select DHCP < save the current IP address 20.0.0.2
5) Now, check the IP addresses of others devices in the network in the IP configuration in desktop.
6) Now in the CLI of router enable follow steps -

```
> 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

7) Go to server < config < gateway 10.0.0.20

8) 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

9) Now go to server < services < DHCP < add new IP address - 20.0.0.2

10) To check the connection, go to the IP configuration of PC outside the network and click on DHCP and IP gateway will be visible.

Result -
From server - from PC2 to PC0 whose ip address is 10.0.0.2

PC> ping 10.0.0.2

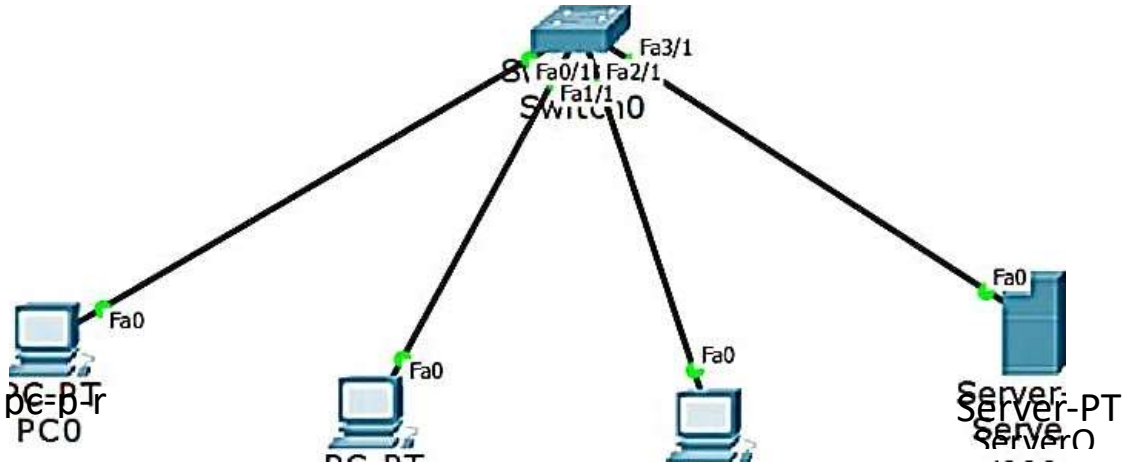
pinging 10.0.0.2 with 32 bytes of data:
Request timed out

Bafna Gold
Date Page

Reply from 10.0.0.2 : bytes = 32 time = 6 ms TTL = 125
Reply from 10.0.0.2: bytes = 32 time = 2 ms TTL = 125
Reply from 10.0.0.2: bytes = 32 time = 12 ms TTL = 125

ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1
Approximate round trip time in milliseconds:
Minimum = 2 ms, Maximum = 12 ms, Average = 6 m

9/10



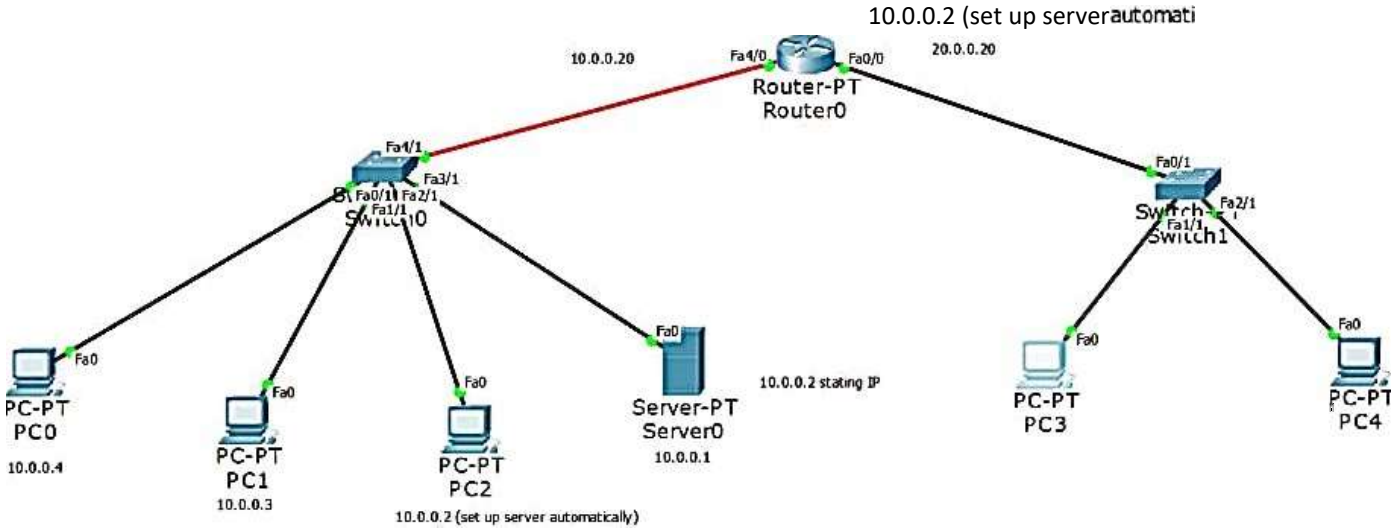
10.0.O.2 stating IP

10.0.0.4 PC-PT PC-PT IO.O.D.I

PCI

PC2

10.0.o.3

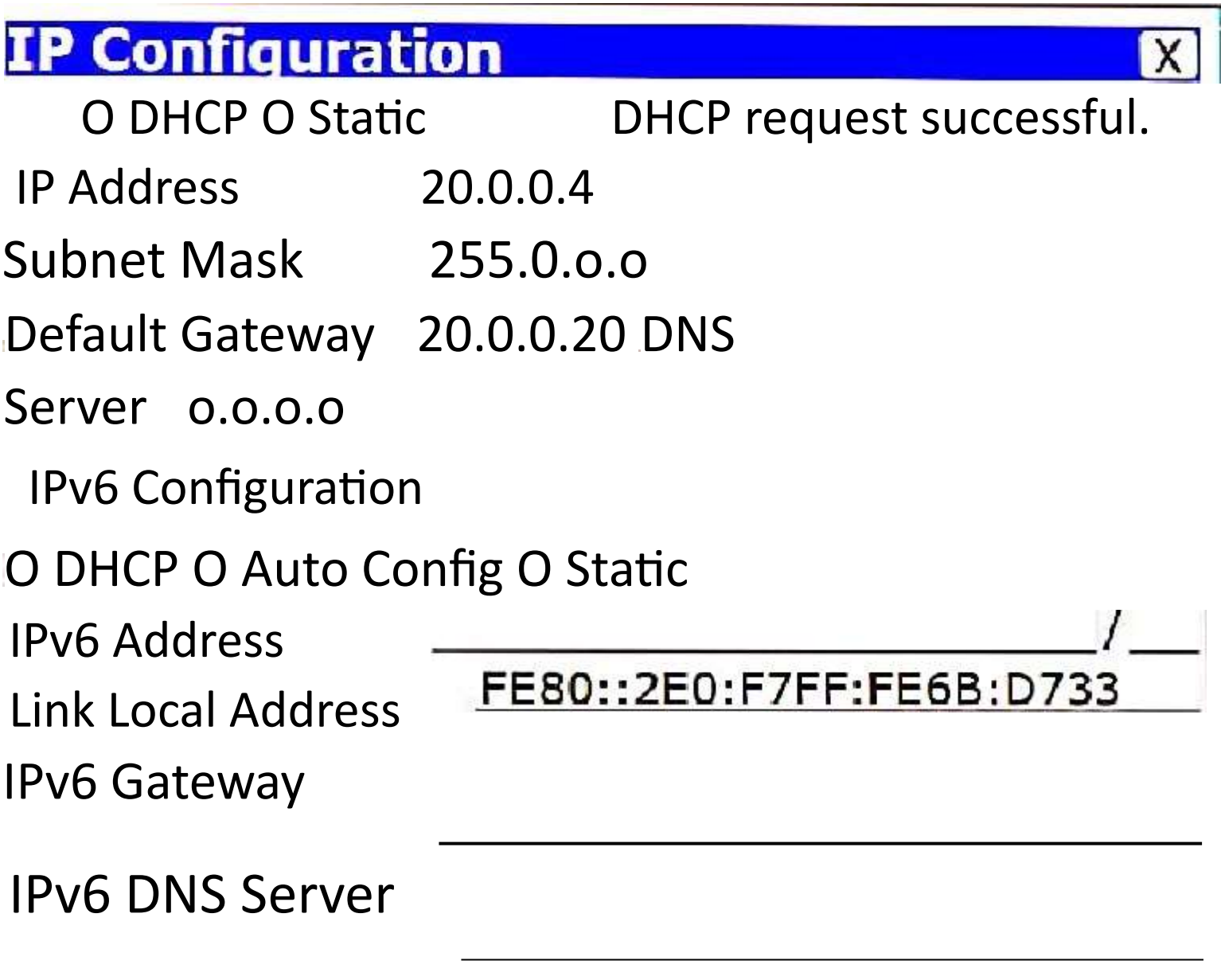



```
Brxagxng sozcware.
X.2S software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface (s)
2 Low—speed serial (sync/async) network interface
(s) 32K bytes of non—volatile configuration memory.
63488K bytes of ATA CompactFIash (Read/write)

Press RETURN to get started!



Router>enable
Router* config t
Enter configuration corrmands, one per line. End with CNTL/Z.
Router (config) *interface serial 2/0
```

```
Router (config—if) 'ip address 20.0.0.20 2SS. 0.0.
Router (config—if) •no shut

  INK-5-CHANGED:Interface Seria12/O, changed state to down
Router (config—if) *exit
Router (config) interface serial 3/0
Router (config—if) 'ip address 30.0.0.10 2SS.O.O.O
Router (config—if)   shut

'LINK-S-CHANGED: interface seria13/0, changed state to down
Router (config—if) 'exit
Router (config) #
%LINK-5-CHANGED:Intezface Sezia12/O, changed state to up

•LINEPROTO-S-ÜPDOWN:    protocol on Interface soria22/0, Changed State to up
exx t
Router'
  YS-5-CONFIG_  I: Contigured ± rom console by
  ow ip route   console Show
Codes: C — connected, S - static, 1 - GRP. R - RIP. M - mobile, B - BGP
       D -EIGRP, EX - EIGRP external, O — OSPF, IA — OSFF incer area N1 -
       ospr NSSA external type 1, N2 — OSPF NSSA external cype 2 E1 -OSPF
       external type 1, E2 ospr external type 2, E — EGP i — IS-IS, — IS-IS
       * -  level-1, IS—IS level —2, ia — IS—IS incez area candidate default,
       U — per—user statxc route, o -P -periodic downloaded seaeic rou e e
Gateway    last resort is not set
Of
           .0/8 is directly connected,
20. O. O O/ e              seria12/0
outer>enable outez#config t ntez configuration commands,
one per line. End with CNTL/Z. outer (config) tinterface
seria12/O outer (config—if) fip address 30.0.0.20 2SS.O.O.O
outer (config—if)     shut



Router#
```

```
outer (config—if)#
LINK-S-CHANGED: Interface seria12/O, changed state to up

LINEPROTO-S-UPDOWN: Line protocol on Interface seria12/O, changed state to up

louter (config) *interface fastethernetO/O
uter(config—if)      address 40.0.0.10 2SS.O.O.O
uter(config—if)      shut


                Interface FastEthernetO/O, changed state to up

                    Line protocol on Interface FastEthernetO/O, changed state to up
o


Router(config-if)#
%LINK-5-CHANGED: Int          Invalid input detected at marker.

                              Router (config) *exit
%LINEPROTO-5-UPDOWN:
exit
Router(config)#show ip zoute  I: Configured from
                              console by console show
ip route
Zodes: C — connected, S — static, I - IGRP, R - RIP, M - mobile, B -
       BGP D -EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
Router#        area
%SYS-5-CONFIG_ N1- OSPF NSSA external type 1, N2 — OSPF NSSÄ external type 2 El
       - OSPF external type 1, 22 - OSPF external type 2, E - EGP i - IS-IS, Ll
       - IS-IS level-I, 12 - 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     30.0.0.0/8 is directly connected, Seria12/O c
      40. O .0.0/8 is directly connected, Fa s tE
thernet O/ O Router i
```

IP Configuration

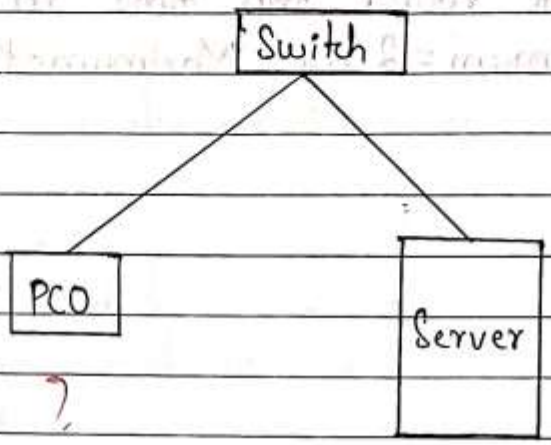


```
pinging 20.0.0.2 with 32 bytes of data:

Reply from 20.0.0.2 : bytes=32 time=lms TTL=127
Reply from 20.0.o.2 : bytes=32 time—Oms TTL=127
Reply from 20.0.o.2 : bytes=32 time—Oms TTL-
=127 Reply from 20.0.0.2 : bytes—32 time—Oms

