ACTIVE CLASS WEEK 7

ACTIVITY 1:

Activity 1: Routing - Group Activity

1. Network Setup:

- **Configuration:**

  - **Router0** is connected to **Switch1** and **PC1** on LAN **10.1.1.0/24**.

  - **Router1** is connected to **Switch2** and **PC3** on LAN **198.168.10.0/24**.

  - **Router0** and **Router1** are directly connected to each other.

- **Roles and Responsibilities:**

  - **Nadia:** Manages LAN **10.1.1.0/24** (handles PC1).

  - **Archit:** Manages LAN **198.168.10.0/24** (handles PC3).

  - **Jasveena:** Operates as the data plane for Router0.

  - **Pranika:** Operates as the data plane for Router1.

  - **Gitanshi:** Manages the control plane for both routers.

2. Ping Test:

- **Nadia** (from PC1) will send two ping requests to **Archit** (PC3).

3. Step-by-Step Instructions:

- **Gitanshi** (control plane) will ensure that Router0 and Router1 are exchanging routing information properly.

- **Jasveena** (Router0’s data plane) will update the routing table to recognize LAN **198.168.10.0/24** from Router1.

- **Pranika** (Router1’s data plane) will update the routing table to recognize LAN **10.1.1.0/24** from Router0.

- **Nadia** (PC1) initiates a ping to **Archit** (PC3). The ping packet is forwarded to **Jasveena** (Router0).

- **Jasveena** (Router0) examines the routing table and forwards the packet to **Pranika** (Router1).

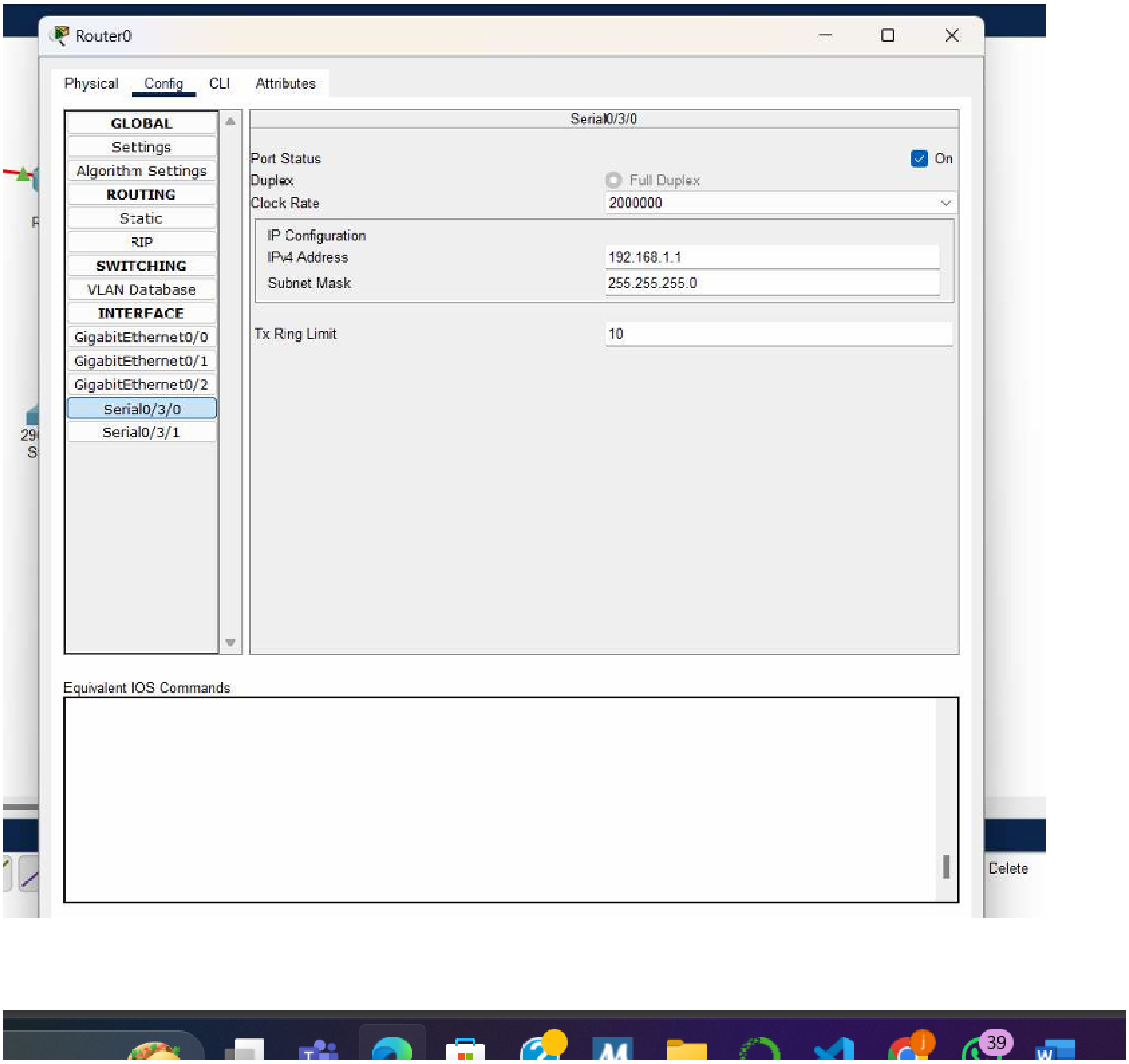
- **Pranika** (Router1) checks the routing table and forwards the packet to **Archit** (PC3).

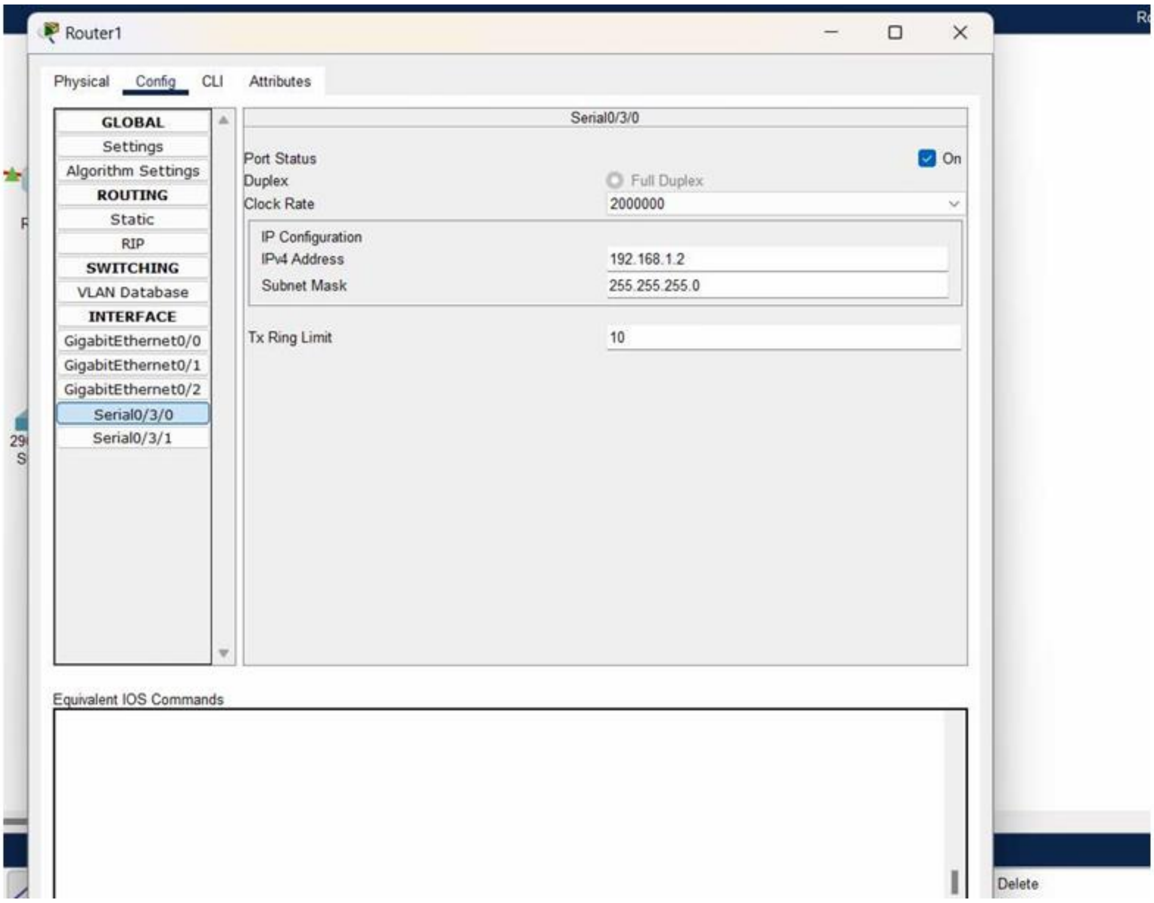
- **Archit** (PC3) receives the ping and sends a reply back to **Nadia** (PC1), following the same route in reverse.

