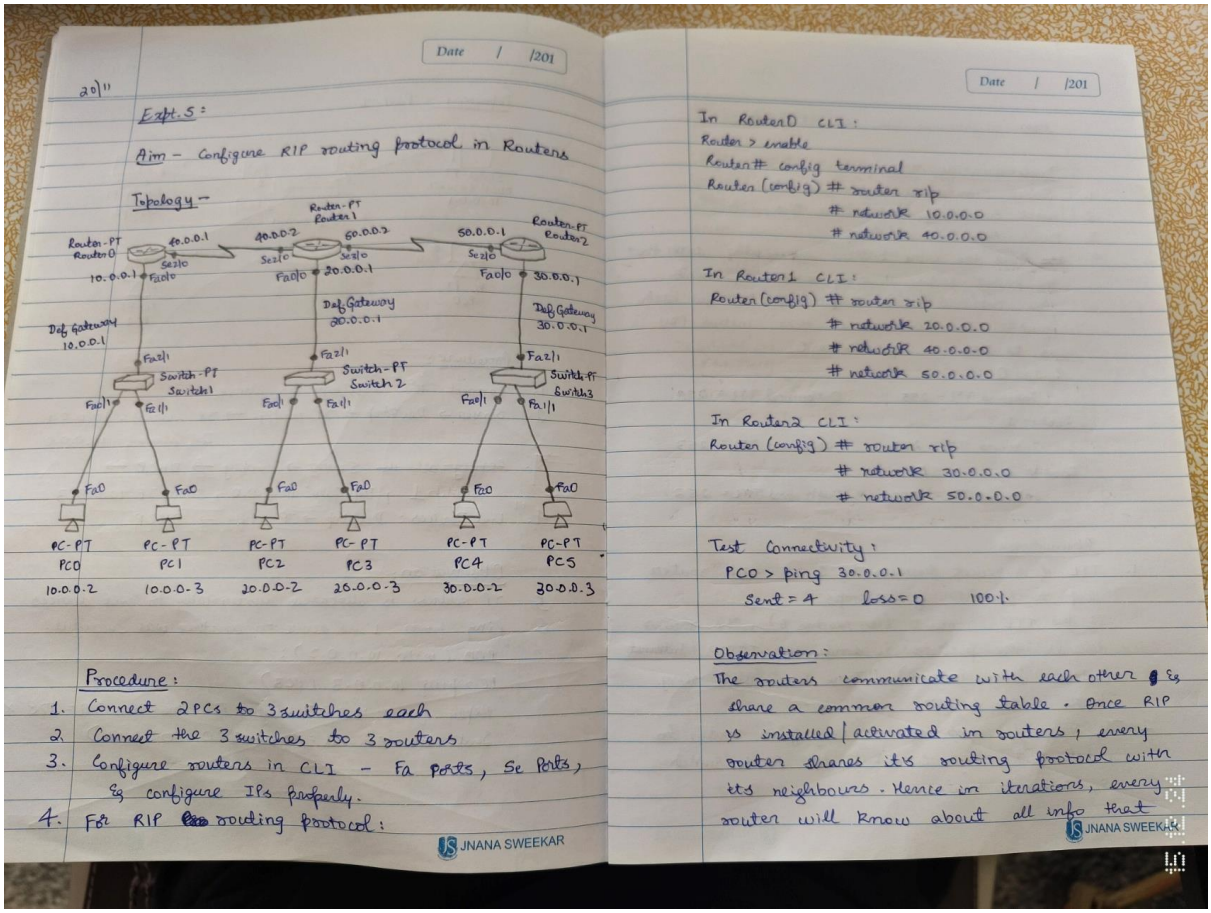
Expt. 5 – 20/11/2024



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Expt. 5 :

Aim – Configure RIP routing protocol in Routers

Topology –

Procedure :

1. Connect 2 PCs to 3 switches each
2. Connect the 3 switches to 3 routers
3. Configure routers in CLI – Fa ports, Se Ports, & configure IPs properly.
4. For RIP routing protocol :

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In Router0 CLI :

```
Router > enable
Router# config terminal
Router(config) # router rip
               # network 10.0.0.0
               # network 40.0.0.0
```

In Router1 CLI :

```
Router(config) # router rip
               # network 20.0.0.0
               # network 40.0.0.0
               # network 50.0.0.0
```

In Router2 CLI :

```
Router(config) # router rip
               # network 30.0.0.0
               # network 50.0.0.0
```

Test Connectivity :

```
PC0 > ping 30.0.0.1
  Sent = 4    loss = 0    100%
```

Observation :

The routers communicate with each other & is share a common routing table. Once RIP is installed / activated in routers, every router shares it's routing protocol with its neighbours. Hence in iterations, every router will know about all info that

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their neighbours are connected to.

Demonstrating TTL:

1. Select Simulation → Simple PDU
2. Select Source & Destination PCs
3. Press Auto Capture / Play.
4. Press the same button repeatedly such that the packet stops at every router & check the Inbound PDU & Outbound PDU for each router. We can notice that initial PDU is 255, ie., for Router 0.

Router 0 :

Inbound TTL = 255 Outbound TTL = 254

Router 1 :

Inbound TTL = 254 Outbound TTL = 253

Router 2:

Inbound TTL = 253 Outbound TTL = 252

Observation:

1. TTL of a packet decreases by 1 at each router hop to prevent infinite loops.
   If the TTL becomes 0 (ie., reaches 0), the router discards the packets & sends an ICMP (Internet Control Message Protocol) "Time Exceeded" msg. back to the sender.
2. TTL value decreases after moving from router to router. But stays constant for PC to Switch & switch to router.