Ping statistics for 20.0.0.2 :
    Packets : Sent — — 4, Received = 4, Lost = O loss) ,
Approximate round trip times in milli—seconds:
    Minimum = Oms, Maximum = Ims, Average = Oms
```

20/7/23

Aim - To understand the working of Domain Name System (DNS) and make changes of the DNS protocol.

Topology -



Procedure -

1) The topology consists of a PC, server and switch.
2) Connect them using copper-straight through wires.
3) Set ip address of PC as 10.0.0.1 and that of server as 10.0.0.2
4) Click on PC
Destop < Web browser < 10.0.0.2
It displays the index.html page of the server.
5) Click on server
Services < index.html < edit <
change the subject to BMS college of engineering CSE < save

6) Click on PC
Desktop < Web browser < 10.0.0.2
It changes the content of index.html page as set by us i.e., BMS College of Engineering CSE.

7) Click on server
Services < DNS < ON <
give domain name as bmscecse <
Set address as 10.0.0.2
< add

8) Click on PC
Desktop < Web browser < bmscecse
It displays the same index.html of page of the server (with ip address 10.0.0.2)

Result-

Web Browser | X

< > | URL | http://bmscecse | Go | Stop

Cisco Packet Tracer

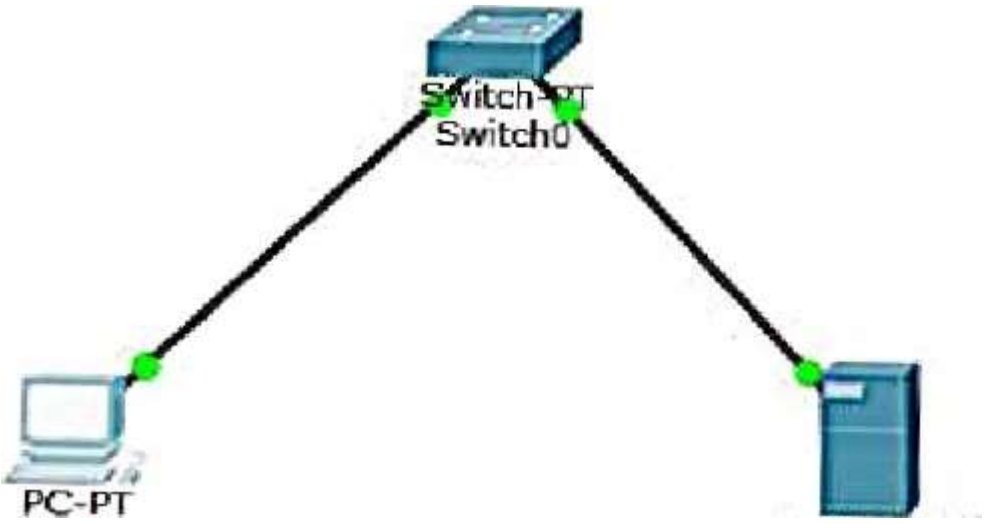
BMS COLLEGE OF ENGINEERING. Opening doors to new opportunities. Mind wide open.

Quick Links:
A small page
Copyrights
Image page
Image

10/10
25/7/23

Observation-

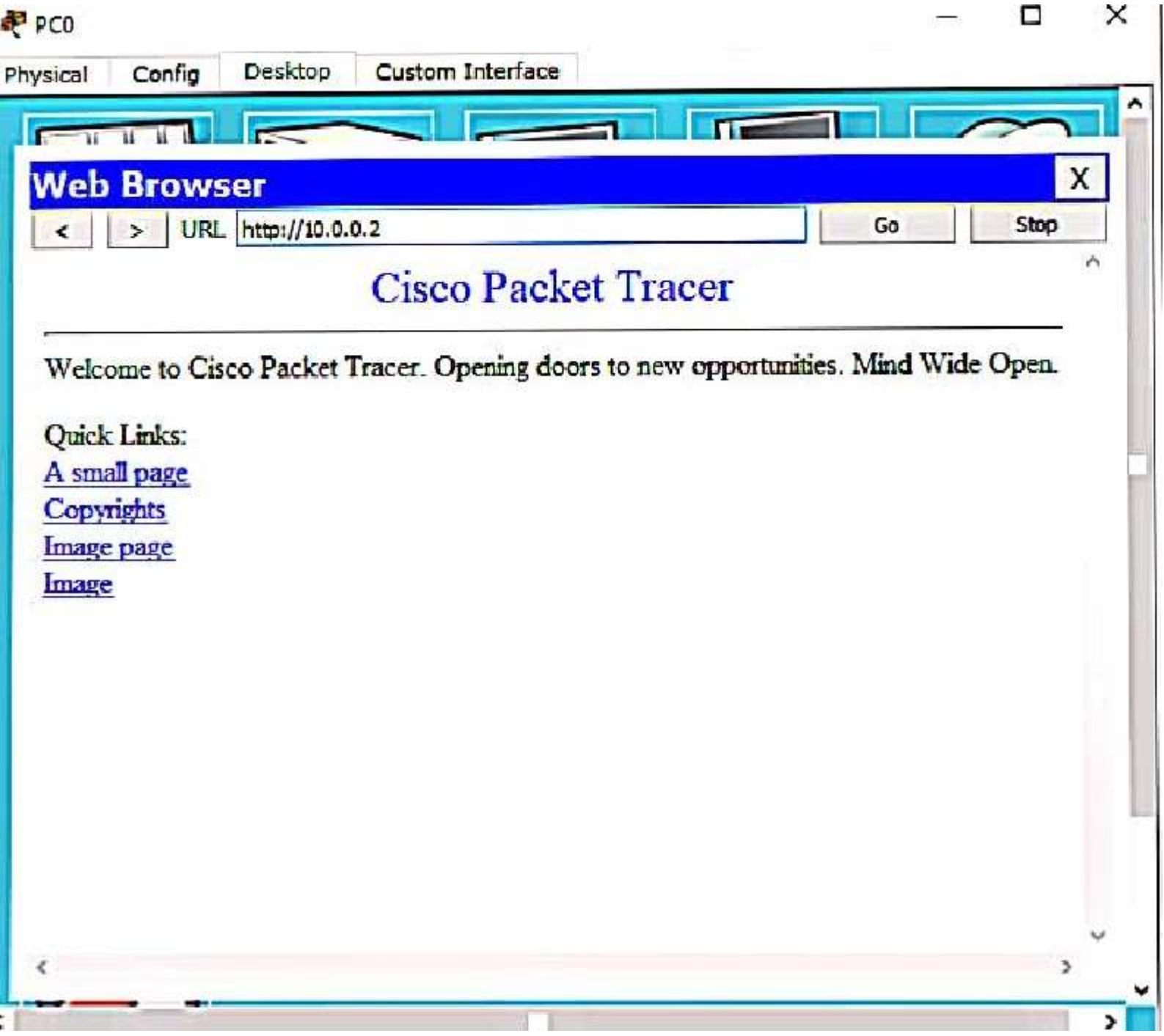
The Domain Name System can be used to address a webpage and in cisco packet tracer, it can be controlled and updated in the server controller. The contents and the name of webpage can also be changed as and when required. And when this domain name is browsed in the PC, the contents of the webpage are displayed.



PCO

Server-pm

ServerO


PC0
Physical
Config
Desktop
Custom Interface
Web Browser
X
<
>
URL
http://10.0.0.2
Go
Stop
Cisco Packet Tracer
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

ServerO □ x

ONS


Physical
Config
Desktop
cache
Services
Custom Interface

SERVICES

DHCPv6

DNS

SYS LOG

NTp

EMAIL

DNS

Resource Records

Name Type A Record

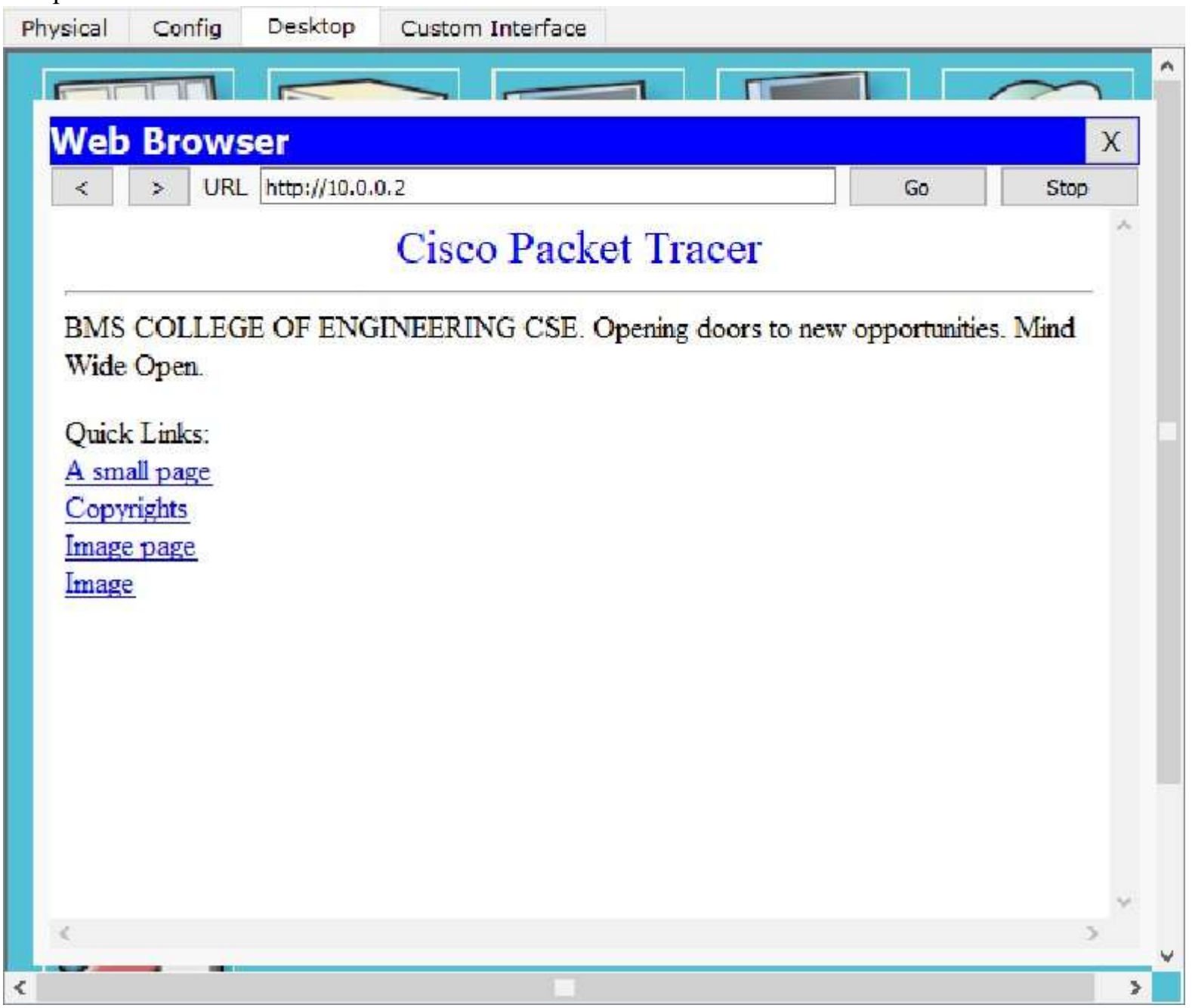
Address

Add Save Remove

0	Name	Type	Detail
	bmscecse	A Record	IOÆÆ.2

DNS service @ On O Off

pco x


Physical
Config
Desktop
Custom Interface
Web Browser
X
<
>
URL
http://10.0.0.2
Go
Stop
Cisco Packet Tracer
BMS COLLEGE OF ENGINEERING CSE. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

Server0

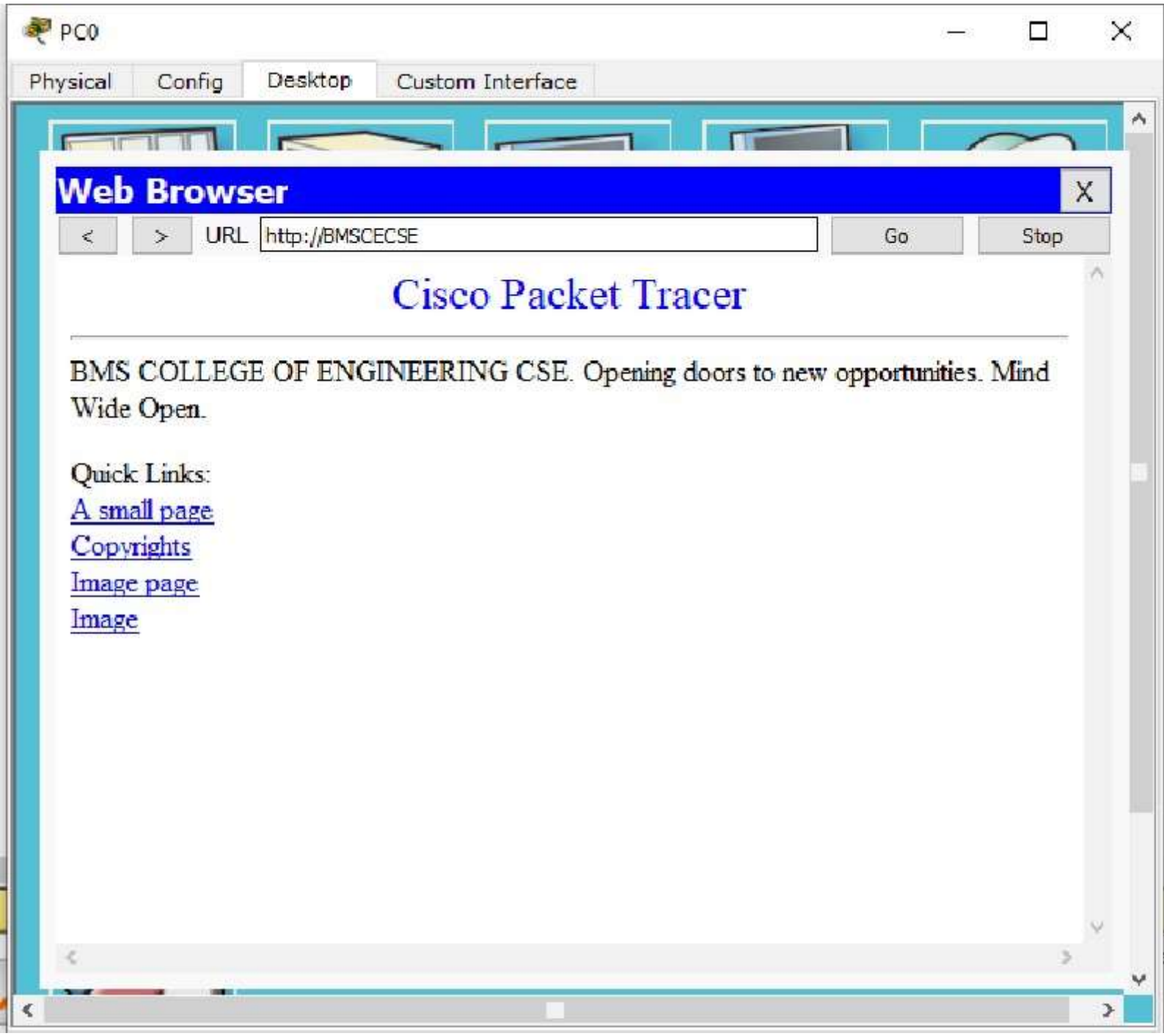
Physical | Config | Services | Desktop | Custom Interface

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP

File Name: index.html

```
<html>
<center><font size='+2' color='blue'>Cisco Packet
Tracer</font></center>
<hr>BMS COLLEGE OF ENGINEERING CSE. Opening doors to new
opportunities. Mind Wide Open.
<p>Quick Links:
<br><a href='helloworld.html'>A small page</a>
<br><a href='copyrights.html'>Copyrights</a>
<br><a href='image.html'>Image page</a>
<br><a href='cscoptlogo177x111.jpg'>Image</a>
</html>
```

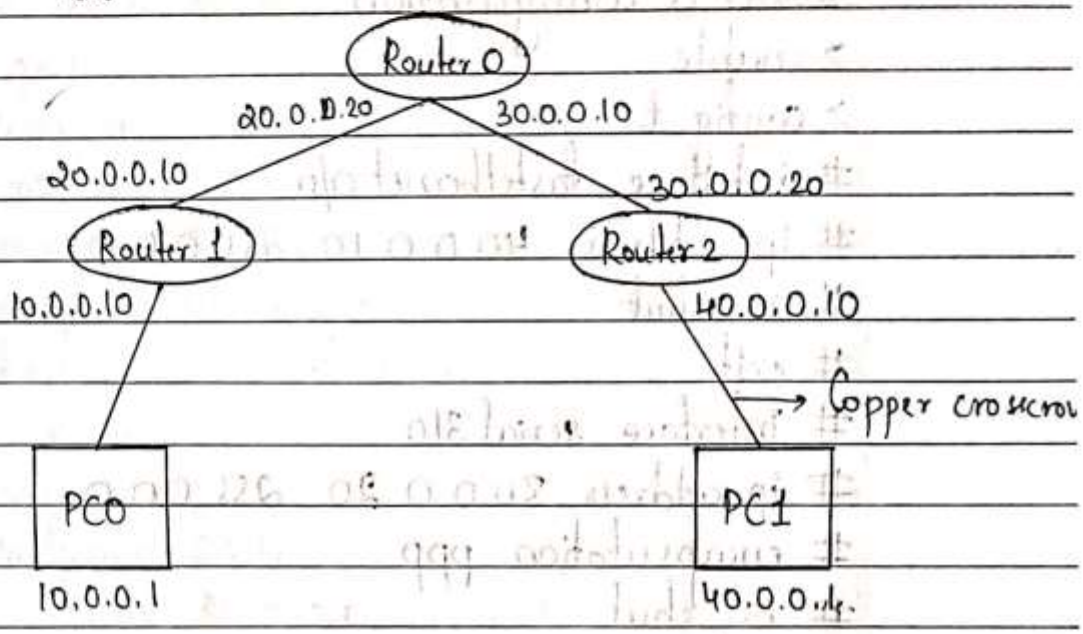
File Manager | Save


PC0
Physical
Config
Desktop
Custom Interface
Web Browser
X
<
>
URL
http://BMSCECSE
Go
Stop
Cisco Packet Tracer
BMS COLLEGE OF ENGINEERING CSE. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

20/7/23

Aim - Configuring RIP routing Protocol in system of 3 Routers.

Topology -



Procedure -

1) Select two PCs and 3 routers, connect the PCs to two routers using copper cross over wires and connect the routers to another router with serial DCE with timer.

2) Set the IP address of both the PCs as 10.0.0.1 and 40.0.0.1 respectively and their gateways as 10.0.0.10 and 40.0.0.10 respectively.

3) Router 1 configuration

```
> enable
> config t
# interface fastethernet 0/0
# ip address 10.0.0.10 255.0.0.0
# no shut
# exit
```

interface serial 2/0
ip address 20.0.0.10 255.0.0.0
encapsulation ppp
clock rate 64000
no shut
exit

Router 2 configuration
> enable
> config t
interface fastethernet 0/0
ip address 40.0.0.10 255.0.0.0
no shut
exit
interface serial 3/0
ip address 30.0.0.20 255.0.0.0
encapsulation ppp
no shut
exit

Router 0 configuration
> enable
> config t
interface serial 2/0
ip address 20.0.0.20 255.0.0.0
encapsulation ppp
no shut
exit
interface serial 3/0
ip address 30.0.0.10 255.0.0.0
encapsulation ppp
clockrate 64000
no shut
exit

4) Now, network router configuration for 'Routing Information Protocol (RIP)' is done as follows -

Router 1 -

```
# router rip
# network 10.0.0.0
# network 20.0.0.0
# exit
```

Router 2 -

```
# router rip
# network 30.0.0.0
# network 40.0.0.0
# exit
```

Router 0.

```
# router rip
# network 20.0.0.0:
# network 30.0.0.0:
# exit
```

5) After RIP configuration of all routers, we check the routing table of all by giving show ip route command.

For router 0 -

```
show ip rout
R  10.0.0.0/8 via 20.0.0.10, 00:00:13, 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  20.0.0.0/32 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, Serial 3/0
C 30.0.0.0/32 is directly connected, Serial 3/0
R 40.0.0.0/8 via 30.0.0.20, 00:00:12, serial 3/0

6) Now, ping 10.0.0.1 from the command prompt of 40.0.0.1 and vice versa.

Result -

from 40.0.0.1 > ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Request timed out
Reply from 10.0.0.1 : bytes = 32 time = 12 ms TTL=
Reply from 10.0.0.1 : bytes = 32 time = 2 ms TTL=
Reply from 10.0.0.1 : bytes = 32 time = 2 ms TTL=

Ping statistics for 10.0.0.1 :
Packets : Sent = 4, Received = 3, Lost = 0 (1
Approximate round trip time in milli-seconds:
Minimum = 2 ms, Maximum = 12 ms, Average = 2

from 10.0.0.1 > ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data:

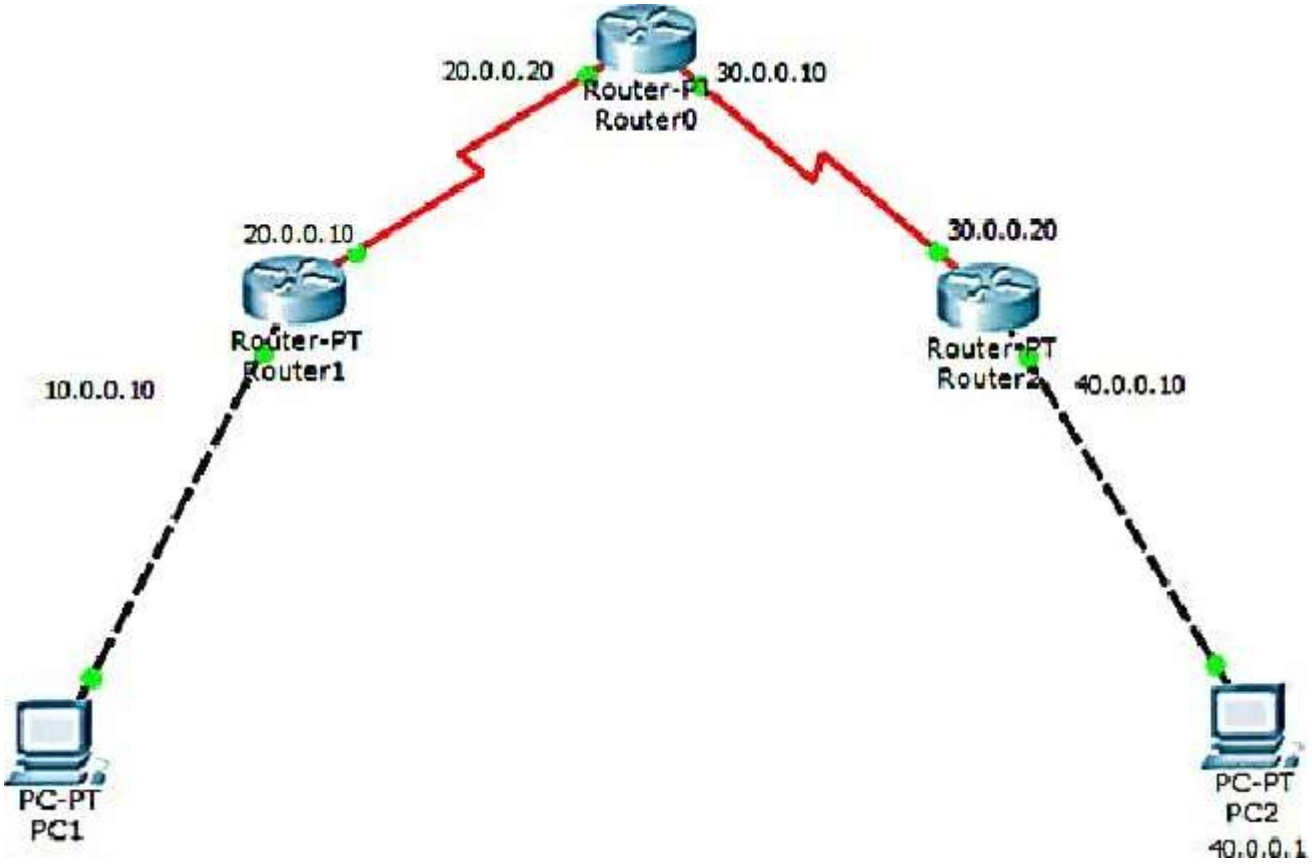
Reply from 40.0.0.1 : bytes = 32 time = 2 ms TTL=12
Reply from 40.0.0.1 : bytes = 32 time = 2 ms TTL=12
Reply from 40.0.0.1 : bytes = 32 time = 2 ms TTL=12
Reply from 40.0.0.1 : bytes = 32 time = 2 ms TTL=12

Bafna Gold
Date: Page:

Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0
Approximate round trip time in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 2ms

10/10

25/7/23


20.0.0.20
Router-PT
Router0
30.0.0.10
20.0.0.10
Router-PT
Router1
30.0.0.20
Router-PT
Router2
10.0.0.10
40.0.0.10
PC-PT
PC1
PC-PT
PC2
40.0.0.1