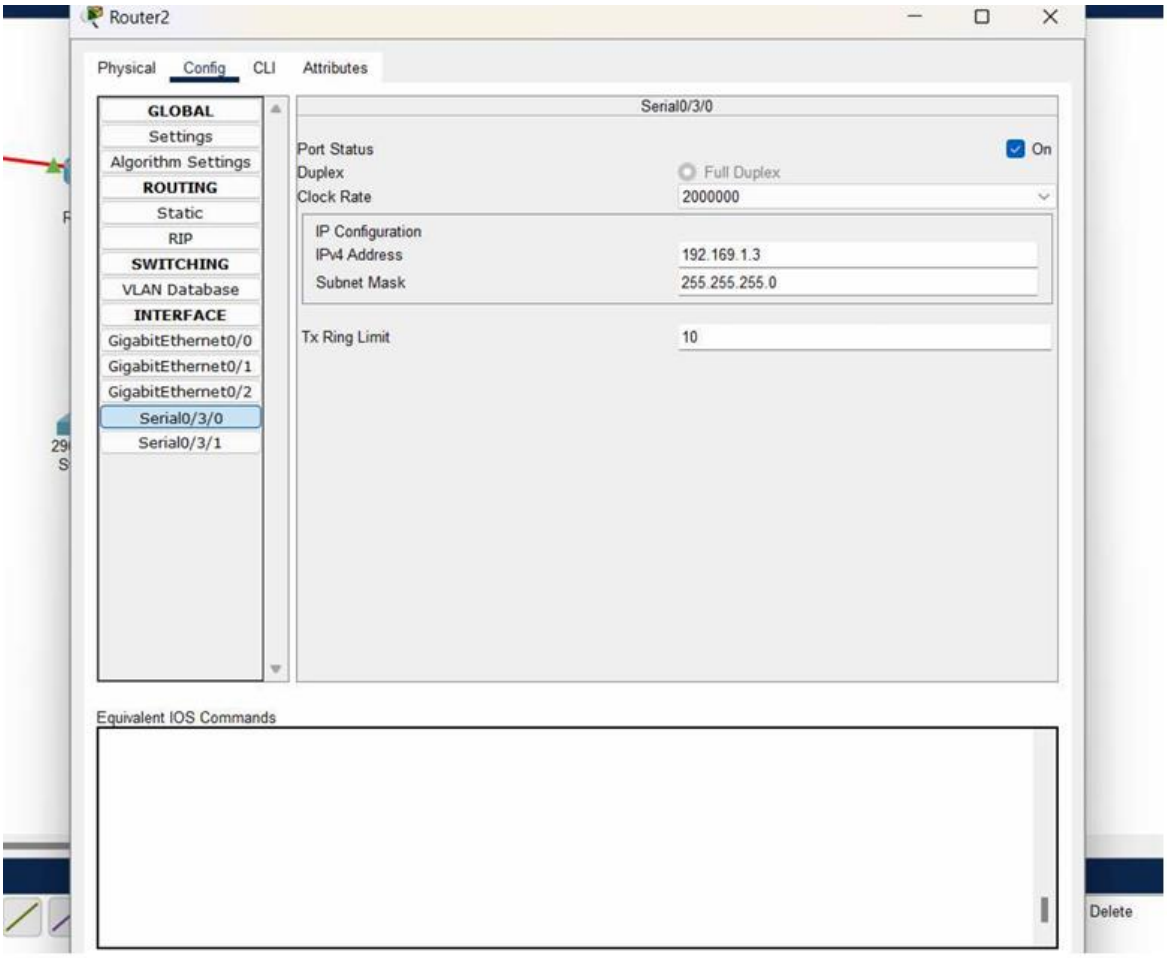
4. Control Plane Responsibilities:

- **Gitanshi** (control plane) is responsible for maintaining up-to-date routing tables, exchanging routing information, and determining the optimal path for data packets. This includes ensuring that Router0 and Router1 are aware of each other’s network information.

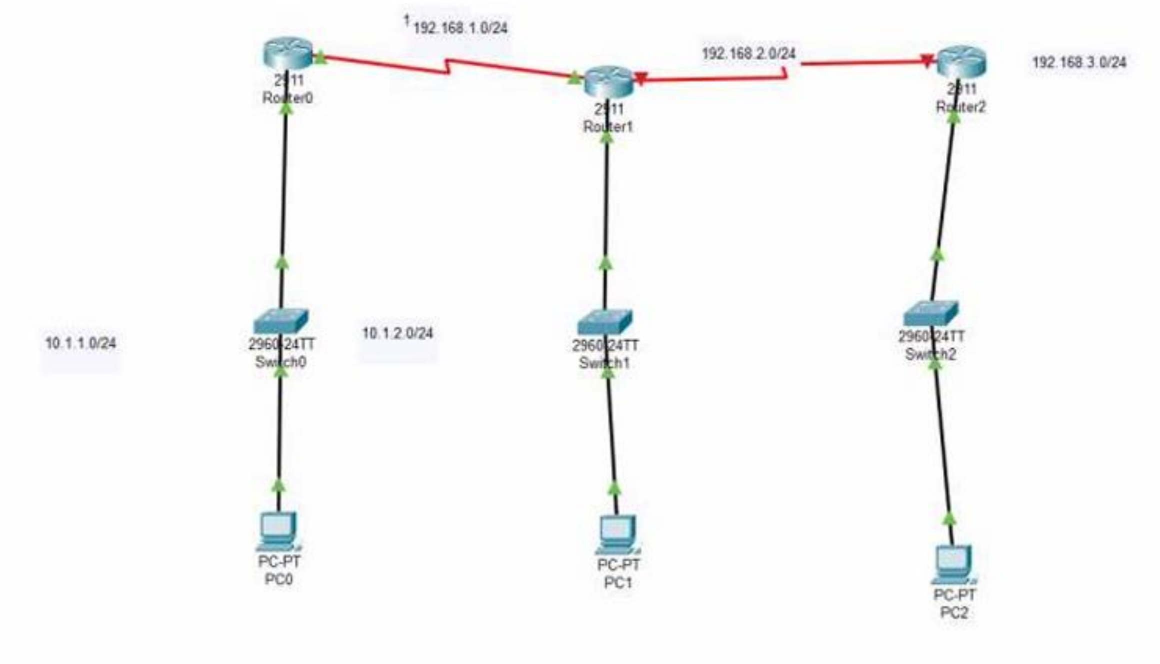
ACTIVITY2:


Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
Serial0/3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
192.168.1.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Delete


Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
Serial0/3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
192.168.1.2
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Delete



Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
Serial0/3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
192.169.1.3
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Delete