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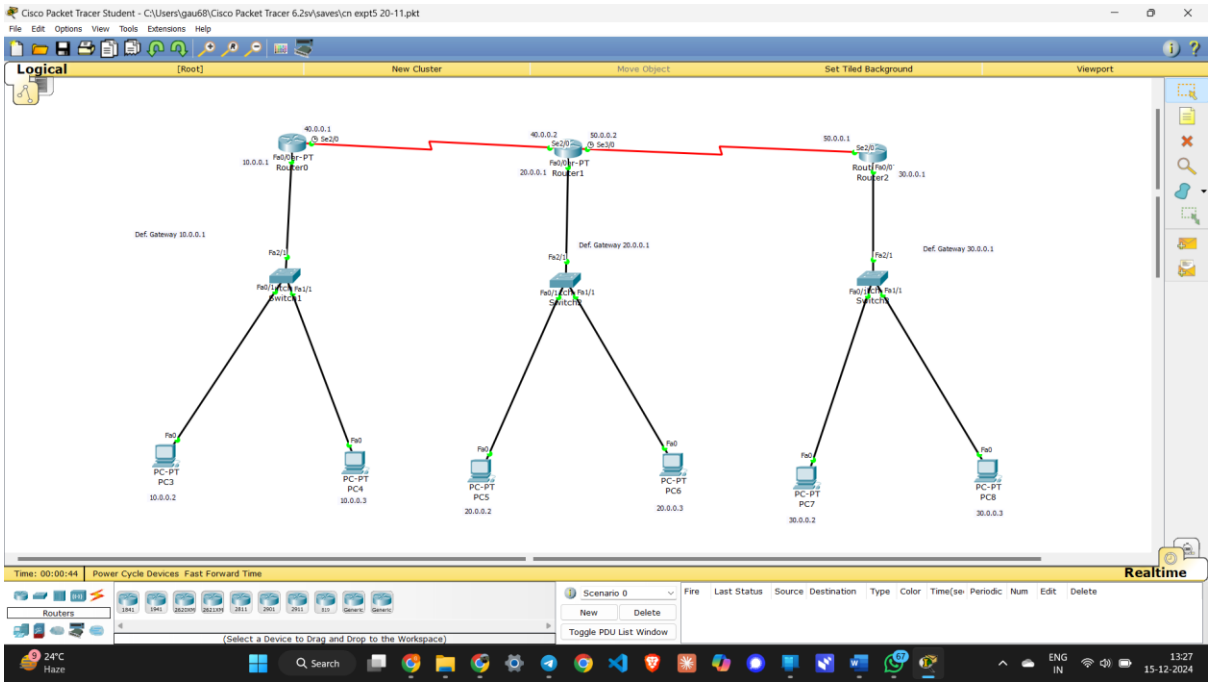
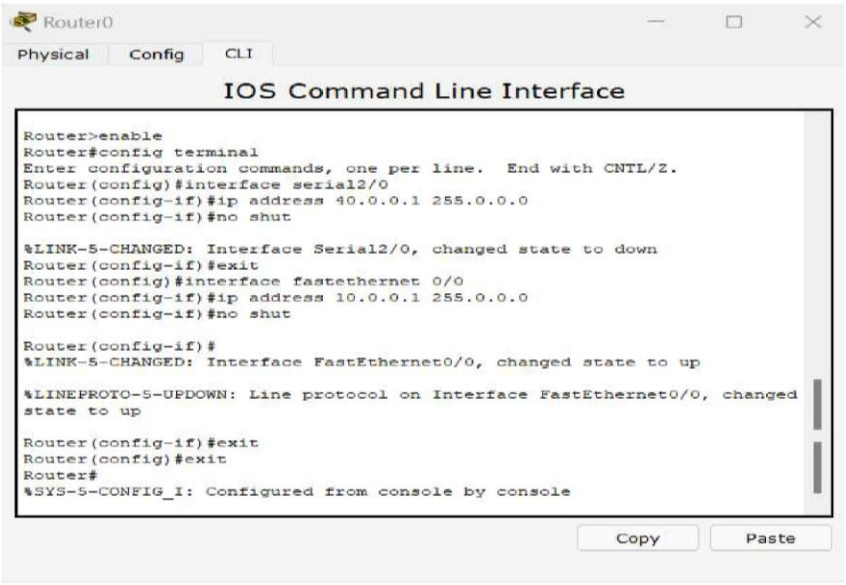
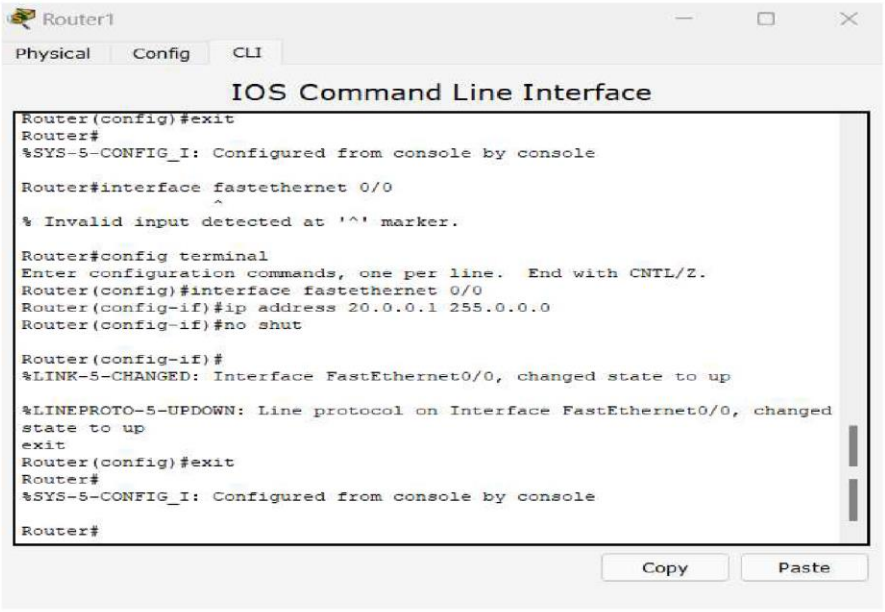
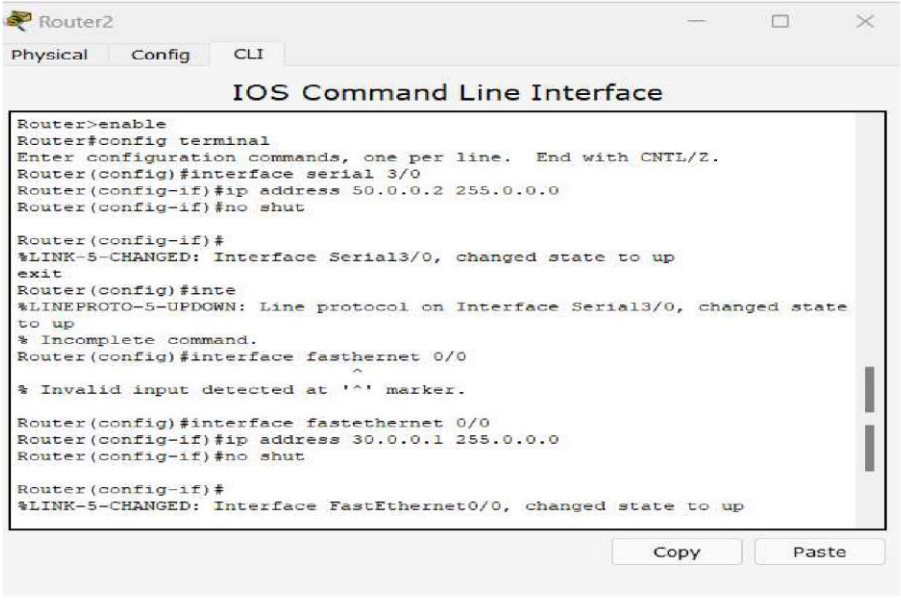
Topology:


Cisco Packet Tracer Student - C:\Users\gau68\Cisco Packet Tracer 6.2sv\saves\cn expt5 20-11.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
40.0.0.1
Se2/0
10.0.0.1
Router0
40.0.0.2
50.0.0.2
Se3/0
20.0.0.1
Router1
50.0.0.1
30.0.0.1
Router2
Def. Gateway 10.0.0.1
Def. Gateway 20.0.0.1
Def. Gateway 30.0.0.1
Switch0
Switch1
Switch2
PC-PT PC3
10.0.0.2
PC-PT PC4
10.0.0.3
PC-PT PC5
20.0.0.2
PC-PT PC6
20.0.0.3
PC-PT PC7
30.0.0.2
PC-PT PC8
30.0.0.3
Time: 00:00:44
Power Cycle Devices Fast Forward Time
Realtime
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Periodic
Num
Edit
Delete
24°C
Haze
Search
ENG
IN
13:27
15-12-2024

Configure Network:




Router1
Physical
Config
CLI
IOS Command Line Interface
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#interface fastethernet 0/0
% Invalid input detected at '^' marker.
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
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
exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
Copy
Paste


Router2
Physical
Config
CLI
IOS Command Line Interface
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface serial 3/0
Router(config-if)#ip address 50.0.0.2 255.0.0.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
exit
Router(config)#inte
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
% Incomplete command.
Router(config)#interface fasthernet 0/0
% Invalid input detected at '^' marker.
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
Copy
Paste

Configure Routing:

Router 0:

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 40.0.0.0
Router(config-router)#network 10.0.0.0
Router(config-router)#
```

Router 1:

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 40.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#network 10.0.0.0
Router(config-router)#exit
Router(config)#
```

Router 2:

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 50.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#
```

Routing;

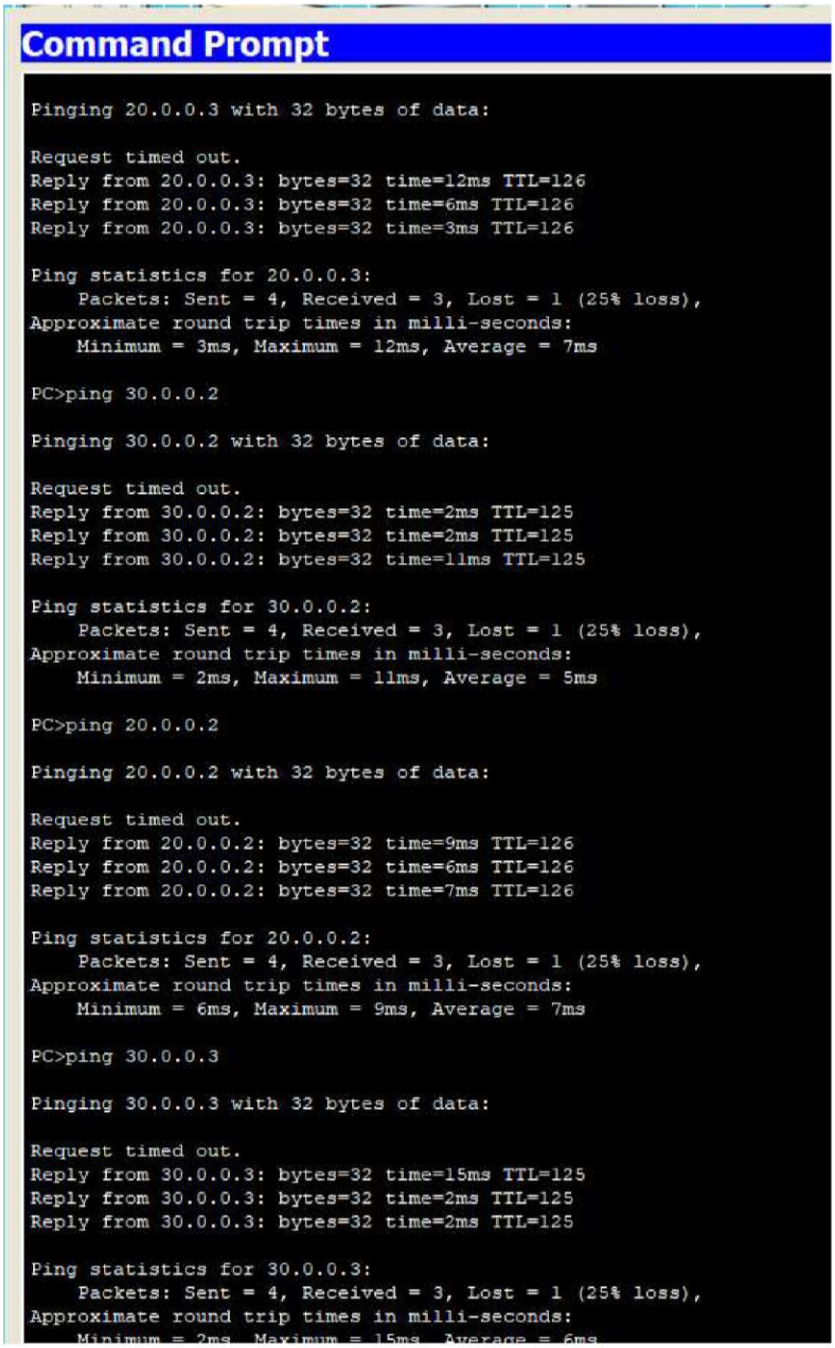

Router0
Physical
Config
CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, 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
C 10.0.0.0/8 is directly connected, FastEthernet0/0
R 20.0.0.0/8 [120/1] via 40.0.0.2, 00:00:02, Serial2/0
R 30.0.0.0/8 [120/2] via 40.0.0.2, 00:00:02, Serial2/0
C 40.0.0.0/8 is directly connected, Serial2/0
R 50.0.0.0/8 [120/1] via 40.0.0.2, 00:00:02, Serial2/0
Router>
Copy
Paste


Router1
Physical
Config
CLI
IOS Command Line Interface
to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
Router>
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
R 10.0.0.0/8 [120/1] via 40.0.0.1, 00:00:12, Serial2/0
C 20.0.0.0/8 is directly connected, FastEthernet0/0
R 30.0.0.0/8 [120/1] via 50.0.0.2, 00:00:16, Serial3/0
C 40.0.0.0/8 is directly connected, Serial2/0