Cisco Packet Tracer Student

Edit Options Vie"'' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

10 , 0 , 01

Activate Windows

Go to Settings to activate

Connections

Toggle POLI List

Window serial DCE

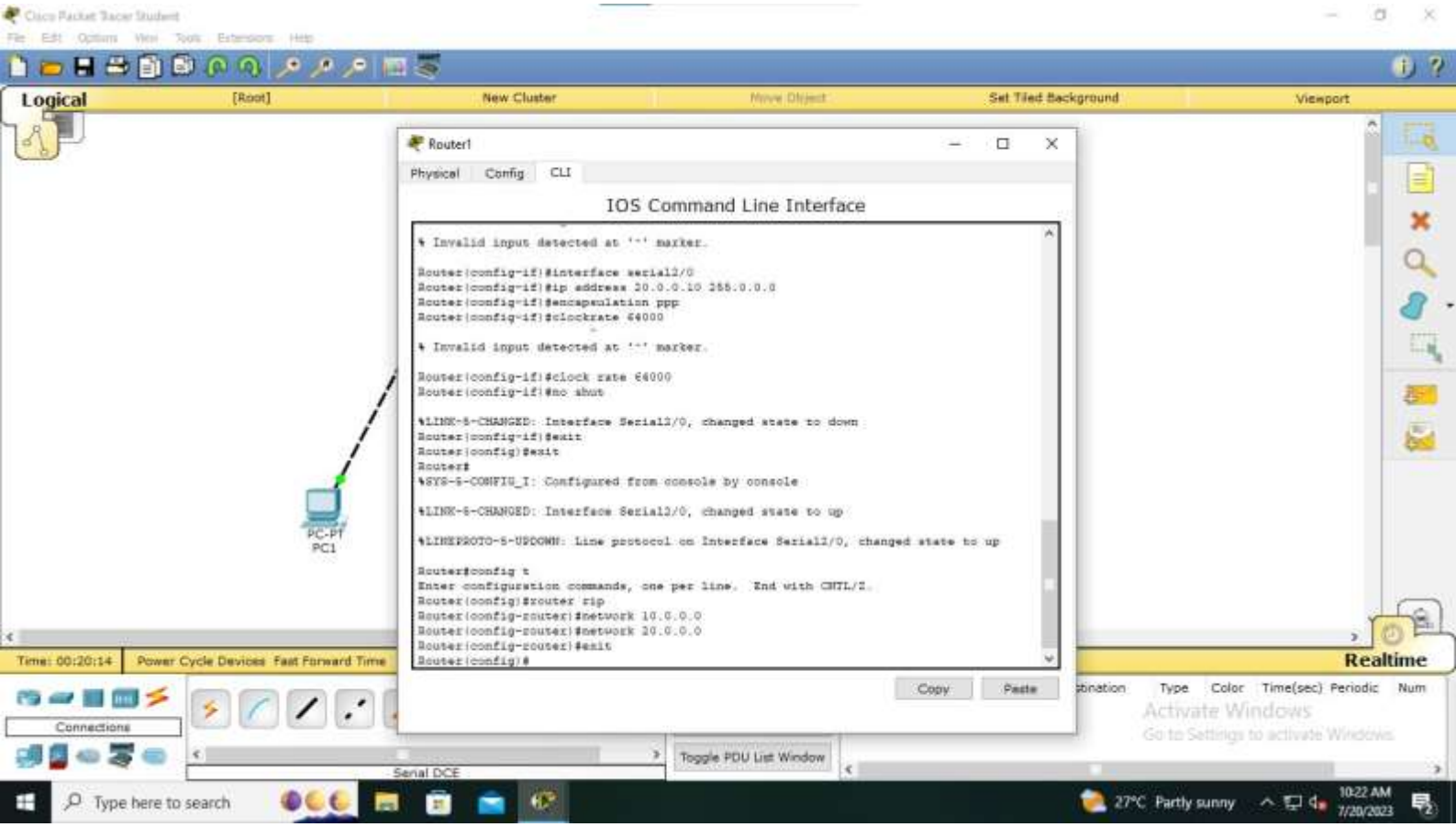
Type here to search

27° C Partly sunny A 7/20/2023

Cisco Packet Tracer Student

Edit Options Vie"' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport



Connections

Activate Windows

Go to Settings to activate Windows.

Toggle POLI List Window

serial DCE

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7/20/2023

Cisco Packet Tracer Student

Edit Options Vie"'' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

Router2

Physica Config CLI

IOS Command Line Interface

Pres s RETURN to get

Route z ab le

Enter Inn figuration one line _ End with INTL/ Z _
Router serials / O address 2
SS _ ppp

Route z) shut

Router state to up
exit
Route z
*LINEPROTO-S-UPDOWN: Line on state to up
Route z / O
address 10 2 SS pc-PT
fig —i f) shut
PCI

Router state to up

: Line on / O , s tate to

Re altime

ination Type Color Time sec) Periodic

Num

Windows.

1020 AM

Time: 00:19: 01 Power Cycle Devices Fast Forward TimeRoute z ig)

RouterO

Physica Config CLI

IOS Command Line Interface

-UPDOWN : Line on / O , state to up

input at '

Activate Windows

Go to Settings to activate

Connections

Toggle POLI List

Window serial DCE

Type here to search

27° C Partly sunny A 7/20/2023

cer Student

e"'' Tools Extensions

[Root] New Cluster Move Object Set Tiled Background Viewport

```
                                    Router    O address          10 2 SS _ ppp
                                              rate €40 00 fig —i f )
                                                     shut

                                                                                 state to
                                    Router    ) fig )
                                    Acute z by

                                                                          O,    state to up pc-PT
                                                          Line            on                          state to up
                              PCI

                                    Route z   f ig t
                                     Enter                          one     line   End with
                                    Route z    ig )        zip
                                    Route z             )
                                    Route z             )
                                    Route z             )
Time: 00:21 : 01 Power Cycle Devices Fast Forward TimeAcute z                                                                                ig )
                         Re altime
                                                                                                                  ination   Type Color   Time sec) Periodic
 Num
```

ns

Toggle POLI List Window serial DCE

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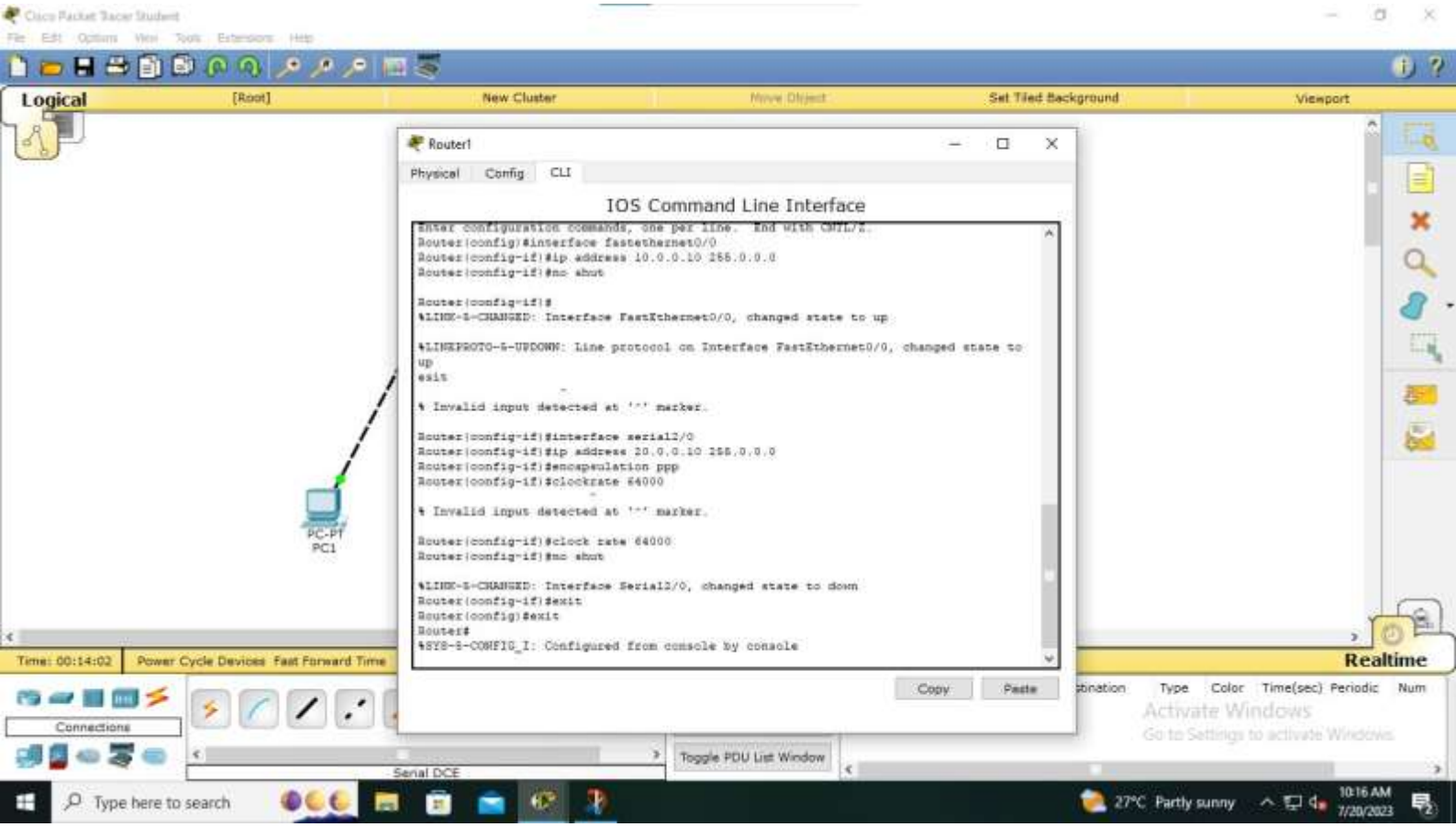
cer Student
e"' Tools Extensions

[Root] New Cluster Move Object Set Tiled Background Viewport



ions

Toggle POLI List Window serial DCE

Type here to search 27° C Partly sunny A 7/20/2023

Router I
Physical Config CLI

IOS Command Line Interface

*LINE : Line on / O , state to up

Route z f ig t

Enter Innfiguzaticn zip one line _ End with
Route z ig)
Router 10
Router
Route z)
Route z)
Route z by

show ip

C static, I IGRP, RIP, M - mbile, BGP
B
D EIGRP, EX. - EIGRP O - OSPF, IA — OSPF inter

OSPF NSSA type 1 , - OSPF NSSA type 2
OSPF type 1 , OSPF type 2, Z IS-IS, Ll - IS-IS level-I,
L2 — IS—IS — IS—IS default, U — per—user static o — ODR

— static

pc-PT of last is set
PCI

directly / O variably subnetted, 2
subnets, 2
is O is directly
O

cer Student
e"'' Tools Extensions

[Root] New Cluster Move Object Set Tiled Background Viewport

[120/1 | serial 2/0
[120/21 serial 2/0

Time: Power Cycle Devices Fast Forward TimeAcute z Re altime
ination Type Color Time sec) Periodic

Num

ions

Toggle POLI List Window serial DCE

Type here to search 27° C Partly sunny A 7/20/2023

Cisco Packet Tracer Student

Edit Options Vie"'' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

Router2

Physica Config CLI

IOS Command Line Interface

mput ete

Route z ab le
Enter Innfiguzaticn one line _ End with
Route z ig) zip
Router 80 _
Route z)

Route z))
Route z
Route z

show ip

by
C static, I IGRP, RIP, M - mbile, B BGP

D EIGRP, EX. - EIGRP O - OSPF, IA — OSPF inter

OSPF NSSA type 1 , - OSPF NSSA type 2
OSPF type 1 , OSPF type 2, Z IS-IS, Ll - IS-IS level-I,
L2 — IS—IS — IS—IS default, U — per—user static o — ODR

— static

pc-PT of last is set
PCI

Activate Windows

Connections

Go to Settings to activate Windows.

Toggle POLI List Window

serial DCE

1022 AM

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Cisco Packet Tracer Student

Edit Options Vie"'' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

[120/21 serial 8/0

[120/1 | seria18/0 a z ably s 2

8 0 _ _ / 8 is directly seria18/0 is

directly O

4 _ O _ O _ O / is directly O

Time: 00:23:13 Power Cycle Devices Fast Forward Time Acute z

Re altime

ination Color Time sec) Periodic

Num

RouterO ter

Route z Router

P Acuter

h Route z

y Acute z

s

i show ip Code s : C

c

a D

Config CLI

IOS Command Line Interface

E

one n line _ End with Z _ f ig) zip

Activate Windows

Connections

Go Settings to activate

Toggle POLI List Window

p Type here to search

Cisco Packet Tracer Student

Edit Options Vie"' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

2 EIGRP, EX. - EIGRP O - OSPF, IA - OSPF inter

0

_

8

0

_

)

f

i

g

)

b

y

IGRP, - RIP, Y — mbile, B — BGP

OSPF NSSA type 1 , N2 - OSPF NSSA type 2

OSPF type 1, 22 — OSPF type 2, Z IS-IS, LI - IS-IS level-I, L2 — IS—IS — IS—IS default,

U — per—user static o — ODR

— periodic static

of last is set

pc-PT

[120/1 | serial 2/0

PCI variably subnetted, 2 subnets, 2

20 _ O _ 0_0/8 is directly Seria12/O

is Serial 2/ O variably subnetted, 2 subnets, 2

80 _ O _ O _ 0/8 is directly Serials / O is directly

O

[120/1 | serial 8/0

Time: 00:22: 55 Power Cycle Devices Fast Forward Time Acute z Re altime

ination Type Color Time sec) Periodic Num

Activate Windows

Go to Settings to activate Windows.

Connections

Toggle POLI List Window

serial DCE

1022 AM

p Type here to search

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Cisco Packet Tracer Student

Edit Options Vie"' Tools Extensions

L ogical [Root] New Cluster Move Object Set Tiled Background Viewport

FaO/O ter cute z state to up

Line on state to up

Ente z f ion s one pe z line _ End with INTL/ Z _

Route z f ig) # ip ig)

Route z s

hut at ' by

Route z p input

Acute z c

show ip -

P Con

CT static, I - IGRP, - RIP, M - mbile, B - BGP

D EIGRP, EX. - O - OSPF, IA - OSPF inter area

OSPF NSSA type 1 , - OSPF NSSA type 2

OSPF type 1, 22 OSPF type 2, E -

IS-IS, LI - IS-IS level-I, L2 — IS—IS — IS—IS default, U — per—user static o — ODR

P — periodic static

Time: 00:21 : 55 Power Cycle Devices Fast Forward Time

of last is 20 _ O _ O _ 2 to O _ O _ O _ O

is directly cted , is directly cted ,

20.0 0 2

Acute z

Re altime

ination Type Color Time sec) Periodic Num

Automaticallv

Router2

to Windows.

Physica Config CLI

Chccse Ccnnectcn

IOS Command Line Interface

230c Partly sunny A @

13-07-2023

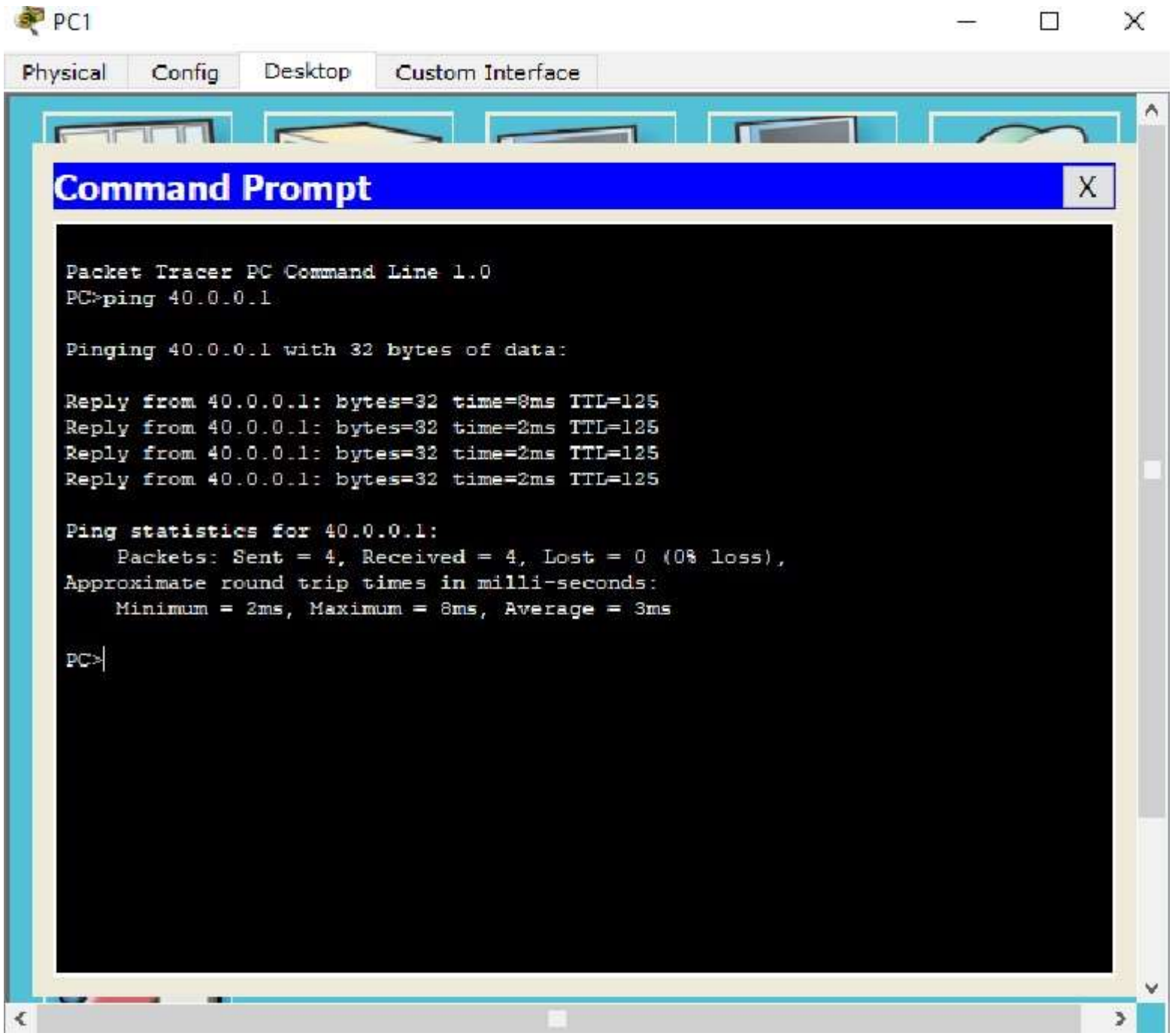
Activate Windows

Connections

Go Settings to activate

Toggle POLI List Window

p Type here to search


PC1
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=8ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 3ms
PC>

Physical Config Desktop Custom Interface

Command Prompt

Packets: Sent — 4 host unzeaehable .