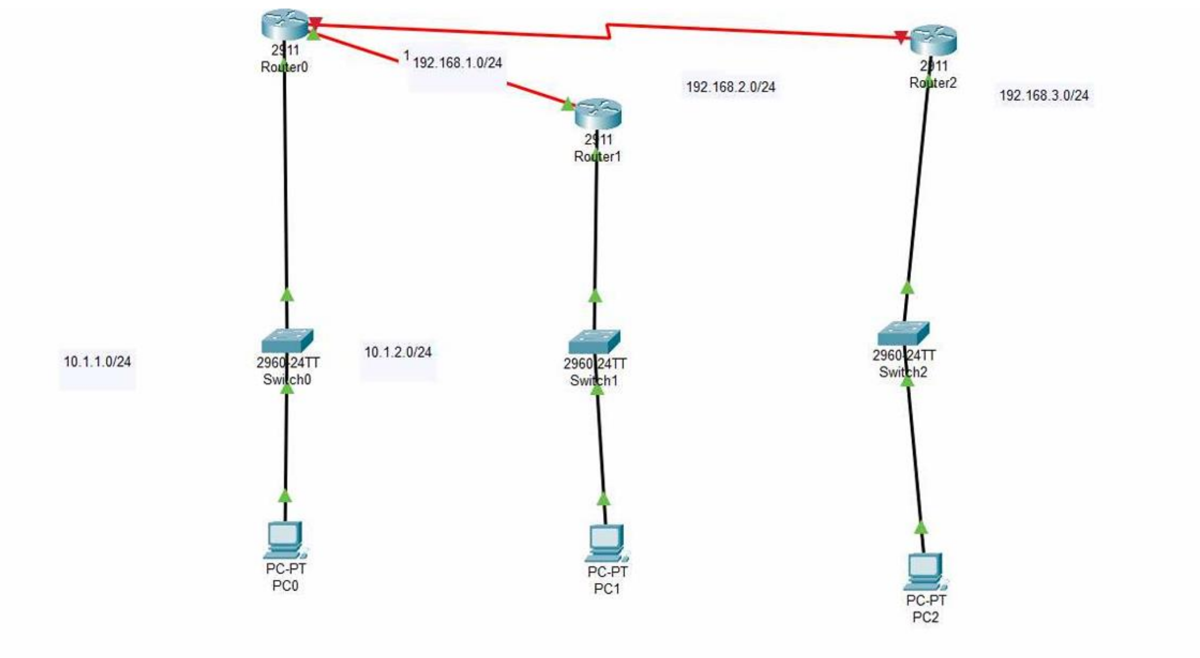


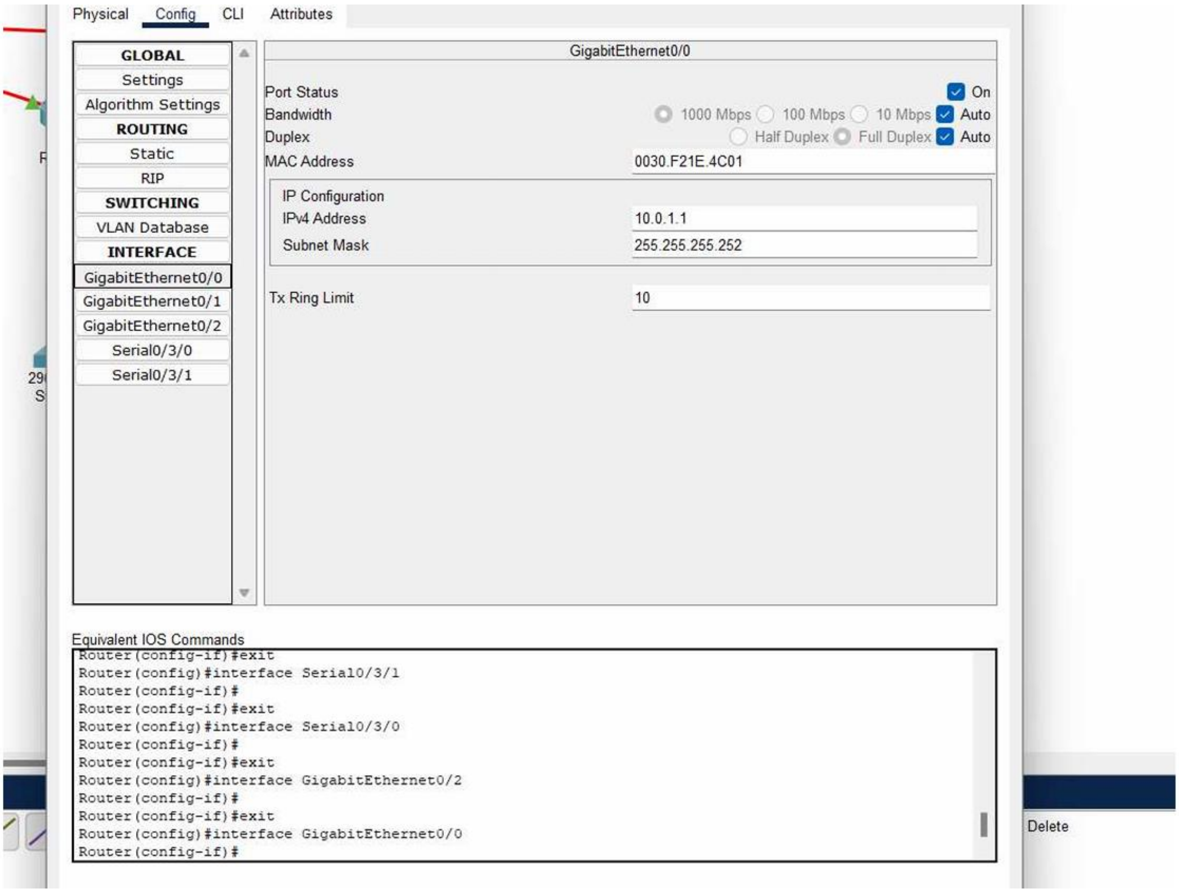
192.168.1.0/24
192.168.2.0/24
192.168.3.0/24
2911
Router0
2911
Router1
2911
Router2
10.1.1.0/24
10.1.2.0/24
2960-24TT
Switch0
2960-24TT
Switch1
2960-24TT
Switch2
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2

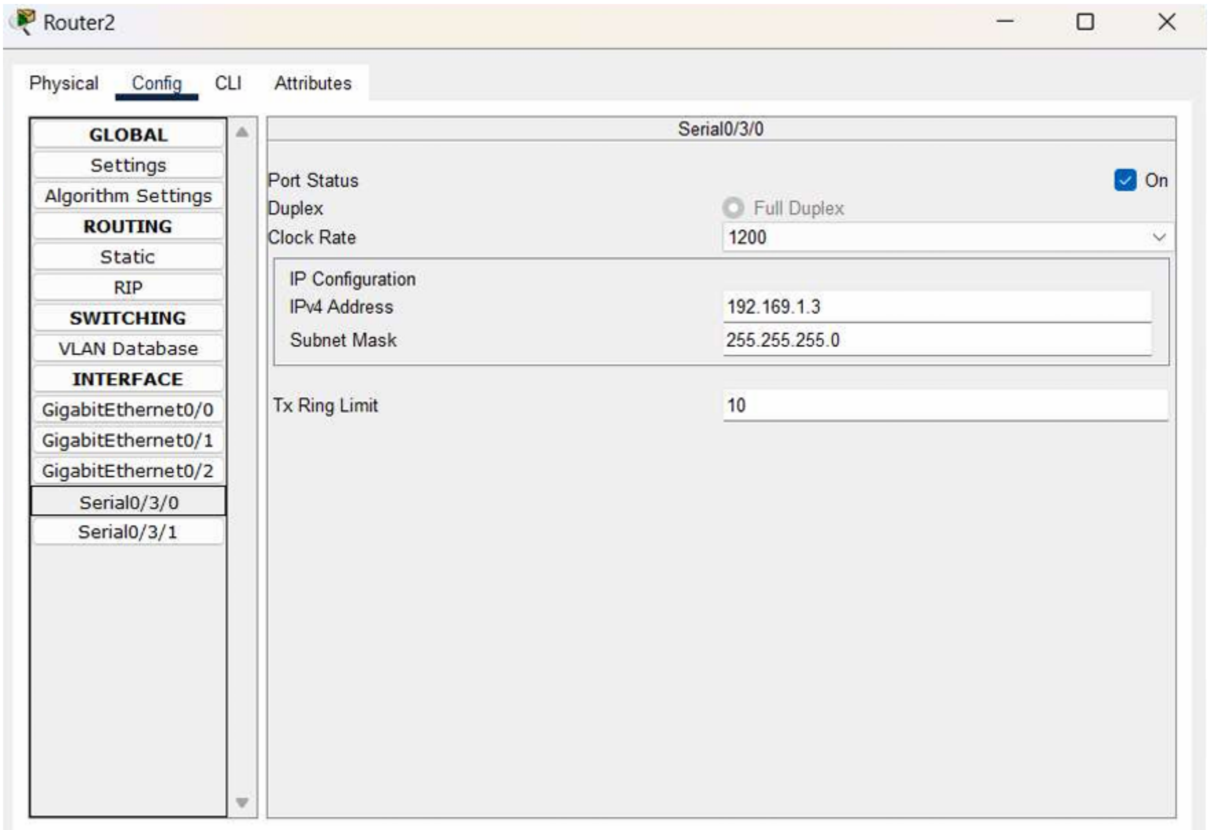
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.1.2.1

Pinging 10.1.2.1 with 32 bytes of data:

Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.