C 50.0.0.0/8 is directly connected, Serial3/0
Router>
Copy
Paste


Router2
Physical
Config
CLI
IOS Command Line Interface
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
R 10.0.0.0/8 [120/2] via 50.0.0.1, 00:00:25, Serial3/0
R 20.0.0.0/8 [120/1] via 50.0.0.1, 00:00:25, Serial3/0
C 30.0.0.0/8 is directly connected, FastEthernet0/0
R 40.0.0.0/8 [120/1] via 50.0.0.1, 00:00:25, Serial3/0
C 50.0.0.0/8 is directly connected, Serial3/0
Router>
Copy
Paste

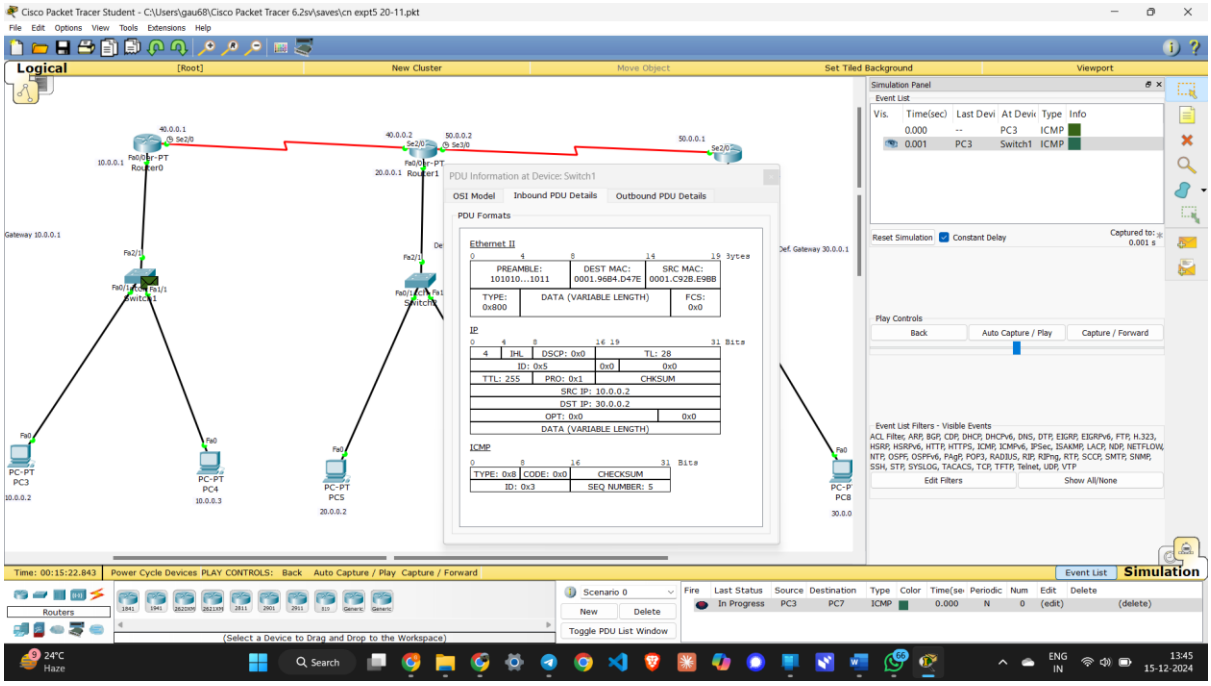
Test Connectivity:

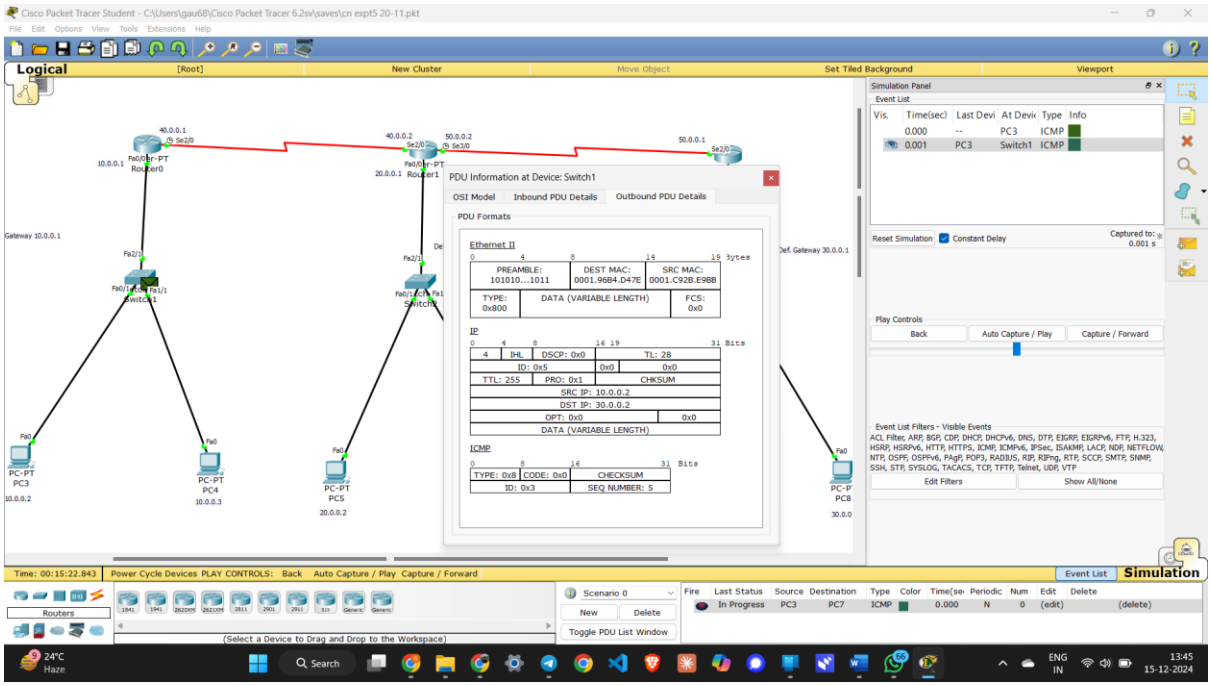
From PC0, ping PC4 –



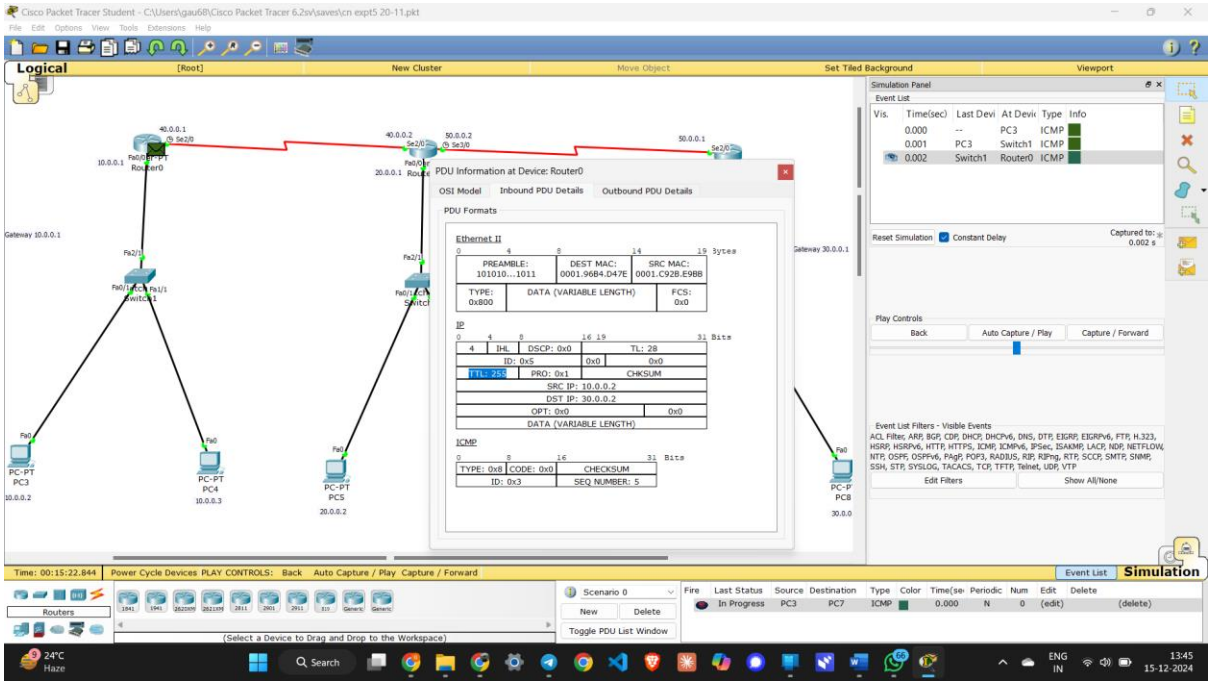
Demonstrating TTL:

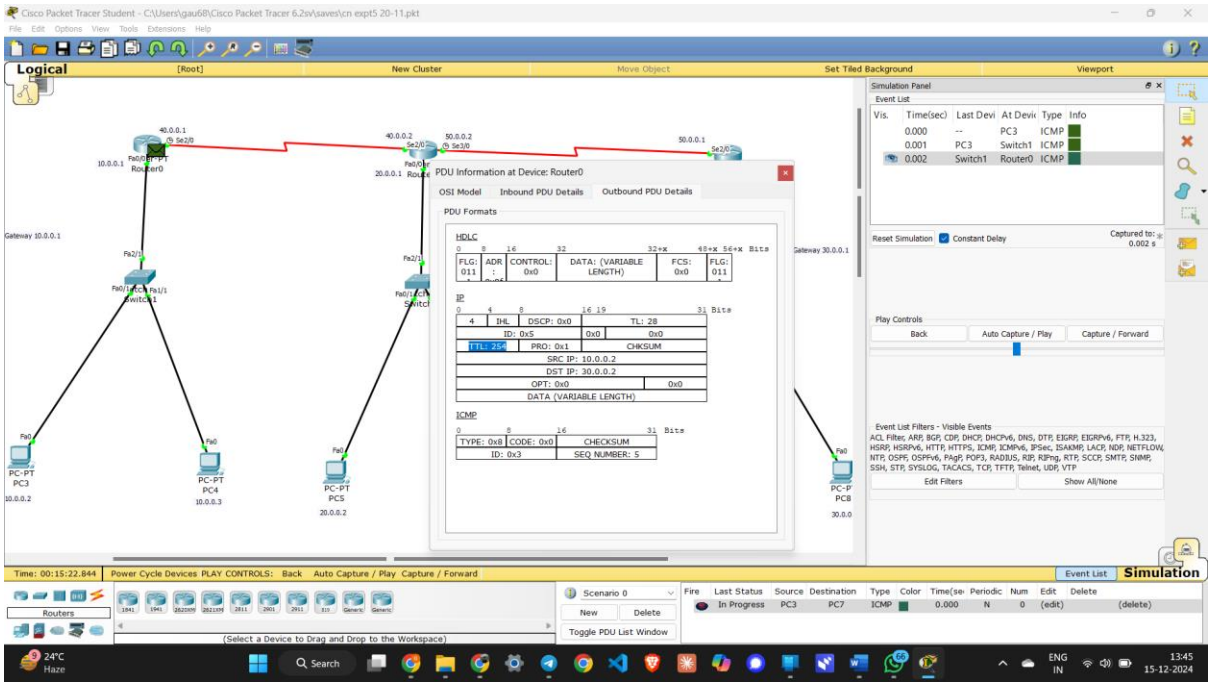
Switch1:



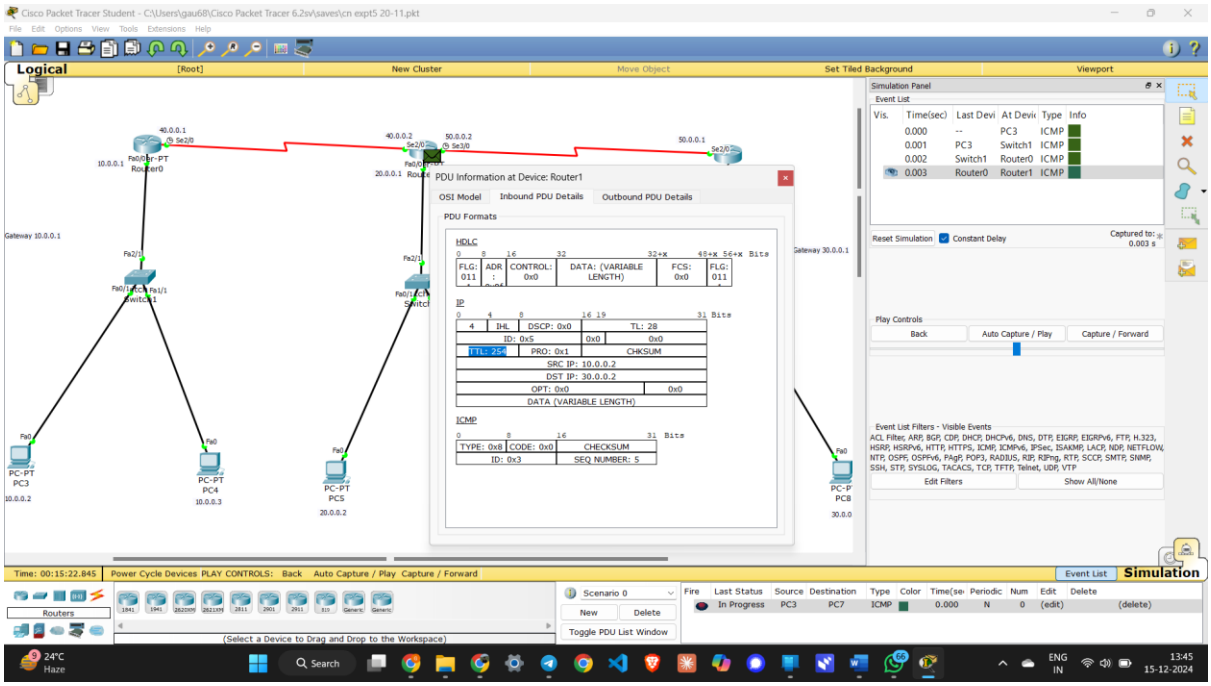


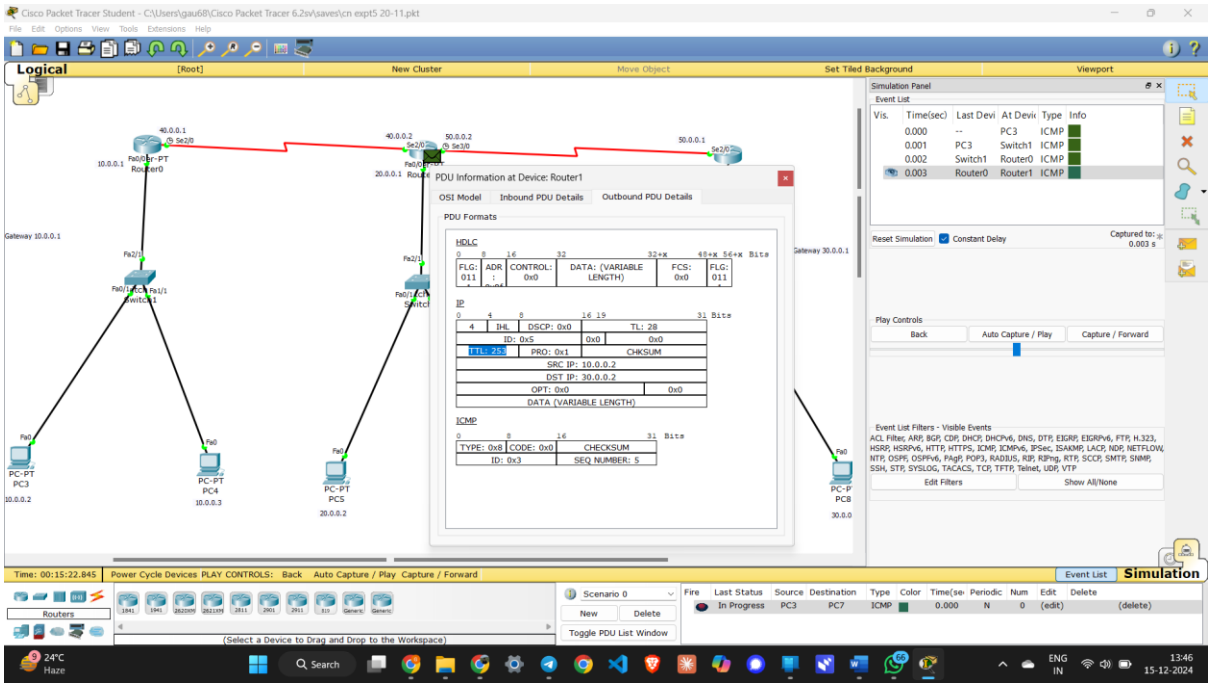
Router0:


Cisco Packet Tracer Student - C:\Users\gau68\Cisco Packet Tracer 6.2sv\saves\cn expt5 20-11.pkt
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0001.9684.D47E
SRC MAC: 0001.C928.E9BB