PC >ping L O

O, Lost —

Pinging 10 _ O _ O _ I with 82 bytes of

*zam 40 . 0 . 0 .10 : Des

data :

Reply from De s tination
Reply from

*zam 40 . 0 . 0 .10 : Des tinazx.n

Ping s for LO

: Sent — 4. Received — PC>ping

Pinging 10 _ O _ O _ I with 82 bytes of

LEE — 4

data :

host unzeaehable . hos t unreach
able hos C eh able
2egue timed _

Reply from 10 _ O _ O _ I : bytes—a 2 time=Ems S from 10 _ O _ O _ I : 2 time—2ms T'TI—12 S a—ply from 10 _ O _ O _ I time—L2ms TTL—L2g

Ping statistic s for

Packets : Sent 4. = S, Lost

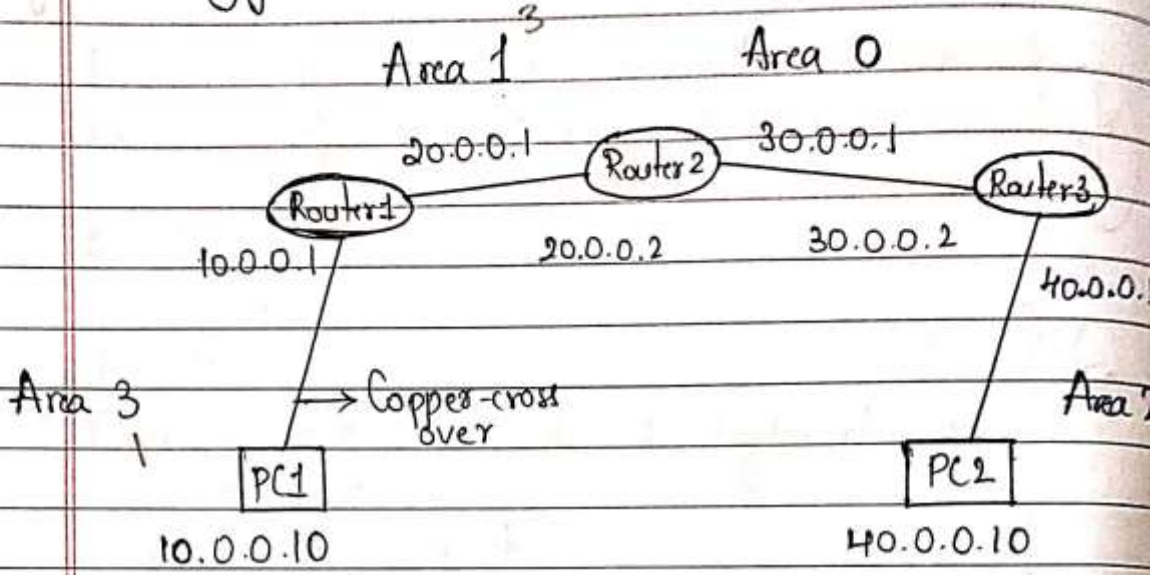
Approximate round trip times in milli— second s

Minimum 2ms, Maximum 12ms, Average éms

27/7/23

Aim - Configuring OSPF protocol for a system of 3 routers.

Topology -



Procedure -

1) Select the two PC's and three routers and join the 2 PC's to the two routers with copper-cross over wires
2) Join the 2 ~~PC's~~ routers to the third router with clocked copper wire.
3) Configure the PC's and gateways with IP's
4) Configure the routers as per the topology above with the IP addresses.
5) Encapsulation ppp and clock rate need to be set as done in rip protocol experiment.
6) Configuring each router with OSPF protocol.

For router 1 -

> enable
> config t

```
R1(config)# router ospf 1
R1(config-r)# router-id 1.1.1.1
R1(config-r)# network 10.0.0.0 0.255.255.255 area 3 1
R1(config-r)# network 20.0.0.0 0.255.255.255 area 1 3
R1(config-r)# exit
```

Router 0

```
> config t
R0(config)# router ospf 1
R0(config-r)# router-id 2.2.2.2
R0(config-r)# network 20.0.0.0 0.255.255.255 area 1 3
R0(config-r)# network 30.0.0.0 0.255.255.255 area 0
R0(config-r)# exit
```

Router 2

```
>config t
R2(config)# router ospf 1
R2(config-r)# router-id 3.3.3.3
R2(config-r)# network 30.0.0.0 0.255.255.255 area 0
R2(config-r)# network 40.0.0.0 0.255.255.255 area 2
R2(config-r)# exit
```

7. Configuring the interfaces

```
R1(config-if)# interface loopback 0
R1(config-if)# ip add 172.16.1.252 255.255.0.0
R1(config-if)# no shutdown
```

R2(config-if)# interface loopback 0
R2(config-if)# ip address 172.16.1.253 255.255.0.
R2(config-if)# no shutdown

R3(config-if)# interface loopback 0
R3(config-if)# ip address 172.16.1.254 255.255.0.
R3(config-if)# no shutdown

R3# show ip route

C 40.0.0.0/8 is directly connected
C 30.0.0.0/8 is directly connected, serial 3/0
30.0.0.1/32 is directly connected, serial 3/0
C 40.0.0.1/32 is directly connected.

8) In Router R1,
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2
In Router R2,
R2(config)# router ospf 1
R2(config-router)# area 1 virtual-link 1.1.1.1
R2(config-router)# exit

Now, a virtual link is established between area 3 and area 0.

9) show ip route must be configured in all routers.
for router 2

O IA 10.0.0.0/8 via 20.0.0.1, 00:00:01, Serial2/0
20.0.0.0/8 is vertically 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 30.0.0.8/32 is directly connected, Serial3/0
O IA 40.0.0.0/8 via 30.0.0.2, 00:06:40,
Serial3/0
C 172.16.0.0/16 is directly connected, Loopback

Result -

> ping 40.0.0.10

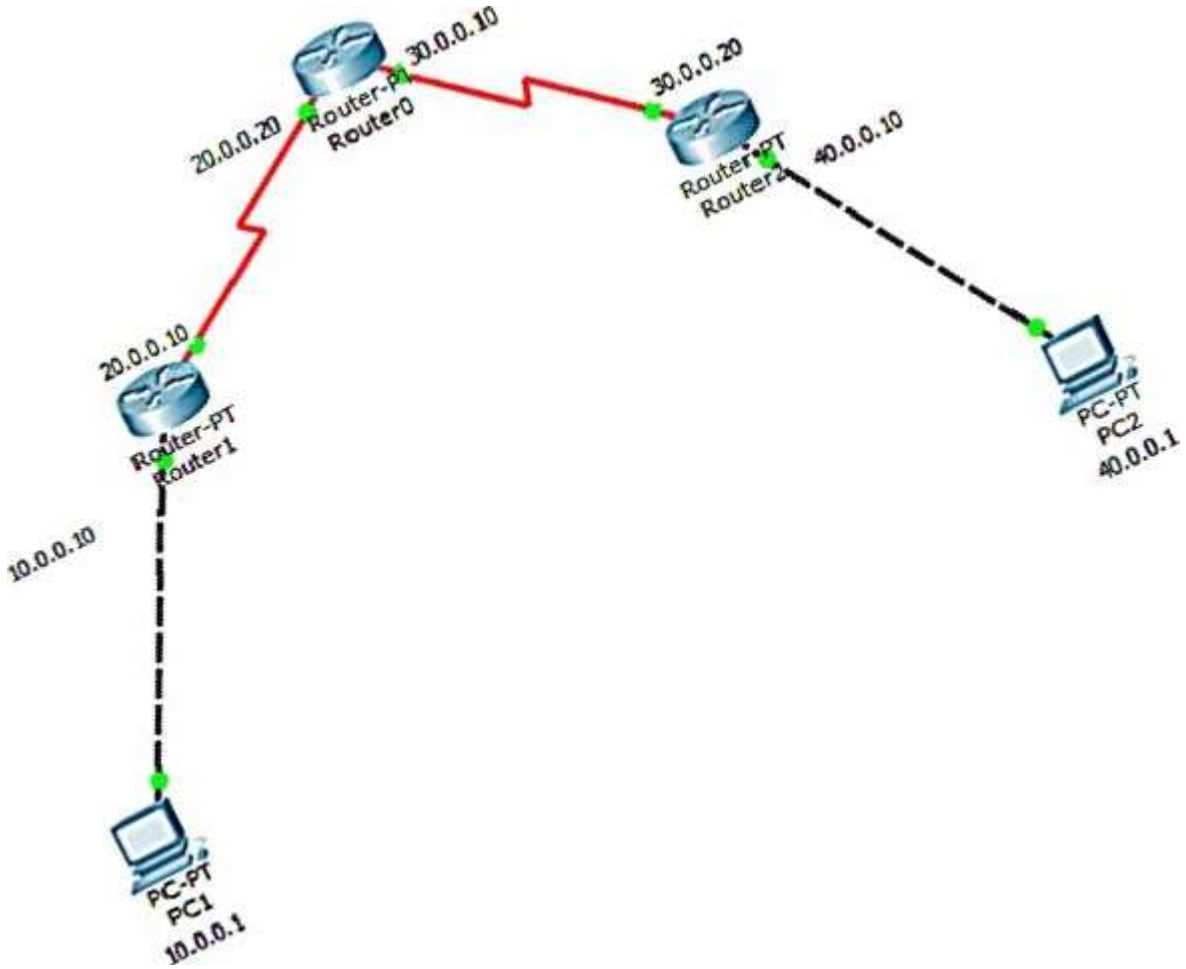
Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes=32 time=9 ms TTL=125
Reply from 40.0.0.10: bytes=32 time=9 ms TTL=125
Reply from 40.0.0.10: bytes=32 time=9 ms TTL=125
Reply from 40.0.0.10: bytes=32 time=9 ms TTL=125

Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 4, Lost = 0
Approximate round trip times in milliseconds:
Minimum = 2 ms, Maximum = 12 ms, Average = 8 ms

10/10

2/8/23



Router2 o x

Physica Config

CLI

TOSCommand LinInterfa

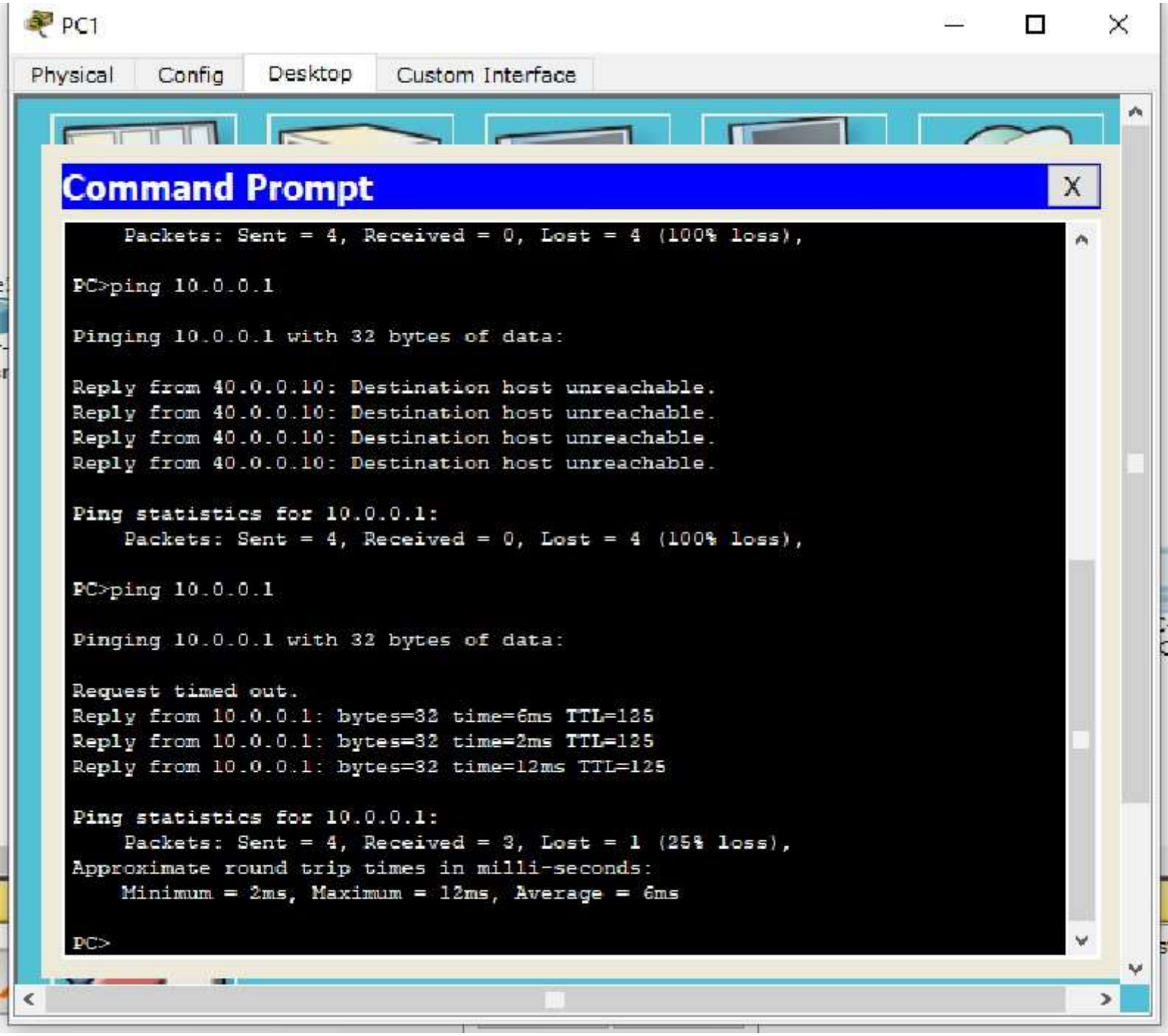
```
Router(config-router)#area 3 virtual-link 1.1.1.1
Router(config-router)#e
00:28:15: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on OSPF_VL0 from LOADING to FULL,
Loading Done
xit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

O IA 10.0.0.0/8 [110/65] via 20.0.0.1, 00:00:01, 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, 00:06:40, Serial3/0
C    172.16.0.0/16 is directly connected, Loopback0
Router#
```

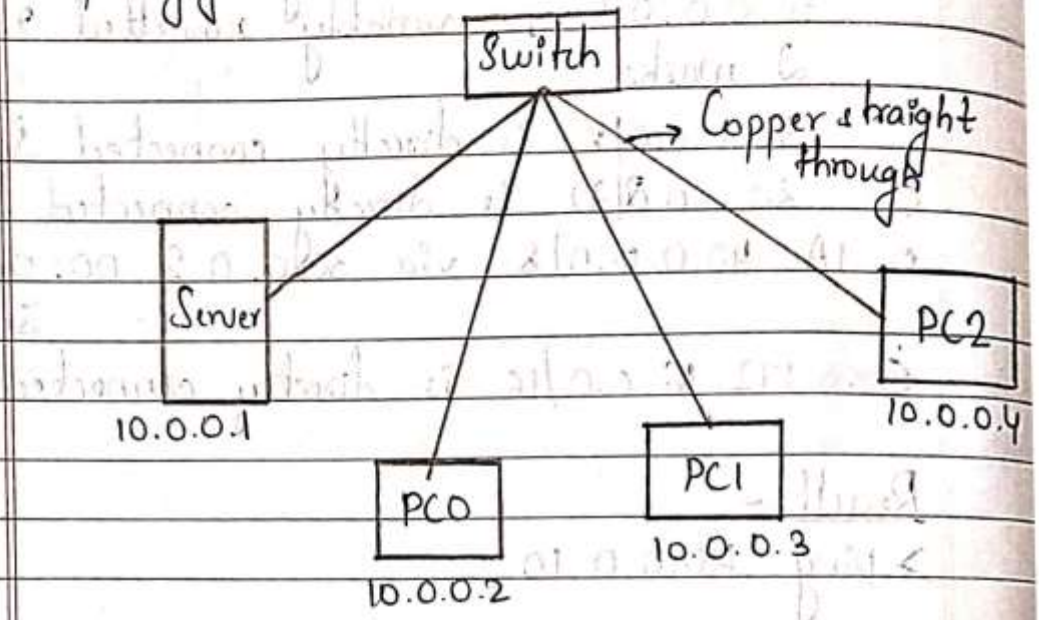
Copy Paste


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Reply from 40.0.0.10: Destination host unreachable.
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.1: bytes=32 time=6ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=12ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 12ms, Average = 6ms
PC>

3/8/23

Aim - To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)

Topology -



Procedure :

1) Select a switch, server and 3 PC's and connect them to the switch as shown in the topology above.
2) Connect them with copper-straight through wires.
3) Set the IP addresses of switch and PCs as shown.
4) Select the inspect tool from the tool bar and open the ARP tables of all the devices.
5) Then, ping the devices from the command prompt of other devices and click on capture in the simulation mode to know the packet routing.

6) With every ping, the arp tables of devices get filled with MAC addresses of the corresponding devices.

7) Even the switch learns about the MAC addresses of all devices during pinging process.

8) Once you have pinged all the devices, you can check the arp table of each device in command prompt of PCs.