Ping statistics for 10.1.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.1.1.2
```

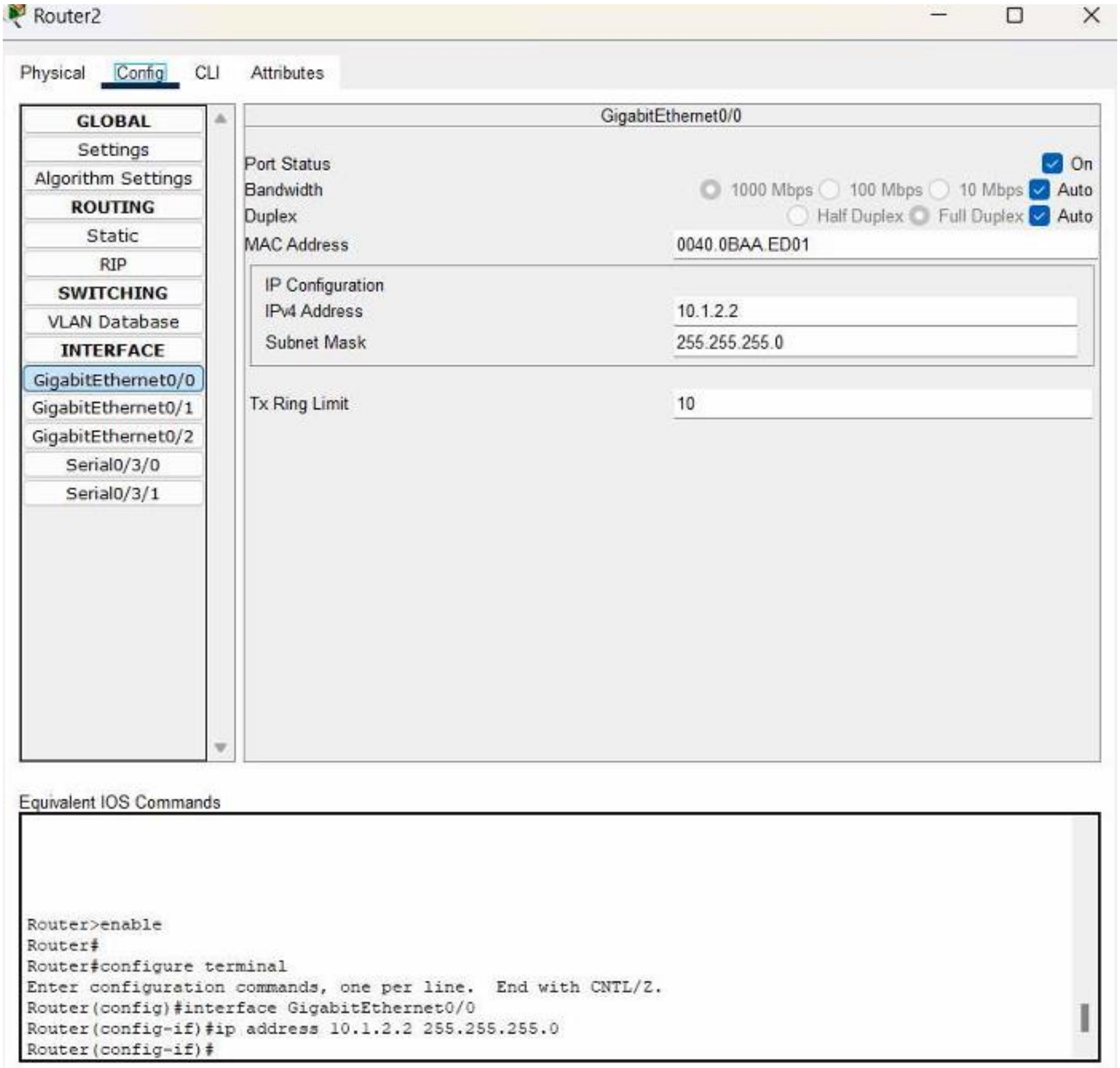
```
Pinging 10.1.2.1 with 32 bytes of data:

Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.
Reply from 10.1.1.2: Destination host unreachable.

Ping statistics for 10.1.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>10.1.1.2
Invalid Command.

C:\>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Reply from 10.1.2.2: bytes=32 time=22ms TTL=254
Reply from 10.1.2.2: bytes=32 time=18ms TTL=254
Reply from 10.1.2.2: bytes=32 time=1ms TTL=254
Reply from 10.1.2.2: bytes=32 time=17ms TTL=254

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 22ms, Average = 14ms
```

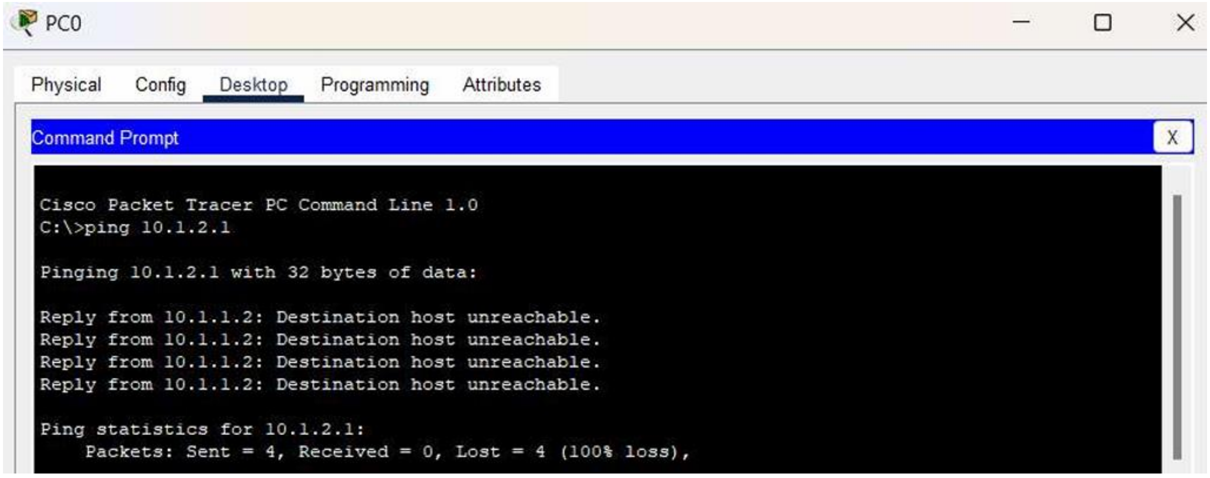



Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
GigabitEthernet0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0030.F21E.4C01
IP Configuration
IPv4 Address
10.0.1.1
Subnet Mask
255.255.255.252
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#interface Serial0/3/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/3/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Delete


Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Serial0/3/0
Serial0/3/1
Serial0/3/0
Port Status
On
Duplex
Full Duplex
Clock Rate
1200
IP Configuration
IPv4 Address
192.169.1.3
Subnet Mask
255.255.255.0
Tx Ring Limit
10




```
C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Reply from 10.1.2.2: bytes=32 time=22ms TTL=254
Reply from 10.1.2.2: bytes=32 time=18ms TTL=254
Reply from 10.1.2.2: bytes=32 time=1ms TTL=254
Reply from 10.1.2.2: bytes=32 time=17ms TTL=254