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
DSCP: 0x0
TL: 28
ID: 0x5
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.2
DST IP: 30.0.0.2
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x3
SEQ NUMBER: 5
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:15:22.844
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
In Progress
PC3
PC7
ICMP
(edit)
(delete)
24°C
Haze
Search
ENG
IN
13:45
15-12-2024

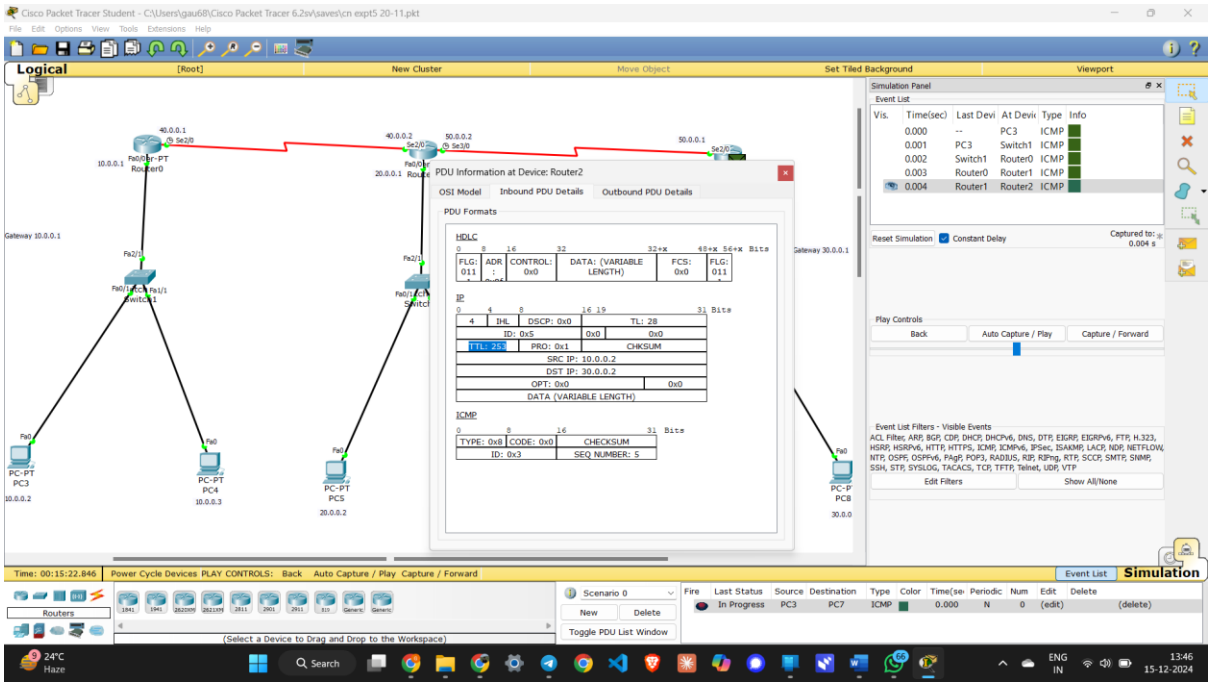

Cisco Packet Tracer Student - C:\Users\gau68\Cisco Packet Tracer 6.2sv\saves\cn expt5 20-11.pkt
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
FLG: 011
ADR
CONTROL: 0x0
DATA: (VARIABLE LENGTH)
FCS: 0x0
FLG: 011
IP
DSCP: 0x0
TL: 28
ID: 0x5
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.2
DST IP: 30.0.0.2
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x3
SEQ NUMBER: 5
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:15:22.844
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
In Progress
PC3