> arp -a

Internet address	Physical address	Type
10.0.0.1	0060.47a4.a043	Dynamic
10.0.0.2	0060.47e5.1424	Dynamic
10.0.0.3	0005.5eal.0b46	Dynamic

9) In the switch → CLI, you can check the MAC addresses of the devices as follows.

switch> show mac address-table

MAC address table

VLAN	MAC address	Type	Ports
1	0005.5eal.0b46	DYNAMIC	Fa2/1
1	000c.8546.6aec	DYNAMIC	Fa3/1
1	0060.4764.a032	DYNAMIC	Fa0/1
1	0060.47e5.1424	DYNAMIC	Fa1/1

Observation -

ARP protocol is communication protocol used for discovering the link layer address, such as a MAC address. After pinging, every device learns about the MAC address of the pinged devices and the switch stores these

MAC address in the ARP table for future pinging. ARP learns about the MAC address by pinging all the devices and the right IP address responds with the acknowledgement

Edit &tensions Help

ARP fcr Server'

[Root] Set Tiled Mewport

IP Address Hardware Addrss Interfa

Event List

Time(sec) Last Device At Device Type Info

Opb«B

Lo ical Background ce

10.0.0.2 FastEth

0001 pco SwitchO
SwitchO ServerO
SwitchO PCI
SwitchO PC2
0.003 SwitchO
SwitchO pco
OD04
O DOA
0004

APP for PCO

Reset Simula bon

play Cont•ols
Back

IP Address server-PT ServerO

Fa0/1 10.0M

Faill

ARP for

IP Address Hardware Address

pco

PCI

Time: Power Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation

Last Status Destination Color Periodic Edit Delete

Toggle List Window

Automaticall Choose Connection

p Search

03-08-2023

Cisco Packet Tracer Student
Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root]

IP Address

Set Tiled Viewport

Hardware Address Interface bon Panel

Event List

Cyde

Interface

Hardware Address Interface

OOCO.47A4.A032 FastEthemetO

Auto Caph_re I Play I FwwMd

Event List Filters - Visible Events

ACL Filter, ARP, SCP, CDP, DHCP, DHCPvs, DNS, DTP, El(RPv6, FTP, H.323, HSRP, HSRPv6, ATP, HTrps, ICMP, ICMPvs, Ipsec, ISAk%P, LAO', W', "ETFLOW, tm, OSPF, OSPFv6, PA:P, POP3, RADIUS, RIP, RIP-ng, RIP, SCG', SMTP, stop, SSH, STP, SYSLOC, TACACS, TCP, TFTP, Telnet, LDP, VIP

Edit Filters

IP Addrss Hardware Address Interface

Source Type

ICMP 0

PCI ICMP

PCI :..tiQ

Constant Delay

0.004s Time(sec)

O Scena rio O

Connections Delete

PDU

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Background

10.0.0.2 D060A7E5.1424 FastEthernetO

10.o.ov3 DD05.5EA10846 FastEthernetO

10.0.0.4 DDOC.8i46.6AEC FastEthernetO

SwitchO ICMP

8.8-91 SwitchO ServerO ICMP ServerO SwitchO

ICMP

SwitchO ICMP

g.878 SwitchO STP

SwitchO ServerO STP

SwitchO

SwitchO

ARP Table for pco

IP Address Hardware Address Interface

10.0.0.1 DD60.47A4.AD32 FastEthernetO

*1/1 *371

10.0.03 DD05.5EA10846 FastEthernetO

10.0.0.4 DDOC.8i46.6AEC FastEthernetO

SwitchO

Rese t Simula ton Constant Delay Captured to : g.87g s

server-PT

Serve ro

ARP Table for PCI

IP Address Hardware Address Interface

10.0.0.1 DD60.47A4.AD32 Fast EthernetO

10.0.0.2 DD60.47E5.1424 FastEthernetO

PC2 10.0.0.4 DDOC.8i46.6AEC FastEthernetO

Pla y Con trols

Auto Capture / Play Capture / Forward

pco

PCI

ARP Table for PC2

IP Address Hardware Address Interface

10.0.0.1 DD60A7A4.AD32 Fast EthernetO

10.0.0.2 DD60.47E5.1424 FastEthernetO

10.o.ov3 DD05.5EA10846 FastEthernetO

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

00:03:34.674

Connections

24•c

Partly sunny

10:25

Sac kg rou nd

O.ODO ICMP •

ARP Table for pco

IP Address pco

*1/1 *371 PhysicalConfigDesktopCustom I nterface

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward

Event List

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

ENG p

Cisco Packet Tracer Student

Edit Optons Tools Extensions Help

ARP Table for ServerO

Logical Root]

IP Address

Set Tiled Viewport

Hardware Address Interface bon Panel

Event List

Captured to

Rese t Simula ton Constant Delay :

0.000 s

Command Prompt x

PC C.nd Line 1 _

O pc>ping server-PT Serve ro

Pinging 10 _ O _ O _ 1 with 32 bytes of data :

pc-PT

PC2

pco

pc-PT

PCI

Pla y Con trols

Auto Capture / PlayCapture / Forward

ARP Table for PC2

IP Address Hardware Address

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

00:03:24.795

Connections

10:11

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward

Event ListSimulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

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Cisco Packet Tracer Student

Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root]

Set Tiled Viewport

IP Address

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Event List

Time(sec) Last Device At Device Type Info

Background

10.0.0.2 D060A7E5.1424 FastEthernetO

10.o.ov3 DD05.5EA10846 FastEthernetO

10.0.0.4 DDOC.8i46.6AEC FastEthernetO

SwitchO ICMP

8.8-91 SwitchO ServerO

ICMP ServerO SwitchO

ICMP

SwitchO ICMP

g.878 SwitchO STP

ARP Table for pco

SwitchO ServerO STP

IP Address

SwitchO

SwitchO

10.0.0.1

*1/1 *371 Physical Config Desktop Custom I nterface

SwitchO

10.0.03

10.0.0.4

Rese t Simula ton Constant Delay

Captured to : g.87g s

Command Prompt

x

PC C.nd Line 1 _ O

PC >ping 10 _ 0 0 1

server-PT Serve ro

Pinging 10 _ O _ O _ 1 with 32 bytes of data :

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward Event List

Simulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

ENG p Search

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Cisco Packet Tracer Student

Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root] Set Tiled Viewport

IP Address

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Event List

Time(sec) Last Device At Device Type Info

Repl y 10.0 8 T-TIF128

Rep y 10.0 bytes = 32 TTL—128

Pla y Con trols

Forward

Auto Capture / Play Capture /

Rep y 10.0 bytes = 32 4 TTL—128

Repl y 10.0 bytes = 32

PC2

pco

Ping

Sent = 4, = 4, Inst = O loss) ,

PCI Appz.te trip tiæs in

PC nzp

ARP Table for PC2

IP Address Hardware Address OOOS _ _ 0b4E

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP,

10.0.0.1 DD60A7A4.AD32

10.0.0.2 DD60.47E5.1424

10.o.ov3 DD05.5EA10846

ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward Event List

Simulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

ENG p Search

03-08-2023

Cisco Packet Tracer Student
Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root] Set Tiled Viewport

IP Address

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Panel

Event List

Time(sec) Last Device At Device Type Info

00:03:34.674

Connections

24•c
Partly sunny

10:26

Background

IP Address	Hardware Address	Interface
10.0.0.2	D060A7E5.1424	FastEthernetO
10.o.ov3	DD05.5EA10846	FastEthernetO
10.0.0.4	DDOC.8i46.6AEC	FastEthernetO

SwitchO ICMP
8.8-91 SwitchO ServerO ICMP ServerO SwitchO
ICMP
SwitchO ICMP
g.878 SwitchO STP
SwitchO ServerO STP
SwitchO
SwitchO
SwitchO

ARP Table for pco

IP Address pco

10.0.0.1
10.0.03

*1/1 *371

Physical Config Desktop Custom I nterface

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward

Event List

Simulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

ENG p Search

03-08-2023

Cisco Packet Tracer Student

Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root]

Set Tiled Viewport

IP Address

Hardw
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Inter
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Panel

Event List

Time(sec) Last Device At Device Type Info

10.0.0.4

Reset Simula ton Constant Delay Captured to :
g.87g s

Command Prompt x

Ping statistics

Pa c kets : Sent = 4, Inst = O loss) ,

Appz.te trip in server-PT = Average =

Serve ro

PC >ping 10 _ 0 0 4

Pla y Con trols Pinging

10 _ O _ O _ 4 with 32 bytes of data :

Auto Capture / Play Capture / Forward

Repl y 10.0 bytes = 32 T-TIF128

PC2 Rep y 10.0 bytes = 32 4

TTL—128 pco Rep y 10.0 b 32 TTL—

128

Repl y 10.0 4 T-TIF128

PCI Ping

Pa c kets : 4, = 4, Inst = O loss) , EOI_md trip in

ARP Table for PC2

PC

IP Address Hardware Address I C.nd

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323,
HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW,
NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP,

10.0.0.1 DD60A7A4.AD32 PC nzp

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward Event List

Simulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

ENG p Search

03-08-2023

Cisco Packet Tracer Student
Edit Options Vie'" Tools Extensions Help

ARP Table for ServerO

Logical Root]

Set Tiled Viewport

IP Address

Hardware Address

Interface bon Panel

Event List

Time(sec) Last Device At Device Type Info

10.0.0.2 DD60.47E5.1424

ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

10.0

10. o.ov3 DD05.5EA10846 10.0 OOOS _ _ 0b4€ Edit Filters Shon All None

10.0 oooc_

00:03:34.674

Connections

24•c
Partly sunny

10:24

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward

Event List

Simulation

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle PDIJ List Window

Automaticallv Choose Connection Tv

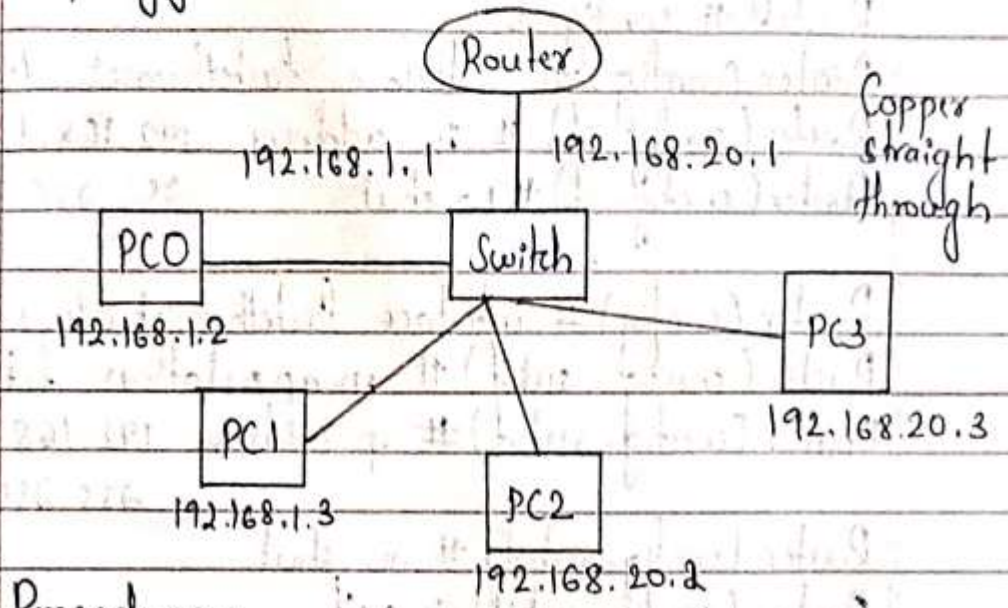
ENG p Search

03-08-2023

3/8/23

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 - fastethernet 4/1). (nearest to the switch from router) and make it trunk.
6) Look into fastethernet 2/1 & 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
Router (config-if) # no shut 255.255.255.0

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

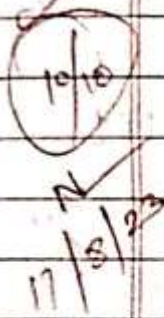
Reply from 192.168.20.3 : bytes=32 time=1 ms TTL=128
Reply from 192.168.20.3 : bytes=32 time=1 ms TTL=128
Reply from 192.168.20.3 : bytes=32 time=0 ms TTL=128
Reply from 192.168.20.3 : bytes=32 time=0 ms TTL=128

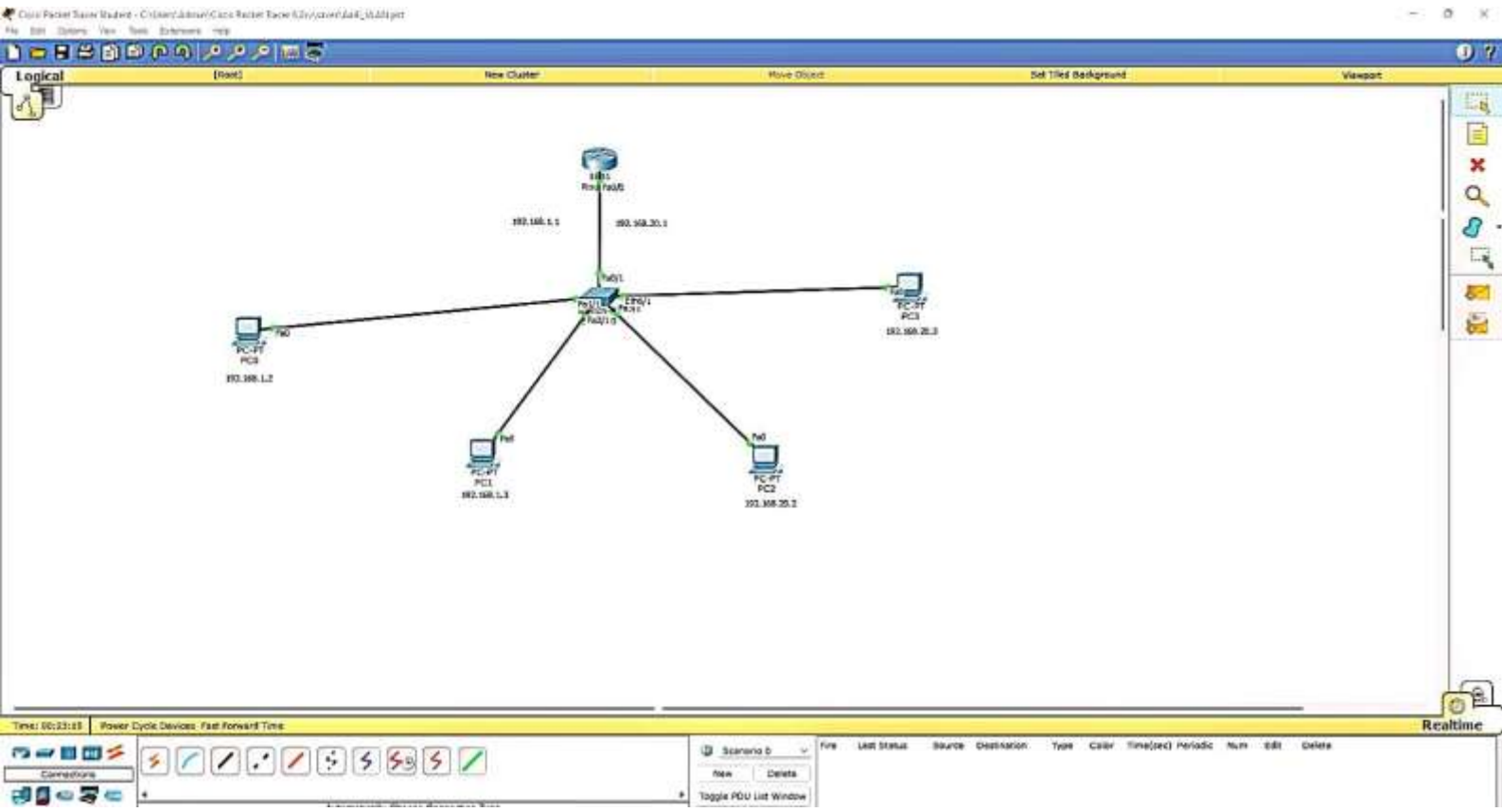
Ping statistics for 192.168.20.3
Packets : Sent = 4, Received = 4, Lost = 0
Approximate round trip time in milliseconds
Minimum = 0 ms, Maximum = 1 ms, Average = 0 ms

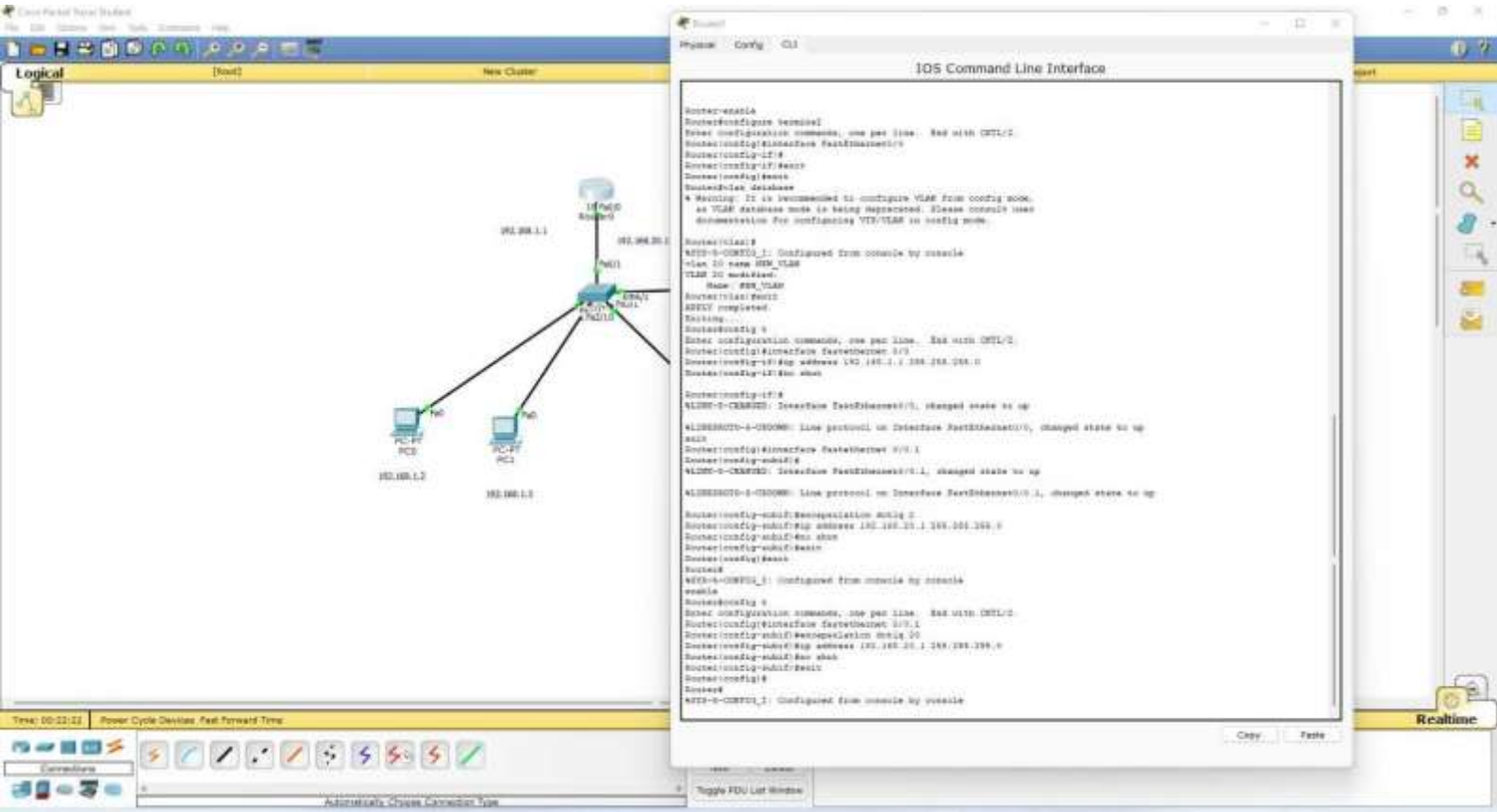
Observation:-

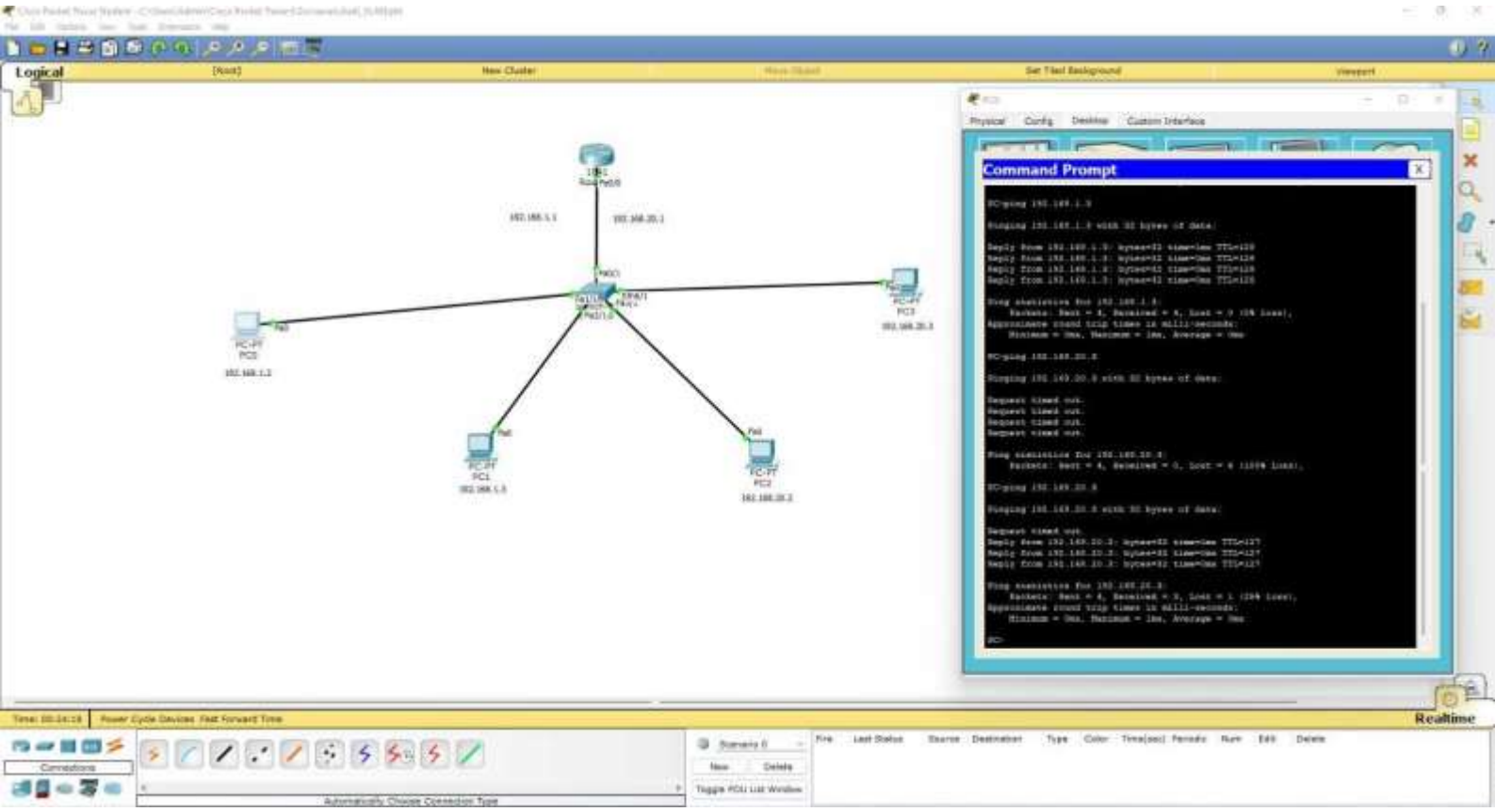
1) VLAN - Virtual local area network is any broadcast domain that is partitioned and isolated in a completed network at the data link layer.