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 22ms, Average = 14ms
```



Activity 3: Alternatives to Static Routing

Question: Is there an alternative to manually configuring the routing table each time connectivity changes?

Answer: To avoid the need for manual updates to the routing table whenever there are changes in network connectivity, dynamic routing protocols can be utilized. Protocols such as RIP (Routing Information Protocol), OSPF (Open Shortest Path First), and EIGRP (Enhanced Interior Gateway Routing Protocol) automatically adjust routing tables in response to network changes, streamlining network management and improving efficiency.

Question: What are the latest routing algorithms available?

Answer: Among the latest routing algorithms are:

- **OSPFv3:** This is an updated iteration of the OSPF protocol, designed specifically for IPv6 networks.

- **BGP-4 (Border Gateway Protocol):** This protocol is utilized for routing in large-scale Internet backbone networks, offering robust path selection and scalability.

- **EIGRP:** An enhanced version of IGRP, EIGRP provides improved convergence times and scalability, making it suitable for modern network environments.

Question: Are there routing algorithms available in Cisco Packet Tracer?

Answer: Cisco Packet Tracer supports several routing algorithms, including RIP v1/v2, OSPFv2, and EIGRP. These protocols can be configured through the graphical interface of the software by accessing the settings for each router.

Implementation Instructions:

- Implement the network as illustrated in the provided figure. Ensure that you use the routing algorithm available in the routers.

Observations:

1. **Initial Route:** When the connection between Router1 and Router2 is operational, the packet is routed directly from Router1 through Router2 to Router3.

2. **Alternative Route:** If the connection between Router0 and Router2 is severed, the packet will automatically take an alternative route through Router1. This scenario underscores the importance of having backup routes in the routing table to maintain network resilience and continuity.

SCREENSHOT FOR ROUTER 0

```
                                        ^
% Invalid input detected at '^' marker.

Router(config-router)#router ospf 1
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
Router#
```

SCREENSHOT FOR ROUTER 1

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#exit
Router(config)#enable
% Incomplete command.
Router(config)#interface FastEthernet0/0
%Invalid interface type and number
Router(config)#router ospf 1
OSPF process 1 cannot start. There must be at least one "up" IP interface
Router(config-router)#network 192.168.2.0 .0.0.0.255 area 0
                                          ^
% Invalid input detected at '^' marker.

Router(config-router)#router ospf 1
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 20.0.1.0 0.0.0.3 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
Router#
```

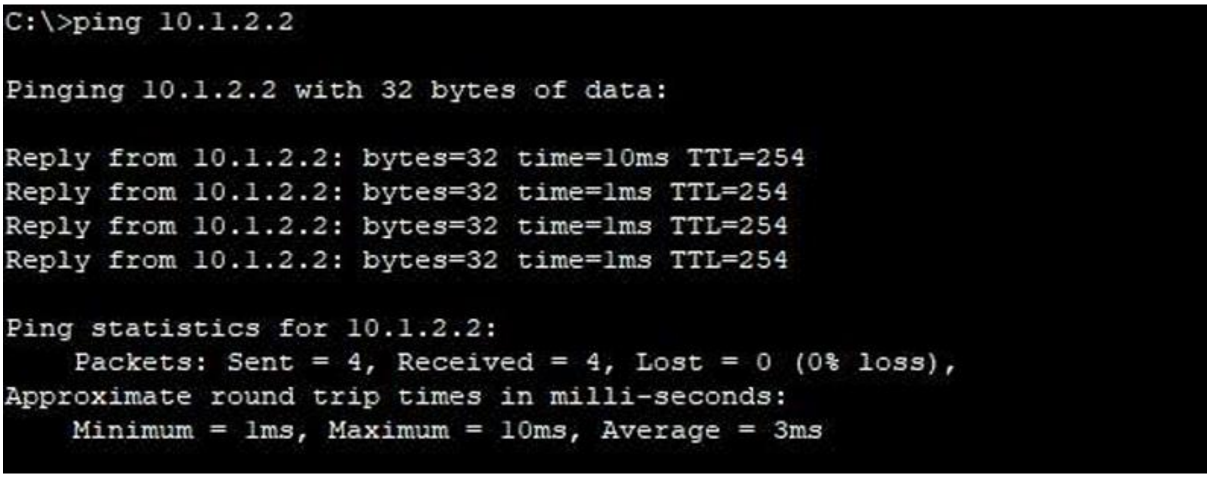
SCREENSHOT FOR ROUTER 2

```
Router>
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
OSPF process 1 cannot start. There must be at least one "up" IP interface
Router(config-router)#router ospf 1
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.4 0.0.0.3 area 0
Router(config-router)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
Router#
```

SCREENSHOTS FOR NETWORK COMMUNICATION USING PING

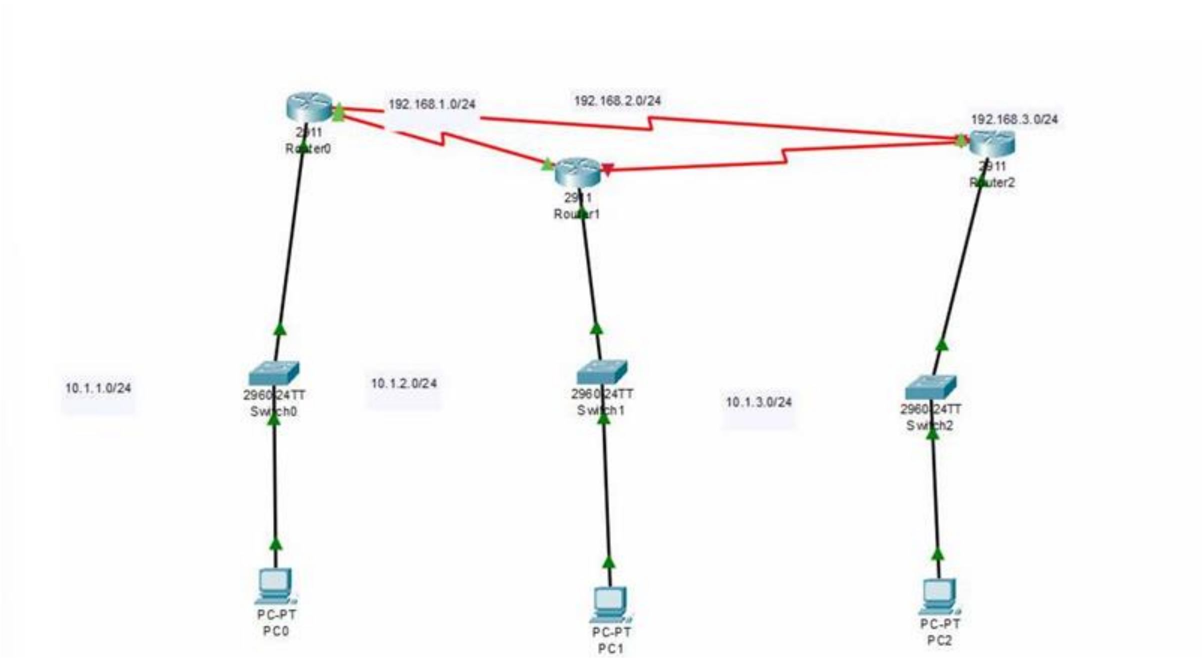
```
C:\>ping 10.1.1
Ping request could not find host 10.1.1. Please check the name and try again.
C:\>ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:

Reply from 10.1.1.1: bytes=32 time=14ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time=2ms TTL=128
Reply from 10.1.1.1: bytes=32 time=4ms TTL=128

Ping statistics for 10.1.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 14ms, Average = 5ms
```

```
:\>ping 10.1.2.1

inging 10.1.2.1 with 32 bytes of data:

equest timed out.
eply from 10.1.2.1: bytes=32 time=7ms TTL=126
eply from 10.1.2.1: bytes=32 time=6ms TTL=126
eply from 10.1.2.1: bytes=32 time=6ms TTL=126

ing statistics for 10.1.2.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
pproximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 7ms, Average = 6ms
```



```
C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Reply from 10.1.2.2: bytes=32 time=10ms TTL=254
Reply from 10.1.2.2: bytes=32 time=1ms TTL=254
Reply from 10.1.2.2: bytes=32 time=1ms TTL=254
Reply from 10.1.2.2: bytes=32 time=1ms TTL=254

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 10ms, Average = 3ms
```

SCREESNHOT OF THE NETWORK IN CISCO



ACTIVE CLASS WEEK 8

ACTIVITY 1

1.Role play:

Jasveena: Welcome everyone! Today, we need to discuss how we can manage the increasing number of IoT devices in our network. Let’s start with the first question. Do we have enough IP addresses to assign for each device that connects to the network?