PC7
ICMP
(edit)
(delete)
24°C
Haze
Search
ENG
IN
13:45
15-12-2024

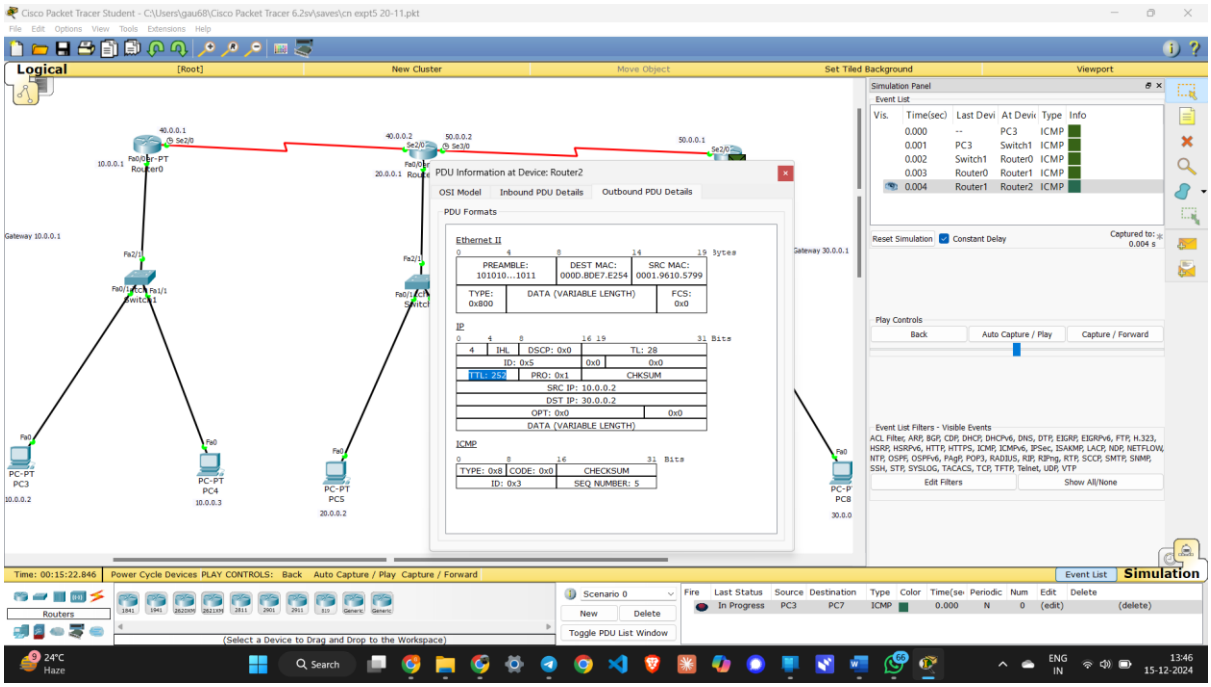
Router1:


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
IP
ICMP
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)
Routers
Simulation

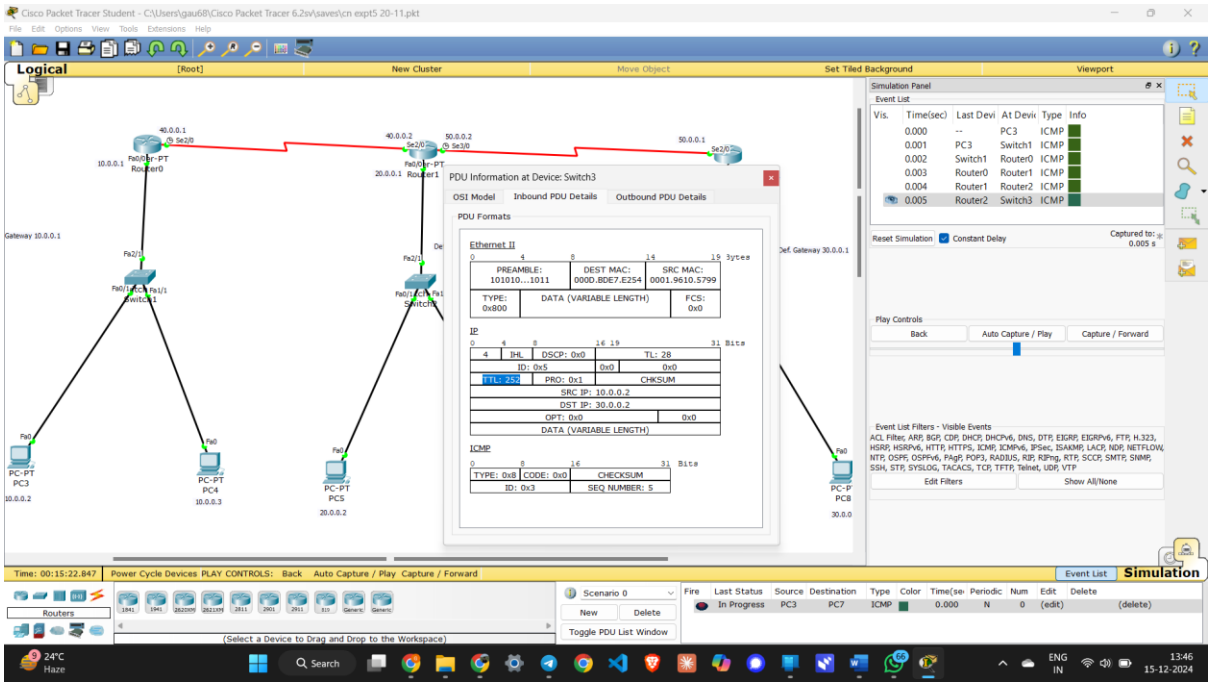

Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
IP
ICMP
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)
Routers
Simulation

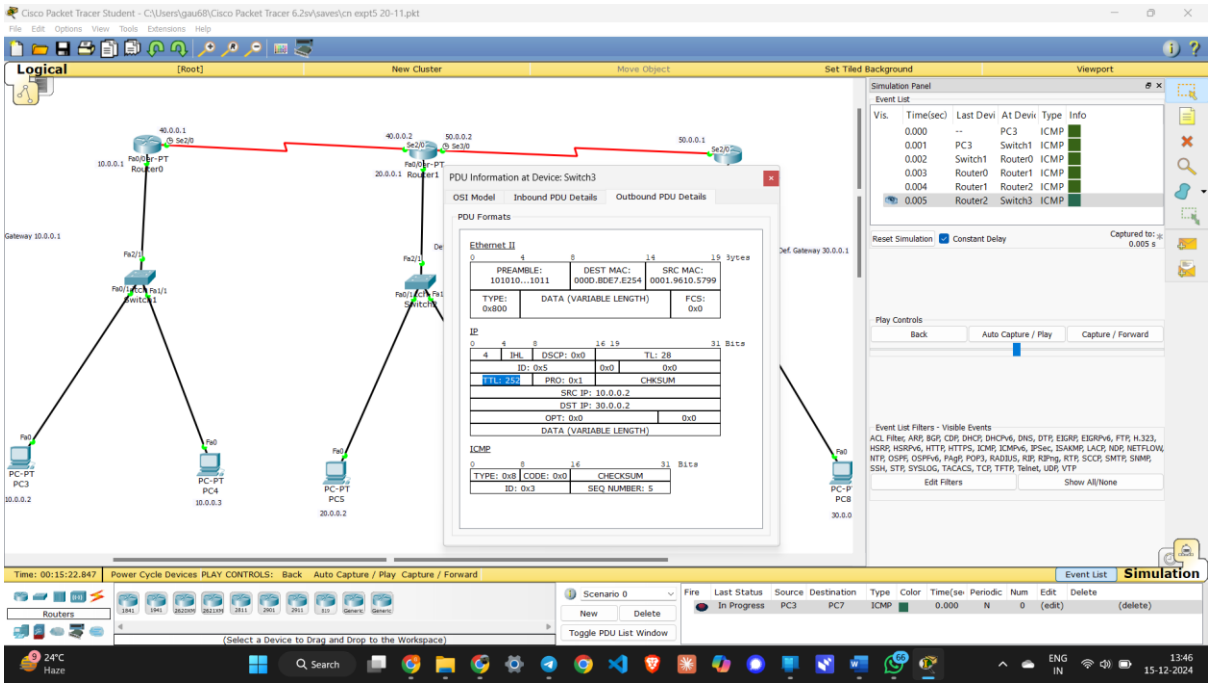
Router2:


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
HDLC
IP
ICMP
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:15:22.846
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC3
PC7
ICMP
0.000
N
0
(edit)
(delete)
24°C
Haze
Search
ENG
IN
13:46
15-12-2024


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
IP
ICMP
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
Edit Filters
Show All/None
Time: 00:15:22.846
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
(Select a Device to Drag and Drop to the Workspace)
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC3
PC7
ICMP
0.000
N
0
(edit)
(delete)
24°C
Haze
Search
ENG
IN
13:46
15-12-2024

Switch3:


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Switch3
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 000D.BDE7.E254
SRC MAC: 0001.9610.5799
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
SRC IP: 10.0.0.2
DST IP: 30.0.0.2
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x3
SEQ NUMBER: 5
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PDU Information at Device: Switch3
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 000D.BDE7.E254
SRC MAC: 0001.9610.5799
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
SRC IP: 10.0.0.2
DST IP: 30.0.0.2
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x3
SEQ NUMBER: 5
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Power Cycle Devices
PLAY CONTROLS:
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)