2) It is a virtualized connection that converts multiple devices and network nodes from different LANs into one local logical network




Logical
192.168.1.1
192.168.30.1
PC-PT
PC0
192.168.1.2
PC-PT
PC3
192.168.20.3
PC-PT
PC1
192.168.1.3
PC-PT
PC2
192.168.20.2
Realtime

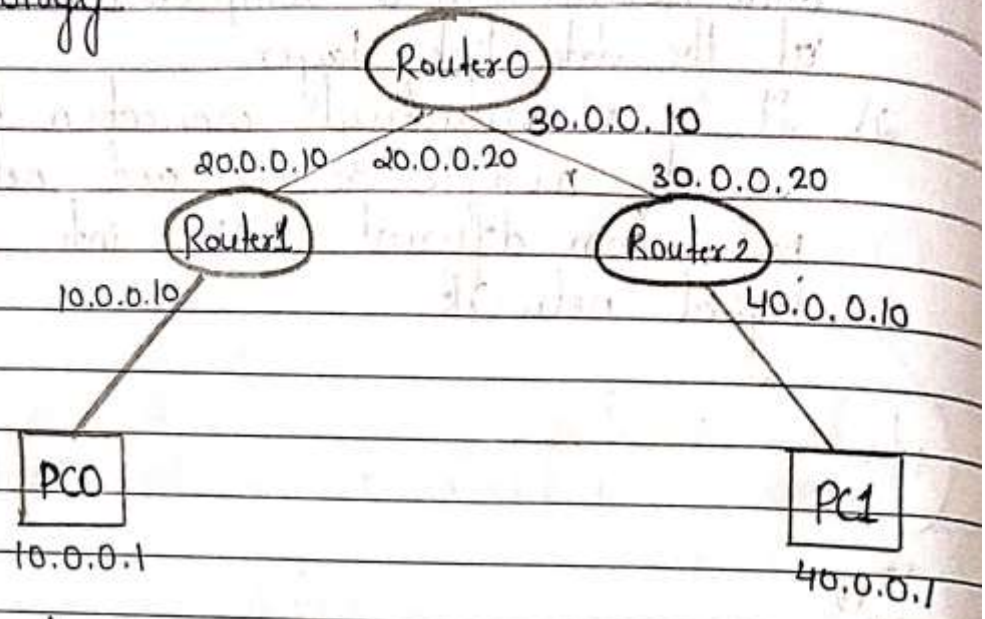

Logical
[Root]
New Cluster
IOS Command Line Interface
Physical
Config
CLI
Copy
Paste
Realtime


Logical
Command Prompt
PC0
PC1
PC2
PC3

10/8/23

Aim - To demonstrate the 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
#config t
#interface fastethernet 0/0
#ip address 10.0.0.10 255.0.0.0
#no shut
#exit
#ip route 30.0.0.0 255.0.0.0 20.0.0.20
#ip route 40.0.0.0 255.0.0.0 20.0.0.20
#exit

For router 1

```
>enable
#config t
#interface serial 2/0
#ip address 20.0.0.20 255.0.0.0
#no shut
#exit
#interface serial 3/0
#ip address 30.0.0.10 255.0.0.0
#no shut
#exit
#ip route 10.0.0.0 255.0.0.0 20.0.0.10
#ip route 40.0.0.0 255.0.0.0 30.0.0.20
#exit
```

For router 2

```
>enable
#config t
#interface serial 2/0
#ip address 30.0.0.20 255.0.0.0
#no shut
#exit
#interface fastethernet 0/0
#ip address 40.0.0.10 255.0.0.0
#no shut
#exit
#ip route 10.0.0.0 255.0.0.0 30.0.0.10
#ip route 20.0.0.0 255.0.0.0 30.0.0.10
```

4) Select simulation mode, select simple PDU and select source & dustination 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 the TTL.

Result -

PDU information at PC0

Outbound PDU details:

TTL = 255

PDU information at Router 0

Inbound PDU details:

TTL = 255

Outbound PDU details:

TTL = 254

PDU information at Router 1

Inbound PDU details:

TTL = 254

Outbound PDU details:

TTL = 253

PDU information at Router 2

Inbound PDU details:

TTL = 253

Outbound PDU details:

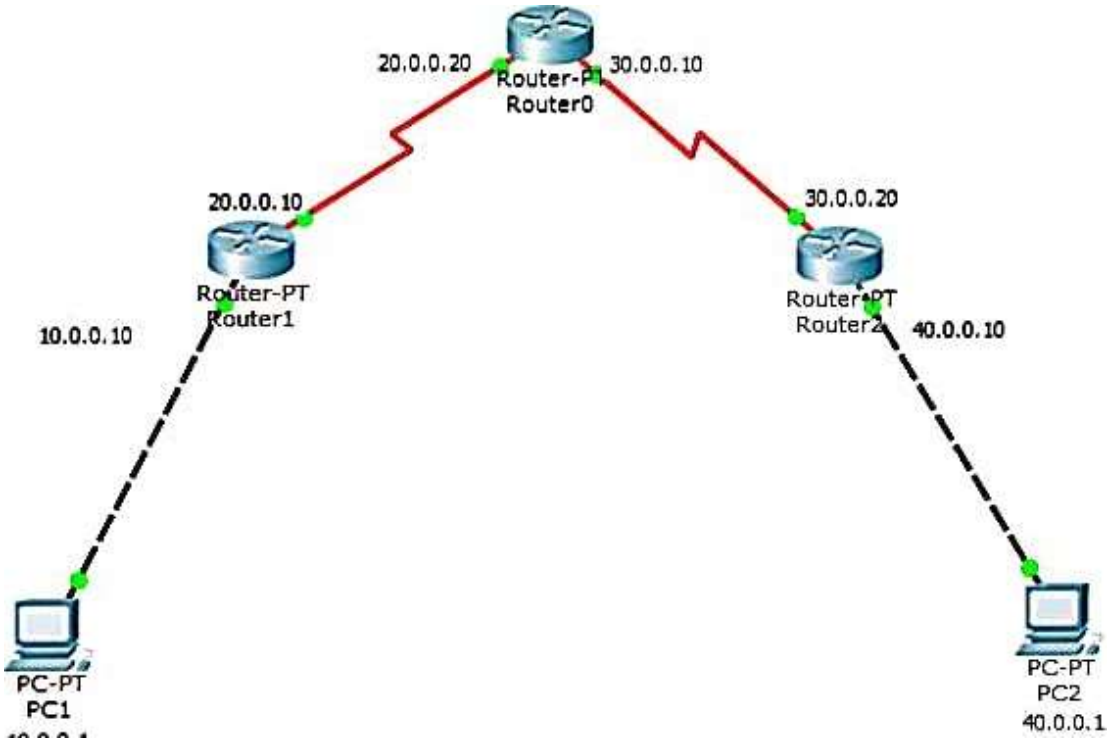
TTL = 252

19/10

17/8/23

Observation -

The TTL is reduced by 1 in every router. TTL is a mechanism which limits the number of hops between source and destination.



10.0.0 , 1

File View Extenäms

8

Cisco Packet 'racer Student
Edit Tools

(Root) New Cluster Move Object Set Tiled

List
Time(sec) Lest Device At Device

Lo ical Background VI ewport

Simula
Event
Vis. Type Info
0.001 pco RouterO
o C02 RO uterO Router I ICMP
pco ICMP
RouterO ICMP
0.0B Ro uterl Router2 ICMP
0004 RouterO Routerl ICMP ocu
Router2 ICMP 0
0005 Routerl Router2 ICMP uter- PCI
0.005

Router2 iCMP
Router I
Capured
Reset Simulation CmstmtDelay to: *
0.0055

Rout ter.pT
Router
uterO

Play
Auto CapWre I Play I FMvvar d
pc-PT

Event LSt Rtas - Vtsble EvenÉ
ACL alter, ARP, 8GP, ax', ma', CHCP.'6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323,
HSRP, HSRPv6, HTTP, Hrrps, lap, la.mr6, Ipsec, ISAKMP, LAC", r,DP,
NIP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, stop, ssH,
STP, sysLOG, TACACS, TCP, TFTP, T&-et, VIP
Edit Filters AID-WE

Simulation

Status Source Edit
Progress PCI ICMP ('dif)

Delete 0 prog ress PCI I CM
POU

Time: Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List

Fire Last Destination Color Time(sec) Periodic Num Delete
In 0.000 (delete) Connections In pco p
0.002 (edit) (delete)

Toggle List Window
Automaticall Choose Connection

EN

G p Search partlv sunnV

Cisco Packet Tracer Student

Edit Optons Tools Extensions Help

Logical Root] New Cluster Move Object Set Tiled Sac kg rou nd Viewport

bon Panel

Event List

Time(sec) Last Device At Device Type Info ICMP

26 •c 10-08-2023 o

ile Viewv

RouterO ICMP

RouterO RouterI ICMP

ICMP

RouterO

ICMP o D03 Route rl

Router2 ICMP

POLI Information at Device: Router2

OSI Model Inbound POLI Details Outbound POLI Details

Reset Simulation Constant Delay Captured to :

PDIJ

0.003s

82+x 48+x SE

FLG: ADR: CONTROL: DATA: FLG:

0111 ox8f LENGTH) 0111 1110 1110

outerO

Pla y Con trols

19 81 Bit s

DSCP: Oxo

Auto Capture / Play Capture / Forward

oxlg Oxo

TTL: 253 pRO: OXI CHKSUM

sac IP 10.0.0

DST 40

OPT: Oxo pc-PT pco

DATA (VARIABLE LENGTH)

Event List Filters - Visible Events

81 Bit s

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

TYPE: 018 CODE: Oxo CHECKSUM

SEQ NUMBER: 17

Edit Filters Shon All None

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward Event List Simulation

Fire Last Sou rce Destination Color Time(sec) periodic Num Edit Delete

Scenario o

In ICM p 0.000 (edit) (delete)

Connections In pco PCI 0.002 (edit) (delete)

Toggle PDIJ List Window

Automaticall Choose Connection

26 ENG 10:43 p Search 10-08Partly sunny

Cisco Packet 'racer Student

Edit Tools

(Root) New Cluster Move Object Set Tiled

List

Time(sec) Lest Device At Device

Status
Progress
Pmgress

Time: Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List

Fire Last Destination Color Time(sec) Periodic Num Delete

In 0.000 (delete) Connections In pco p

0.002 (edit) (delete)

Toggle List Window

Automaticall Choose Connection

EN

G p Search partlv sunnV

Cisco Packet Tracer Student

Edit Options Vie"' Tools Extensions Help

Logical Root] New Cluster Move Object Set Tiled Sac kg rou nd Viewport

bon Panel

Event List

Time(sec) Last Device At Device Type Info ICMP

RouterO ICMP

ICMP

ICMP

ICMP

ICMP

ICMP

ICMP •

Captured to : 0.004s

Capture / Forward

RouterO Routerl

Router O Routerl Router2

RouterO Routerl

PDU Information at Device: PCI

o DOA Router2

OSI Model Inbound POLI Details Outbound POLI Details

PDIJ Rese t Simula ton Constant Delay

Ethernet II

19

PREAMBLE: DEST MAC: sac MAC:

Time: Power Cycle Devices PLAY CONTROLS: Sack Auto Capture / Play Capture / Forward Event List Simulation

Fire Last Sou rce Destination Color Time(sec) periodic Num Edit Delete

Scenario

o

In ICM p 0.000 (edit) (delete)

Connections In pco PCI 0.002 (edit) (delete)

Toggle PDIJ List Window

Automaticall Choose Connection

26 ENG p Search 10-08Partly sunny

Set Tiled Sac kg rou nd Viewport

bon Panel

Event List

Time(sec) Last Device At Device Type Info ICMP

101010...1011 0030.F23D.8g21 oooc.8587.g7Aa

outerO

TYPE: DATA (VARIABLE LENGTH)

01800

Pla y Con trols

Auto Capture / Play

IE 19 81 Bit s

DSCP: Oxo

ID: oxIg Oxo Oxo

TTL: 252 PRO Oxl CHKSUM

pc-PT sac 10.0.0.1 pco

DST 40.0.0.1

OPT: Oxo

DATA(VARIABLELENGTH)

TYPE: 018 CODE: Oxo CHECKSUM

SEQ NU MBE R: 17

Status

Progress

Pmgress

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

8

1

0001 RouterO ICMP

PDU Information at Device: RouterO

OSI Model Inbound POLI Details Outbound POLI Details

PDIJ Reset Simulation Constant Delay :

Captured to

0.001s

82+x 48+x SE

FLG: ADR: CONTROL: DATA: FLG:

0111 ox8f LENGTH) 0111 1110 1110

outerO

Pla y Con trols

19 81 Bit s

DSCP: Oxo

Auto Capture / Play Capture / Forward

oxIg Oxo

pRO: OXI CHKSUM

sac IP 10.0.0

DST 40

Event List Simulation

e Last Sou rce Destination Color Time(sec) periodic Num Edit Delete

Scenario o

ICM p 0.000 (edit) (delete)

pco PCI 0.002 (edit) (delete)

Toggle PDIJ List Window

Viewport

Event List

Device At Device Type Info ICMP

OPT: Oxo pc-PT pco

DATA (VARIABLE LENGTH)

81 Bit s

TYPE: 018 CODE: Oxo CHECKSUM

SEQ NUMBER: 17

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW, NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

00:06:16.433

Status
In Progress
Successful

RouterO ICMP

O. D02 RouterO Routerl
ICMP • o DD2 ICMP •

VDU Information at Device: Routerl

OSI Model Inbound POLI Details Outbound POLI Details

Captured to :

Reset Simulation Constant Delay 0.002s

POLI Formats

82+x 48+x SE

FLG: ADR: CONTROL: DATA: FLG:
0111 ox8f LENGTH) 0111 1110 1110 outerO

Pla y Con trols

IE 19 81 Bit s

Auto Capture / Play Capture / Forward

DSCP: Oxo

Event List Simulation

m Edit Delete

Scenario o

(edit) (delete)

(edit) (delete)

Toggle PDIJ List Window

Viewport

Event List

Device At Device Type Info ICMP

ID: oxIg Oxo Oxo

TTL: 253 pRO: OXI CHKSUM

sac 10.0.0.1

DST 19: 40.0.0.1

OPT: Oxo pco

DATA (VARIABLE LENGTH)

81 Bit s

TYPE: 018 CODE: Oxo CHECKSUM

SEQ NUMBER: 17

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW,

NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

Edit Filters Shon All None

00:06:16.434

Status

In Progress

In Pmgress

RouterO ICMP

RouterO RouterI ICMP

ICMP

RouterO

ICMP o D03 Route rl

Router2 ICMP

PDU Information at Device: Router2

OSI Model Inbound POLI Details Outbound POLI Details

Captured to :

PDIJ Reset Simulation Constant Delay

0.003s

19

PREAMBLE: DEST MAC: sac MAC:

101010...1011 0030.F23D.8921 oooc.8587.97Aa

Event List Simulation

m Edit Delete

Scenario o

(edit) (delete)

(edit) (delete)

Toggle PDIJ List Window

Viewport

Event List

Device At Device Type Info ICMP

TYPE: DATA (VARIABLE LENGTH)

outerO 01800

Pla y Con trols

Auto Capture / Play Capture / Forward

19 81 Bit s

DSCP: Oxo

oxlg Oxo

TTL: 252 pRO: OXI CHKSUM

sac 19: 10.0 0 1

pc-PT DST 40.0 0 1 pco OPT: Oxo

DATA (VARIABLE LENGTH)

Event List Filters - Visible Events

ACL Filter, ARP, SCP, cop, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTrp, HTrps, ICMP, ICMPv6, Ipsec, ISAWP, LACP, NDP, NETFLOW,

81 Bit s

NTP, OSPF, ospFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, sccp, SMTP, SNMP, ssH, STP, sysLOG, TACACS, TCP, TFTP, Telnet, UDP,

TYPE: 018 CODE: Oxo CHECKSUM

SEQ NUMBER: 17

Edit Filters Shon All None

Status

In Progress

In Pmgress

Event List Simulation

m Edit Delete

Scenario o

(edit) (delete)

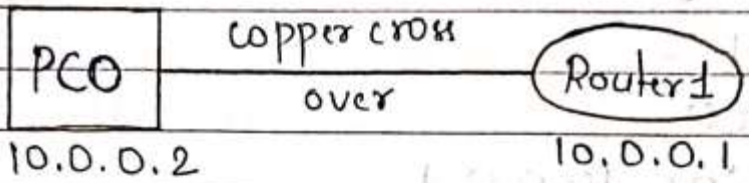
(edit) (delete)

Toggle PDIJ List Window

10/8/23

Aim - To understand the operation of TELNET by accessing the router in server room, from a PC in IT office.

Topology -



Procedure -

1) Configure topology as above. Use copper cross over wire to connect both. Configure IP address and gateway and the router generally.