Nadia: With the traditional IPv4 addressing scheme, we have approximately 4.3 billion unique IP addresses. However, with the rapid growth of IoT devices, this number is insufficient to provide a unique IP address for every device.

Pranika: That's correct. We need to find a solution to address the shortage of IPv4 addresses.

Archit: One solution is to transition to IPv6, which provides a vastly larger address space. However, this transition is still in progress and not all devices support IPv6 yet.

Gitanshi: Another solution is to use Network Address Translation (NAT). NAT allows multiple devices on a local network to share a single public IP address, conserving the number of public IP addresses needed.

Jasveena: That's a great point. We can also use the Dynamic Host Configuration Protocol (DHCP) to dynamically assign IP addresses to devices on the network. This helps manage IP address allocation efficiently. Archit: And don't forget about the Internet Control Message Protocol (ICMP). ICMP is used for diagnostic and error-reporting purposes in network communication. It helps us troubleshoot and diagnose network problems.

Gitanshi: Exactly. By using these protocols together, we can effectively manage the IP address space and ensure smooth network operations.

• Discussion:

Do we have enough IP addresses to assign for each device that connect to the network?

Answer: With the traditional IPv4 addressing scheme, we have approximately 4.3 billion unique IP addresses. However, with the rapid growth of IoT devices, this number is insufficient to provide a unique IP address for every device.

Do we have any solution?

Yes, there are several solutions to address the shortage of IPv4 addresses:

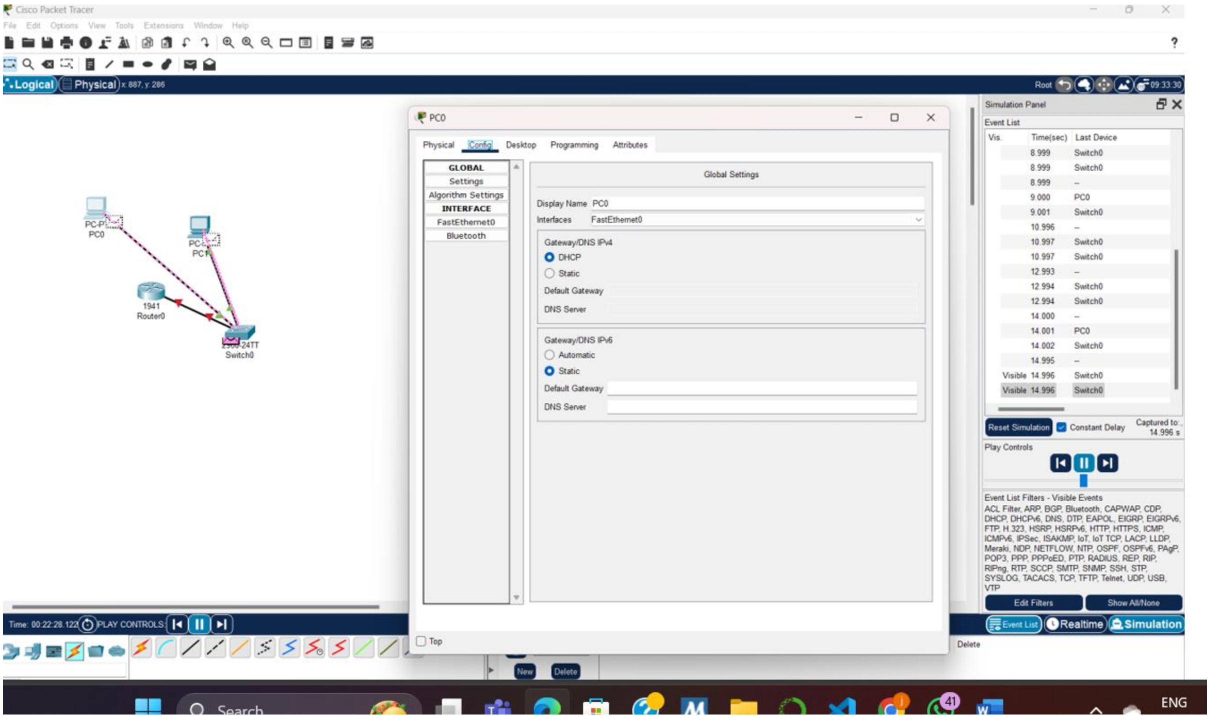
• IPv6: The most comprehensive solution is transitioning to IPv6, which provides a vastly larger address space (approximately 340 undecillion addresses).

• Network Address Translation (NAT): NAT allows multiple devices on a local network to share a single public IP address, conserving the number of public IP addresses needed.

• Dynamic Host Configuration Protocol (DHCP): DHCP dynamically assigns IP addresses to devices on a network, reusing addresses when devices are not actively connected

Explain a protocol that we can use along with IPv4 to conserve the global IP address space.

Answer: Network Address Translation (NAT): NAT is a protocol used to map multiple private IP addresses to a single public IP address (or a few public IP addresses). This allows multiple devices on a local network to access the internet using a single public IP address, effectively conserving the global IP address space. NAT is commonly used in home and office networks.



ACTIVITY 2

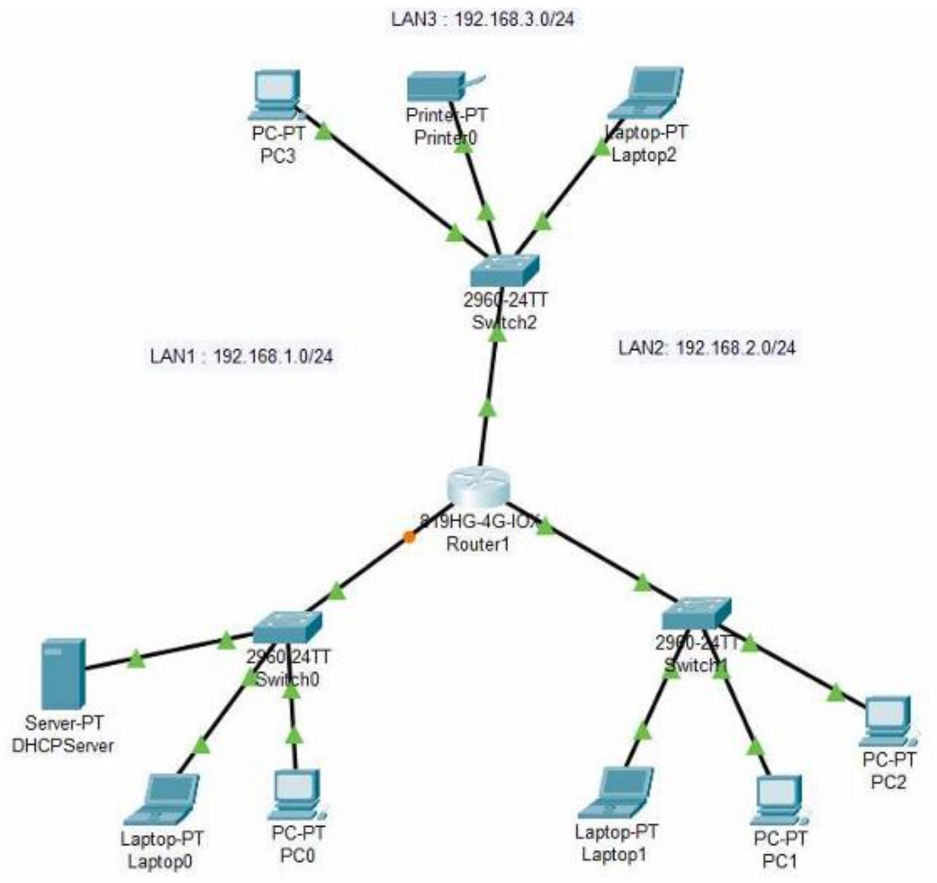
Role Play Scenario

1. **Gitanshi (Router):** “Broadcasting DHCPDISCOVER to find DHCP clients.”
2. **Nadia (Switch):** “Receiving and forwarding DHCPDISCOVER to all devices on the network.”

3. **Pranika (PC):** “Receiving DHCPDISCOVER and responding with a DHCPOFFER message.”
4. **Nadia (Switch):** “Forwarding DHCPOFFER from Pranika to the DHCP server (Gitanshi).”
5. **Gitanshi (Router):** “Receiving DHCPOFFER and sending a DHCPREQUEST message.”
6. **Jasveena (Printer):** “Receiving DHCPREQUEST and responding with a DHCPACK message.”
7. **Archit (Network Storage Device):** “Receiving IP address from DHCPACK, connectivity established.”

TIME	GITANSHI (ROUTER)	Nadia (Switch)	Pranika (PC)	Jasveena (Printer)	Archit (Network Storage Device)	
T1	Broadcasting DHCPDISCOVER	Receiving and forwarding DHCPDISCOVER				
T2		Forwarding DHCPDISCOVER	Receiving and responding with DHCPOFFER			
T3		Forwarding DHCPOFFER				
T4	Receiving DHCPOFFER					

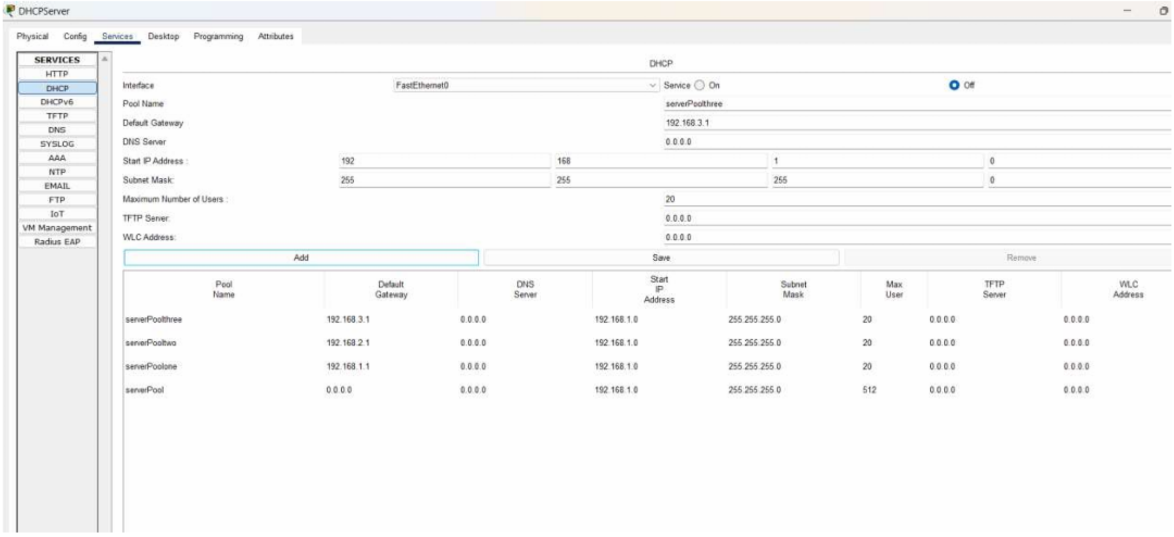
T5	Sending DHCPREQUEST			Receiving DHCPREQUEST		
T6				Responding with DHCPACK		
T7						Receiving IP address, connectivity established

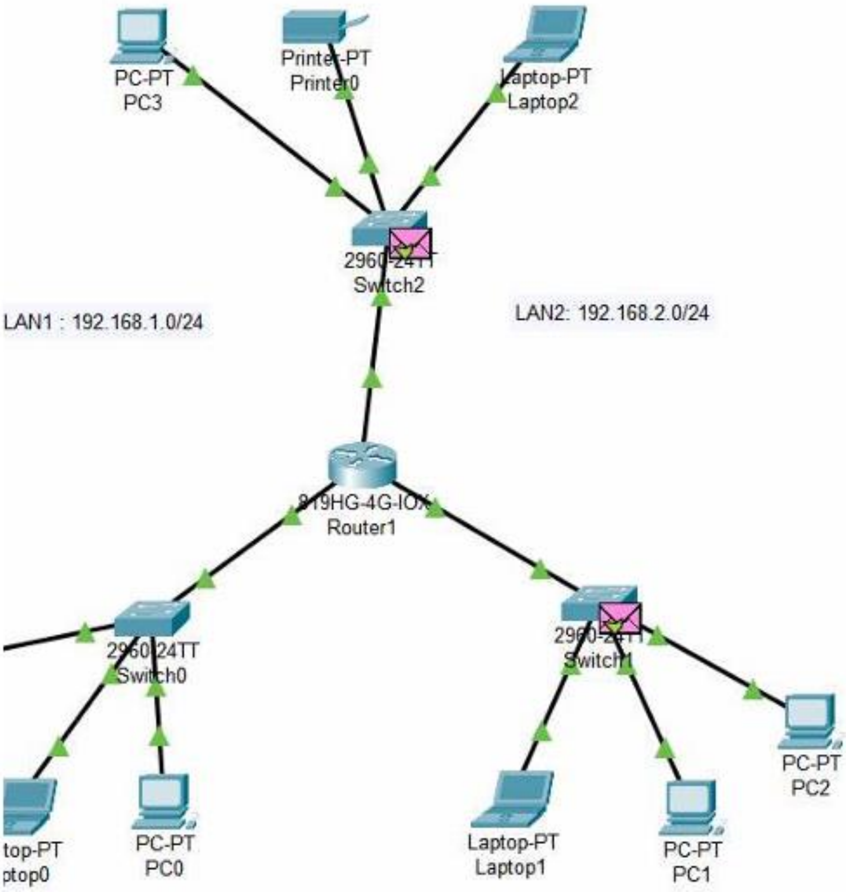


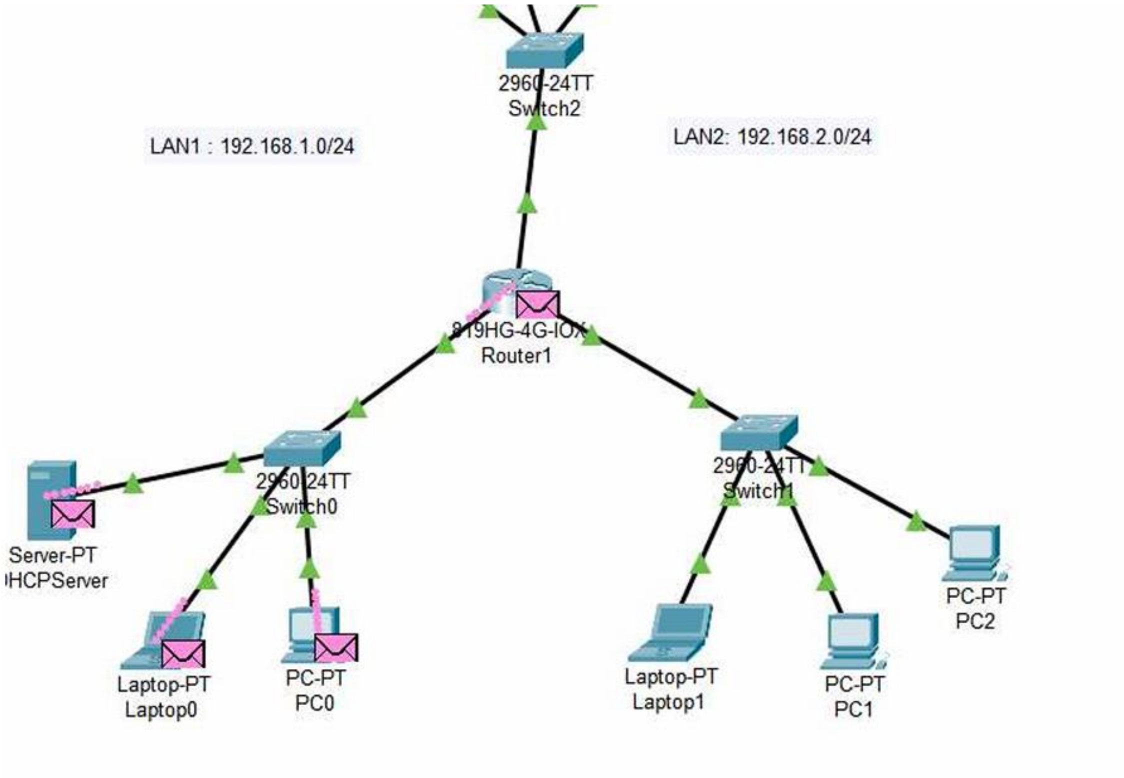
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Configuring DHCP Pool for Subnet 192.168.1.0/24
                                 ^
% Invalid input detected at '^' marker.