2) In Router CLI

```
Router > enable
Router # config t
Router (config) # hostname r1
r1 (config) # enable secret p1
r1 (config) # interface fastethernet 0/0
r1 (config) # 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
% login disabled on line 132, until 'password' is set
% login disabled on line 133, until 'password' is set
% login disabled on line 134, until 'password' is set
% login disabled on line 135, until 'password' is set
% login disabled on line 136, until 'password' is set
```

1. login disabled on line 137, until 'password' is set

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 : byte=32 time=21 ms TTL=25
Reply from 10.0.0.1 : byte=32 time=13 ms TTL=25
Reply from 10.0.0.1 : bytes=32 time=6 ms TTL=25
Reply from 10.0.0.1 : bytes=32 time=0 ms TTL=25

Ping statistics from 10.0.0.1:
Packets: Sent=4, Received = 4, Lost = 0
Approximate roundtrip time in milliseconds:
Minimum = 6 ms, Maximum = 21 ms, Average=12 ms

Observation:
1) Wireless local area network VLAN in a group of allocated computers or other devices that form a network based on radio transmission rather than wired connections.
2) After the WLAN is setup, the linked connection appears in the topology from the access point

PC> telnet 10.0.0.1
Trying 10.0.0.1 ... open
User access verification
Password: (Typed P0)
r1 > enable
Password: (Typed P1)
r1# show ip route
Code:
gateway of last resort is not set
C 10.0.0.0/8 is directly connected, fastethernet 0/0
r1#

Observation -

1) TELNET is used by terminal emulation programs that allow you to log into a remote host.
2) We logged into 10.0.0.1 IP device through 10.0.0.2 IP device.
3) The password typed is not visible.

10/10

17/8/23

PC0

Physical | Config | Desktop | Custom Interface

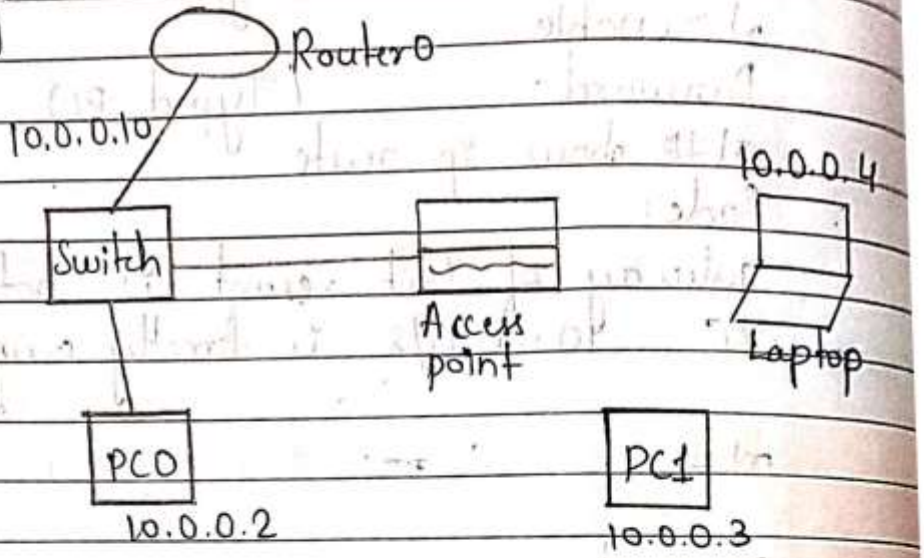
Command Prompt

```
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 = 1ms, Average = 0ms

PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open


User Access Verification

Password:
r1>enable
Password:
r1#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
r1#
```

10/8/23

Aim: To construct a WLAN and make the nodes communicate wirelessly.

Topology:



Procedure -

1) Construct the above topology. Use access point connect it to router. Set the IP address of the PC connected with wire and configure router 1.

2) Configure access-point1 → port1 → SSID name → WLAN
Select WEP and give any 10 digit key (here 1234567890)

3) To configure PC0 and laptop wirelessly, switch off the device. Drag the existing PT-HOST-NM-1AM to the component listed in the LHS. Drag WMP300N wirelessly interface to the empty port and switch on the device.

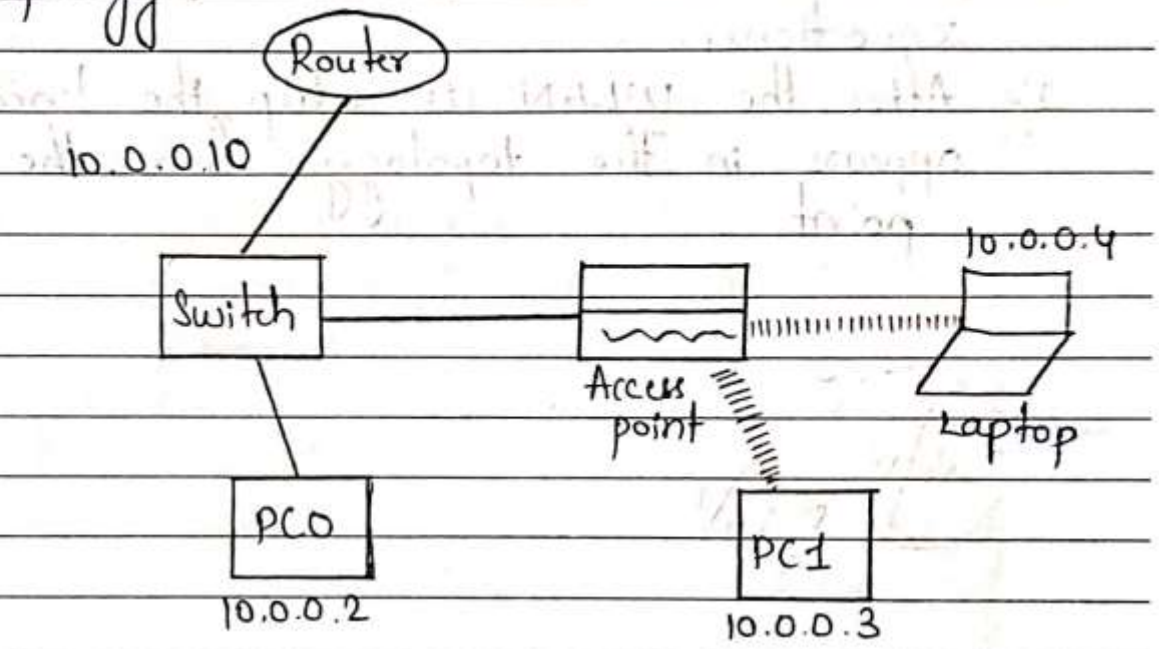
4) Now, in the config tab, a new wireless interface would have been added. Configure SSID, WEP, WEP key, IP address &

gateway to the device.

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

Result -

Topology -



Result - in PC0

PC > ping 10.0.0.3

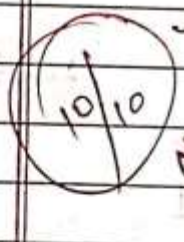
Pinging 10.0.0.3 with 32 bytes of data:

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

Ping statistics for 10.0.0.3
Packets: Sent = 4, Received = 4, Lost = 0
Approximate roundtrip time in milliseconds
Minimum = 6 ms, Maximum = 21 ms, Average = 12 ms

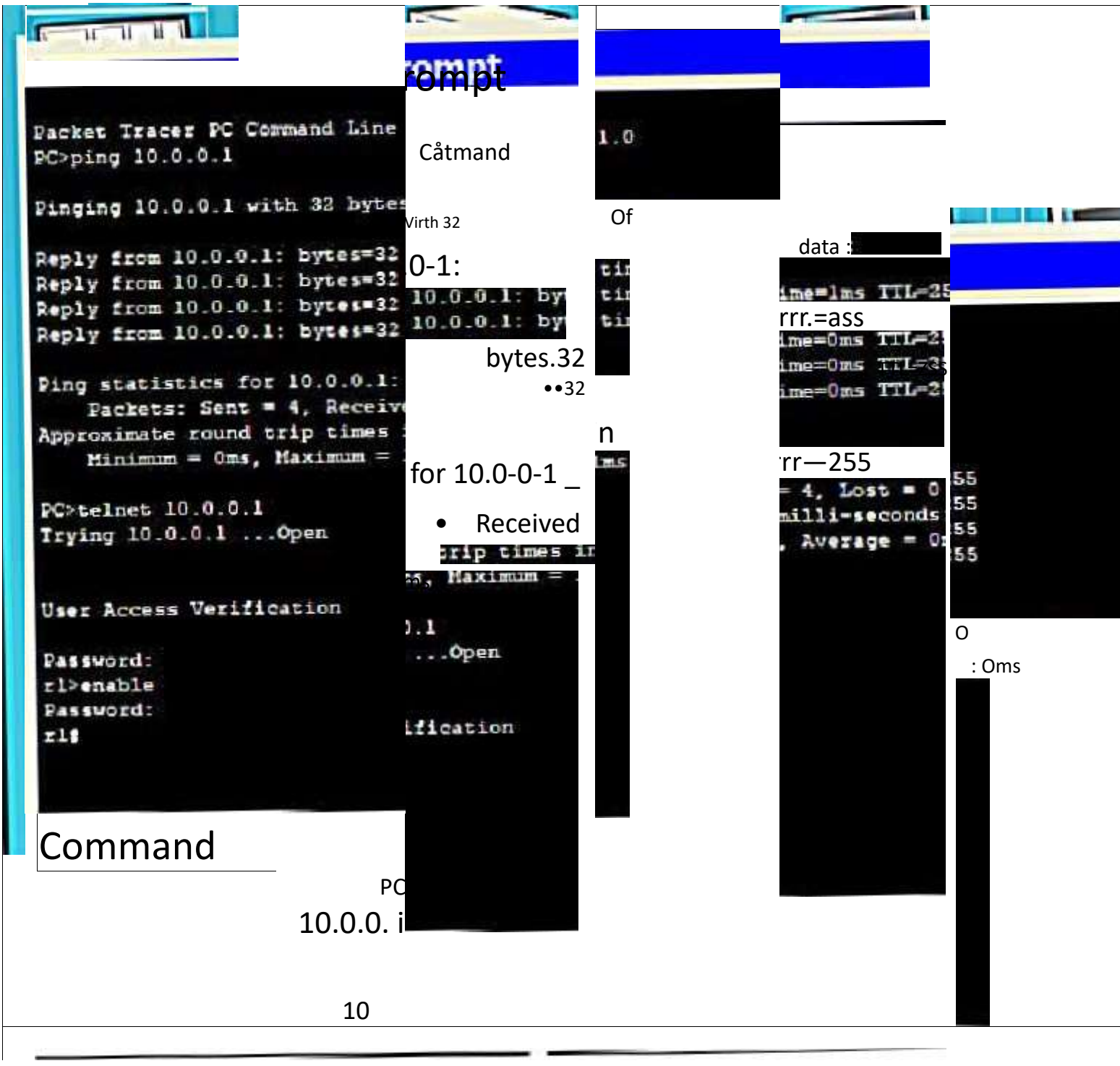
Observation -

1) Wireless local area network WLAN is a group of alocated computers or other devices that form a network based on radio transmission rather than wired connections.
2) After the WLAN is setup, the linked connection appears in the topology from the access point



pco

Physicel Config Deskt0> Custom Interfece



Command

PC

10.0.0. i

10

Cisca Packet Tracer Student
Edit Optons Vie'A' Tools Extensions Help

Logicai Root] New Cluster Move Object Set Tiled Background Viewport

LaptopO

Physica ConfigDesktopCustom Interface

Command Prompt x

PC>ping 2

S

Pinging IO _ O _ O _ 2 with 32 bytes

of data : itchO

10.0 bytes = T-TIF128
32

Rep y 10.0 = T-TL-128
32

Rep y 10.0 = T-TL-128
10.0 32 T-TIF128

Ping stati s

4, = 4, = O (OS
trip in loss) ,

Pinging IO _ O _ O _ 3 with 32 bytes of data :

pc-PT
PCO

Repl y 10.0 s = 32 T-TIF128
10.0 bytes = 32 T-TL-128
10.0 bytes = 32 7 T-TL-128
Repl y 10.0 T-TIF128

Ping

4, = 4, = O (OS
loss) , trip in
= = Average =

Time: Power Cycle Devices Fast Forward Time Realtime

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Toggle List Window

Automaticall Choose Connection

ENG p Search

10-08-

Cisca Packet Tracer Student
Edit Optons Vie'A' Tools Extensions Help

Logicai Root] New Cluster Move Object Set Tiled Background Viewport

00:14:37

End Devices

PDL'

27 -c
Afternoon rain

Time: Power Cycle Devices Fast Forward Time

Realtime

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario ○

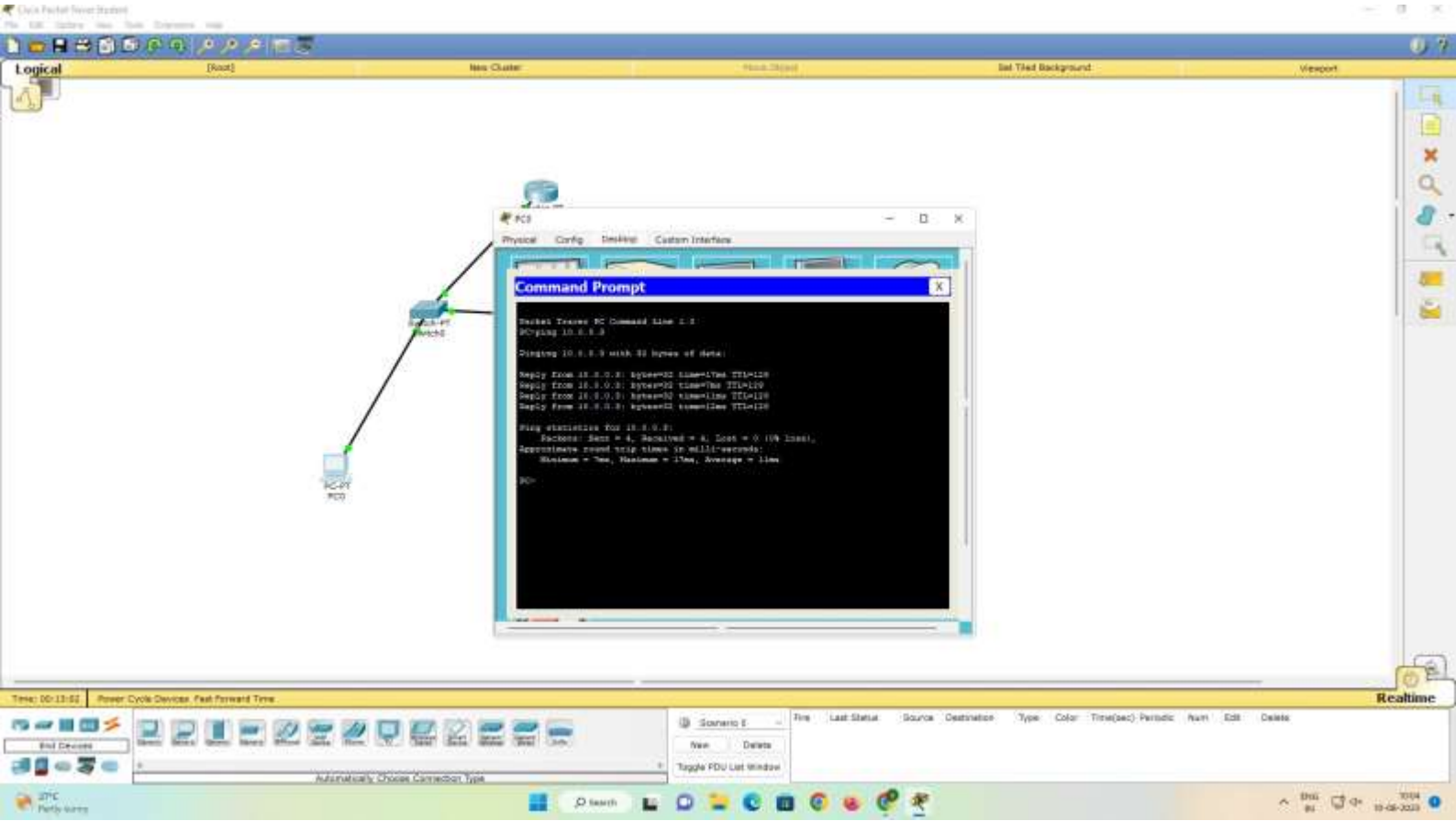
Devices

Toggle PDIJ List Window

Automaticall Choose Connection

ENG p Search

10-08Partly sunny


Logical
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
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=7ms TTL=128
Reply from 10.0.0.3: bytes=32 time=11ms TTL=128
Reply from 10.0.0.3: bytes=32 time=12ms 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 = 7ms, Maximum = 17ms, Average = 11ms
PC>
PC-PT
PC0
Realtime

Cisca Packet Tracer Student
Edit Optons Vie'A' Tools Extensions Help

Logicai Root] New Cluster Move Object Set Tiled Background Viewport

pco

PhysicalConfigDesktopCustom Interface

Command Prompt x

PC>ping 10 _ 0 0 8

S

Pinging 10 _ O _ O _ 3 with 32 bytes
of data : itchO

bytes=32 T-TIF128 Rep I y
bytes=32 TTL—128
Rep I y bytes=32 TTL—128
bytes=32 T-TIF128

Ping stati s
4, = 4, Inst = O loss) , trip
tiæs in

PC >ping 10 _ 0 0 4

Pinging 10 _ O _ O _ 4 with 32 bytes of
data : pc-PT
pco Repl y bytes=32 T-TIF128
Rep y bytes=32 TTL—128 Rep y
bytes=32 TTL—128 Repl y
bytes=32 T-TIF128

Ping
Pa c kets : 4, = 4, Inst = O loss) , trip
tiæs in
Average =

Time: Power Cycle Devices Fast Forward Time Realtime

FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete

Scenario o

Devices

Toggle PDIJ List Window

Automaticall Choose Connection

ENG p Search

10-08Partly sunny

Cisca Packet Tracer Student
Edit Optons Vie'A' Tools Extensions Help

Logicai Root] New Cluster Move Object Set Tiled Background Viewport

00:13:35

End

27 •c 10:05

Time: Power Cycle Devices Fast Forward Time

Realtime

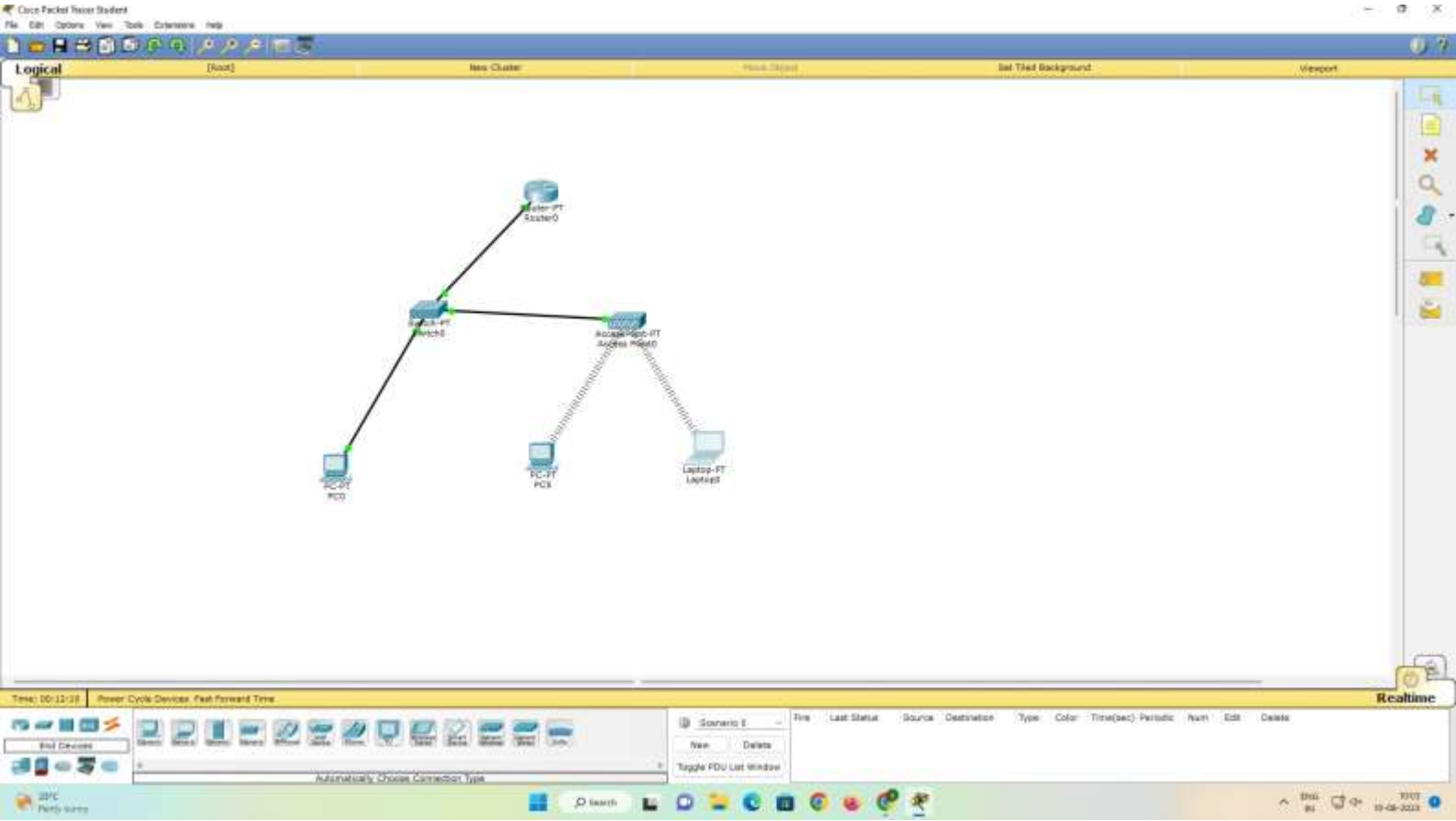
FireLast StatusSou rceDestination ColorTime sec) PeriodicNum Edit Delete
Scenario o

Devices

Toggle PDIJ List Window

Automaticall Choose Connection

ENG p Search 1


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Set Tiled Background
Viewport
Router-PT
Router0
Switch-PT
Switch0
Access Point-PT
Access Point0
PC-PT
PC0
PC-PT
PC1
Laptop-PT
Laptop0
Time: 00:12:18
Power Cycle Devices Fast Forward Time
Realtime
End Devices
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
Search

17/8/23

CRC implementation

Write a program for error detecting code using CRC-CCITT

C-code

```
#include<stdio.h>
#include<string.h>
#define N strlen(poly)

char data[30];
char check_value[30];
char poly[10];
int data_length, i, j;

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

void receiver()
{
  printf("Enter the received data:");
  scanf("%s", data);
  printf("Data received : %s", data);
  crc();
  for (i=0; (i<N-1) && (check_value[i]!='1'
       ; i++)
```

```
        if (c<N-1)
            printf("\n Error detected\n");
        else
            printf("\n No error detected\n");
}

void crc()
{
    for(i=0; i<N; i++)
        check_value[i] = data[i];
    do{
        if(checkvalue[0]=='1')
            XOR();
        for (j=0; j<N-1; j++)
            check_value[j] = check_value[j+1];
        check_value[j] = data[j++];
    } while (i<=data_length+N+1);
}

int main()
{
    printf("\n Enter data to be transmitted:");
    scanf("%s", data);
    printf("\n Enter the divisor polynomial:");
    scanf("%s", poly);
    data_length = strlen(data);
    for (i=data_length; i<datalength+N-1; i++)
        data[i] = '0';
    printf("\n Data padded with n-1 zeroes : %s",
        data);
    crc();
```

```
    printf("\n CRC value is %s",
                                check_value);
    for(i=data_length; i<data_length+N-1; i++)
        data[i] = check_value[i-data_length];
    printf("\n Final dataword to be sent : %s"
                                data);

    receiver();
    return 0;
}
```

Output -

Enter data to be transmitted : 101010
Enter the divisor polynomial : 1011

Data padded with n-1 zeroes : 101010000
CRC value is : 001
Final codeword to be sent : 101010001

Enter the received data : 100010000
Error detected

Enter data to be transmitted : 101100
Enter the divisor polynomial : 1001

10/10

Data padded with n-1 zeroes : 101100000
CRC value is : 001
Final codeword to be sent : 101100001

17/5/23

Enter the received data : 101100001
No error detected

17/8/23

Write a program for congestion control using Leaky Bucket algorithm.

C-code -

```
#include <stdio.h>

int main()
{
    int incoming, outgoing, buck_size, n, store = 0;
    printf("Enter bucket size:");
    scanf("%d", &buck_size);
    printf("Enter outgoing size:");
    scanf("%d", &outgoing);
    printf("Enter number of inputs:");
    scanf("%d", &n);

    while(n!=0)
    {
      printf("Enter the incoming bucket size:");
      scanf("%d", &incoming);
      if(incoming <= (buck_size - store))
      {
        store += incoming;
        printf("Bucket buffer size %d out of %d
          \n", store, buck_size);
      }
      else
      {
        printf("Dropped %d no. of packets\n",
          incoming - (buck_size - store));
```

```
            printf("Bucket buffer size %d out of
                %d \n", store, buck_size);
            store = buck_size;
        }
        store = store - outgoing;
        printf(" After outgoing %d packets left
        out of %d in buffer \n", store,
        buck_size);
        n--;
    }
}
```

Output:

```
Enter bucket size: 5000
Enter outgoing rate: 2000
Enter number of inputs: 2
Enter the incoming packet size: 3000
Bucket buffer size 3000 out of 5000
After outgoing 1000 packets left out of 5000
in buffer
Enter the incoming packet size: 1000
Bucket buffer size 2000 out of 5000
After outgoing 0 packets left out of 5000
in buffer
```

10/10

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24/8/23

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.

Python Program -

ClientTCPpy

```
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("\n From Server:\n")
print(filecontents)
clientSocket.close()
```

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('\nSend contents of' + sentence)
file.close()
connectionSocket.close()
```

Result:

Client window:
Enter the file name : serverTCP.py
Contents of the file are displayed

Server window:
The server is ready to receive

Sent contents of serverTCP.py
The server is ready to receive

10/10

28/8/23

24/8/23

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

Python program -

ClientUDP.py

```
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.recvfrom(2048)
print("\nReply from Server:\n")
print(filecontents.decode("utf-8"))
# for i in filecontents:
    # print(str(i), end=' '))
clientSocket.close()
```

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 = ' ')
print(sentence)
# for i in sentence:
    # print (str(i), end = ' ')
file.close().
```

Result -

Client window:
Enter the file name: serverTCP.py
Contents of the file are displayed

Server window:
The server is ready to receive

Sent contents of serverTCP.py
The server is ready to receive

10/10

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M, serverTCP.py - C:/Users/bmscecse/AppData/LocaI/Programs/Python/Python310/serverTCP.p...

clientTCP.py - C:/Users/bmscecse/AppData/LocaI/Programs/Python/Python310/cIientTCP .py...

File Edit Format Run Options Window Help

```
socket s e I v e IN ame="127 . 0 . 0 . 1"       socket serve: Port—12000
serversockec=sockec  (AF  INET,  SOCK  STREAM)  serverP01C=12000  serverSocket  .  bind  (  (serverName,  server  Port)  )
clientsockec=sockec INET, SOCK STREAM) serverSockeC . listen (I) clientSockeC . connect ( (serverName, server Port) ) sentence—
input ( the file name:
    print ("The server is leady Co receive") clientSockeC . send (sentence . enccde ) connecti on Socket , addl serverSockeC
    . accept O fileconCenCs=cIienCSockeC . recN (1024) . deccde () sentence—connectionsocket . (1024) . deccde print ("\nFrom
    server: \n") file—open (sentence, print (filecontents) I—file . read (1024)         clientSockeC      .      close      O
    connectionSockeC . send (I . enccde O ) print ( "\nSent contents of "*sentence) file . close ( b connectionSockeC . close
```

File Edit Format Run Options Window Help

```
s e I v e IN ame="127.0.   o.   1"
```

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

File Edit Format Run Options Window Help

```
socket
s e I v e Iname="127.0. o. 1"        serverP01C=12000 serverP01C=12000
clientsockec=sockec INET, SOCK DGRA_M) serverSockeC . bind ( ("127 . 0.0. I", server Port) ) sentence—input ( file name")
print ("The server is leady Co receive") clientSockeC . sendto (bytes (sentence,"utf—8") , (serverName, serverPorC)) whi I
e
recNfIom(2048) filecontents , serverAddIess=cIienCSockeC . recNform(2048) sentence—sentence . deccde ( "utf—8 print ("\nRepIy from
server: \n")      file—open (sentence , print (filecontents . deccde ( )      con—file . read (2048)
clientSockeC . close
```

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

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```
socket
                                                    INET,  SOCK  DGRAM)
                                    sentence    ,    clientAddress    serverSockeC    .
serverSockeC . sendCo (bytes (cxvn, "utf—8") . clienCAddress)
print  ("\nSent  contents  of",
end=' print  (sentence)  file  .
close O
```

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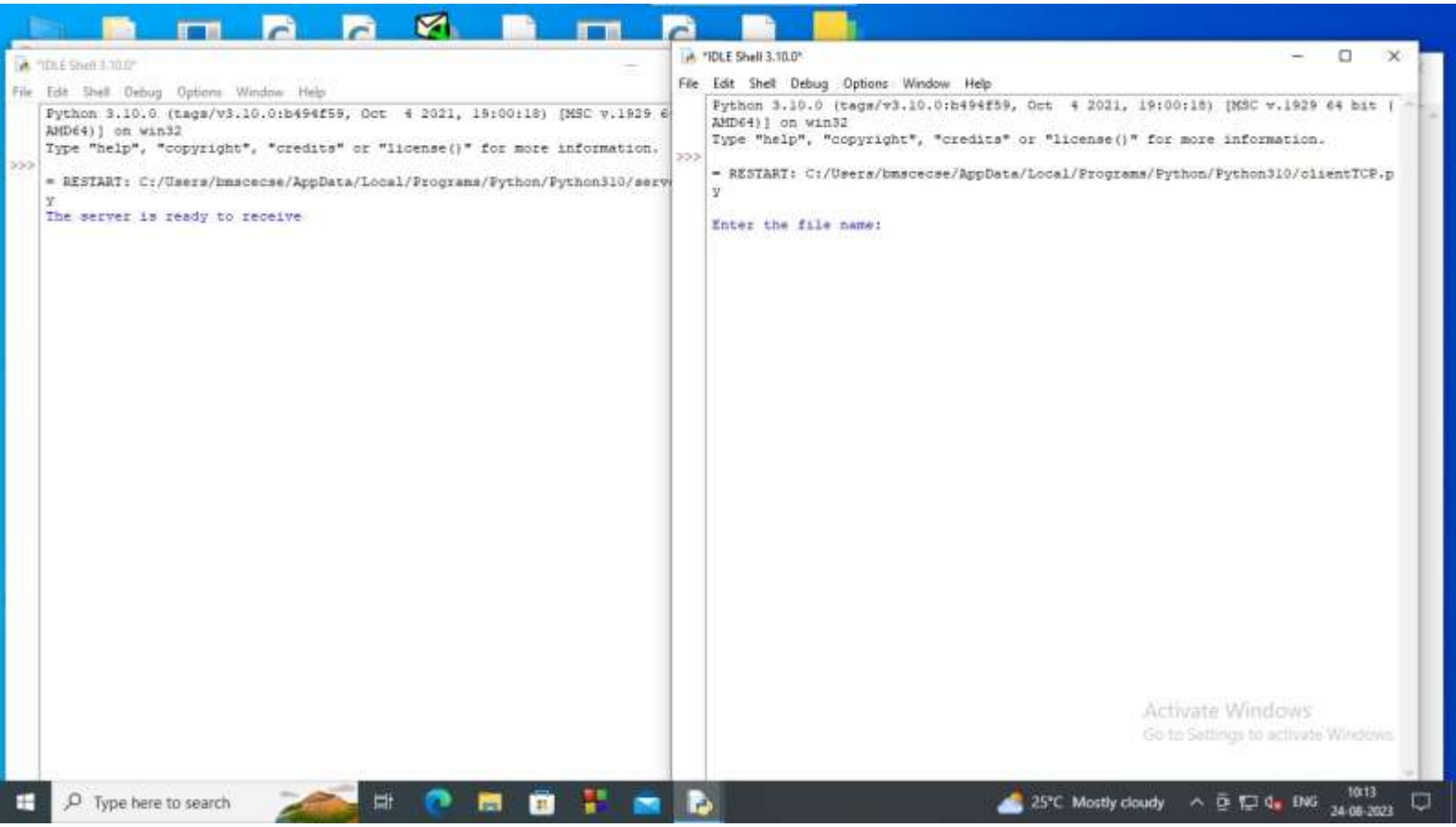
"IDLE Shell 3.10.0"
File Edit Shell Debug Options Window Help
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 6
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/bmscecse/AppData/Local/Programs/Python/Python310/serv
y
The server is ready to receive
"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/clientTCP.p
y
Enter the file name:
Activate Windows
Go to Settings to activate Windows.
Type here to search
25°C Mostly cloudy
ENG
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4, IDLE Shell 3.1010 *IDLE Shell 3.10.0*

File Edit Shell Debug Options Window Help

```
     I  ine  E,  in  clientSocket  .  sendto  (bytes  (sentence,  "utf—8")  ,
        (serverName, server Port) )
  NameE1101 : name ' serverName' is not defined. Did mean: ' servername ' ?

RESTART • C : / Use rs /bms ce cse /AppDaca/LocaI / Programs / Python/ Pythons
                                                          I O / cl i entUD


   Enter file namecIienCTCP . py
   T raceback (most recent call last)
     File                              "C:                                /
     Users/bmscecse/AppData/LocaI/Programs/Pychon/Pychon3LO/cIiencUDP
    I ine 8, in filecontents, serverAddress=cIientSocket .
       yecvform (2048)
                  ' socket' object has no attribute ' yecvform' Did  mean:
   from'?

RESTART • C : / Use rs /bms ce cse /AppDaca/LocaI / Programs / Python/ Pythons
                                                          I O / cl i entUD


   Enter file namecIienCTCP . py

 RESTART: C: / Users/bmscecse/AppDaca/LocaI/PIograms/Pychon/Pychon310/cIiencUD


   Enter file namecIienCTCP . py

   Reply from server:

   from socket import*
                  . 0.0. I" server  Port—12000
   clientsockec=sockec   INET,   SOCK   STREAM)
   clientSockeC . connect ( (serverName, server
   Port)  )  sentence—input  ("\nEnceI  the  file
   name: " ) clientSockeC . send (sentence .
```

```
encode ) fileconCenCs=cIienCSockeC . lecv
(1024) . deccde l ) print ("\nFIom server:
\n") print (filecontents) clientSockeC .
close l )
```

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e

Edit Shell Debug Options Window Help

```
Python 3.10. O (tags/v3.10.O:b4g4fSg, OCC 4 2021, [Msc v. 1929 64 bic on Win32

Type "help" " copy IighC " "credits" or "license  for more information .

   RESTART: C: / Users/bmscecse/AppDaca/LocaI/Programs/Pychon/Pychon310/serveIUDP
   .

 The server is ready Co receive
 T raceback (most recent call last)
   File "C: / Users/bmscecse/AppData/LocaI/Programs/Pychon/Pychon3LO/serveIUDP .
   u•"
    I ine 12, in serve:Socket . sendto (bytes (con, "utf—
      8") . clientAddress)
ACC IibuteError: 'bytes' object has no attiibute '           '

   RESTART: C: / Users/bmscecse/AppDaca/LocaI/Programs/Pychon/Pychon310/serveIUDP
   .

 The server is leady Co receive

 Sent contents of clientTCP . py
```

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```
                                                                    IDLE Shell 3.10.O
   *IDLE Shell 3.10.0*
                                                                  File Edit Shell Debug Options Window Help
File Edit Shell Debug Options Window Help
                                                                      Python 3.10. O (tags/v3.10.O:b4g4fSg, OCC 4 2021,          [Msc v. 1Y2g 64 bit
  Python 3 .10. O (tags/v3.IO.O:b4Y4fSY, occ 4 2021,          [Msc v. 1Y2g 64             on Win32
          on Win32                                                                                  "
                                                                       Type "help" " copy ghC "credits" or "license for more information . Type
    "help" " copyright " "credits" or "license for more information .
                                                                    RESTART: C: / Users/bmscecse/AppDaca/LocaI/PIogIams/Pychon/Pychon310/cIiencTCP .
      RESTART: C: / Users/bmscecse/AppDaca/LocaI/PIograms/Pychon/Pychon310/serve

    The server is leady Co receive       Enter the file name: serverTCP.py T raceback (most recent call last)
    File "C: / Users/bmscecse/AppDaca/LocaI/Programs/Pychon/Pychon3LO/serveITC    Flom server:
      I ine L O, in
    sentence—connectionsocket . recv (L 024) . decoder (j                        from socket import

  ACC IibuCeError: 'bytes' object has no attribute 'decoder ' Did   mean:                    . 0.0. I"
                                                                                 server Port—12000
                                                                                                  INET, SOCK STREAM)
                                                RESTART • C: / Users/bmscecse/AppDa serverSockeC . bind ( (serverName, server
    Port) ) al / Programs / Python/ Python 310 / se Ive ITCP . py serverSockeC . listen (I)
                                                                                 while
    The server is leady Co receive                                                  print ("The server is leady Co receive")

                                                                                   connecti on Socket ,    serverSockeC . accept l)
  Sent contents ofseIveITCP . py                                                 sentence—connectionsocket . lecv (1024) . deccde
    The server is leady Co receive                                                 file—open (sentence,

                                                                                    I—file . (1024) connectionSockeC .
                                                                                    send (I . encode ) print ("\nSenc
                                                                                    contents  of"  *sentence)  file  .
                                                                                    close l)  connectionSockeC . close
                                                                                    l)
```

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Wireshark Demonstration

- Wireshark is a free and open source packet analyzer.
- It is used for network troubleshooting, analysis, software and communication protocol development and education.

- It provides following functionality -
- It lets the user put network interface controllers that support promiscous mode into that mode, so they can see all the traffic visible on that interface.
- If a remote machine captures packets and sends the captured packets to a machine running Wireshark, it dissects the packets so it can analyze packets captured on a remote machine at the time they are captured.
- It understands the structure of different networking protocols. It can parse and display fields along with their meanings as specified by different protocols.
- It also supports capture formats from several other commerical and open source network sniffers.

Some of the features of wireshark are -

- Data can be captured from the wire from a live network connection or read from a

file of already captured packets.

- Live data can be read from a number of types of networks including Ethernet, IEEE 802.11, PPP and loopback.
- Data display can be refined using a display filter.
- The IP address of the device can be used in the filter to capture only the packets sent out and to that IP address.
- VoIP calls in the captured traffic can be detected. If encoded in a compatible encoding, the media flow can even be played.
- Raw USB traffic can be captured.
- Various settings, timers and filters can be set that ensure only triggered traffic appear.
- The information of the packets include ID number, time (standard), source IP address, destination IP address, protocol name, length and other important information.

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