Router(config)#ip dhcp pool Pool1
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#defualt-router 192.168.1.1
                                   ^
% Invalid input detected at '^' marker.

Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 8.8.8.
                               ^
% Invalid input detected at '^' marker.

Router(dhcp-config)#dns-server 8.8.8
                               ^
% Invalid input detected at '^' marker.

Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
```

```
Router(config)#
Router(config)#ip dhcp pool Pool2
Router(dhcp-config)#network 192.168.2.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.2.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#
```

```
Router(dhcp-config)#exit
Router(config)#ip dhcp pool Pool3
Router(dhcp-config)#network 192.168.3.1
% Incomplete command.
Router(dhcp-config)#networl 192.168.3.0 255.255.255.0
                           ^
% Invalid input detected at '^' marker.

Router(dhcp-config)#network 192.168.3.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.3.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#
```

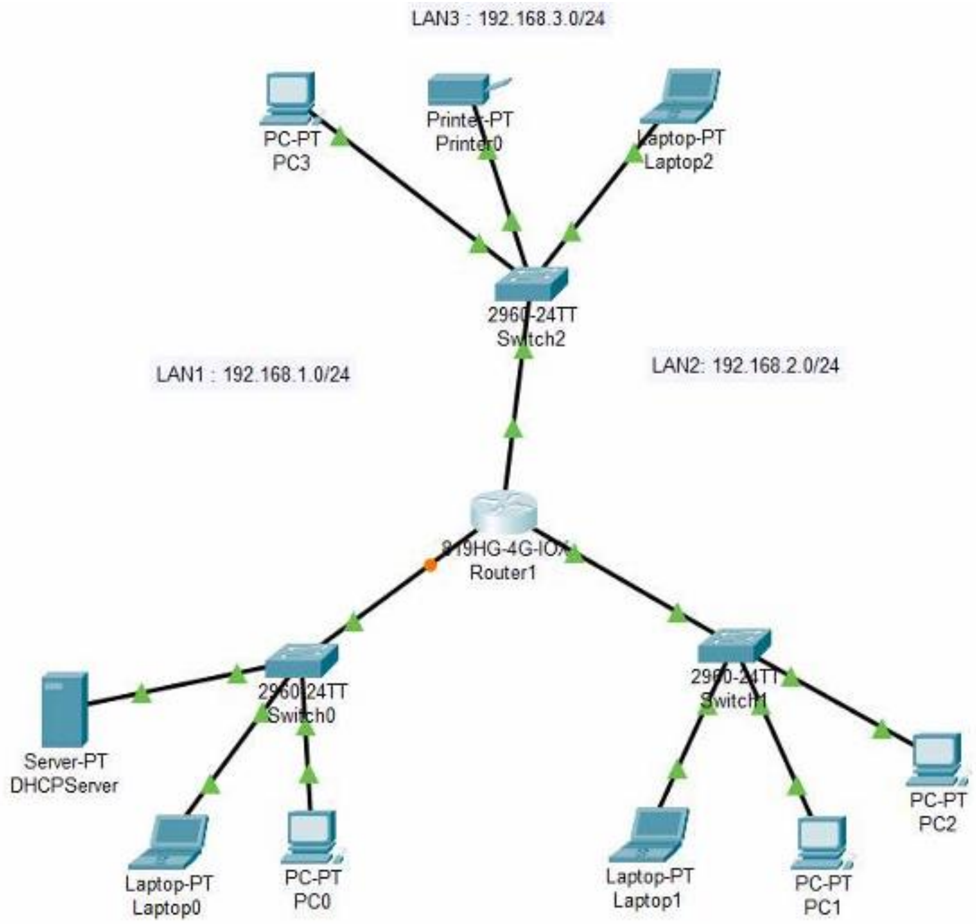

DHCPServer
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPoolthree
Default Gateway
192.168.3.1
DNS Server
0.0.0.0
Start IP Address :
192
168
1
0
Subnet Mask:
255
255
255
0
Maximum Number of Users :
20
TFTP Server:
0.0.0.0
WLC Address:
0.0.0.0
Add
Save
Remove
Pool Name
Default Gateway
DNS Server
Start IP Address
Subnet Mask
Max User
TFTP Server
WLC Address
serverPoolthree 192.168.3.1 0.0.0.0 192.168.1.0 255.255.255.0 20 0.0.0.0 0.0.0.0
serverPooltwo 192.168.2.1 0.0.0.0 192.168.1.0 255.255.255.0 20 0.0.0.0 0.0.0.0
serverPoolone 192.168.1.1 0.0.0.0 192.168.1.0 255.255.255.0 20 0.0.0.0 0.0.0.0
serverPool 0.0.0.0 0.0.0.0 192.168.1.0 255.255.255.0 512 0.0.0.0 0.0.0.0

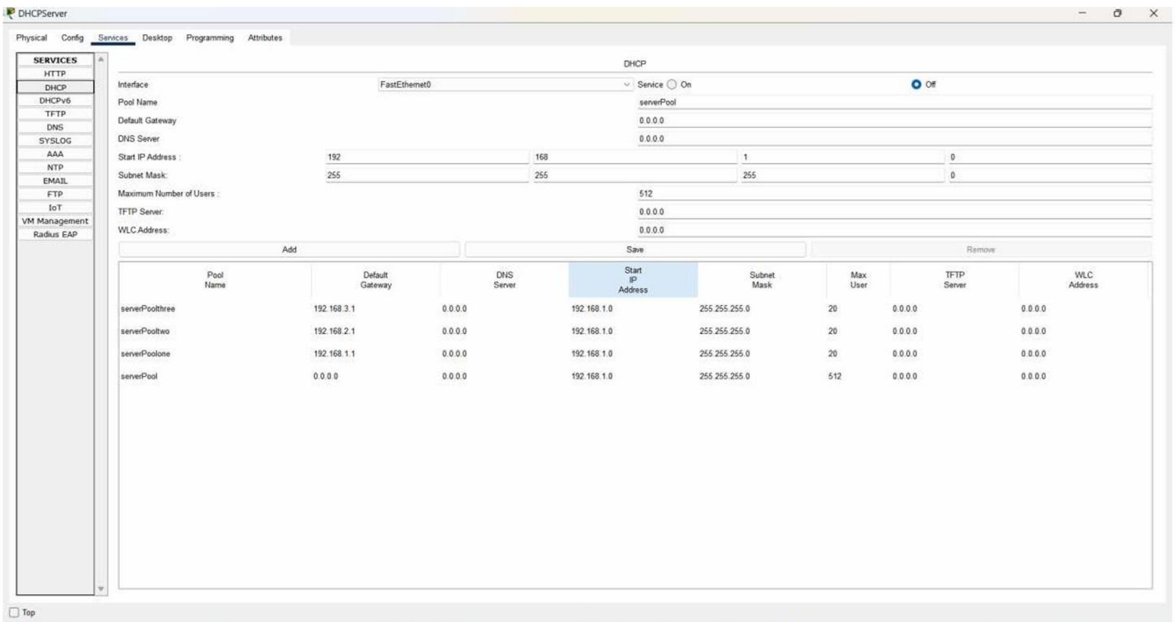

PC-PT
PC3
Printer-PT
Printer0
Laptop-PT
Laptop2
2960-24TT
Switch2
LAN1 : 192.168.1.0/24
LAN2: 192.168.2.0/24
819HG-4G-IOX
Router1
2960-24TT
Switch0
2960-24TT
Switch1
PC-PT
PC0
PC-PT
PC2
Laptop-PT
Laptop1
PC-PT
PC1

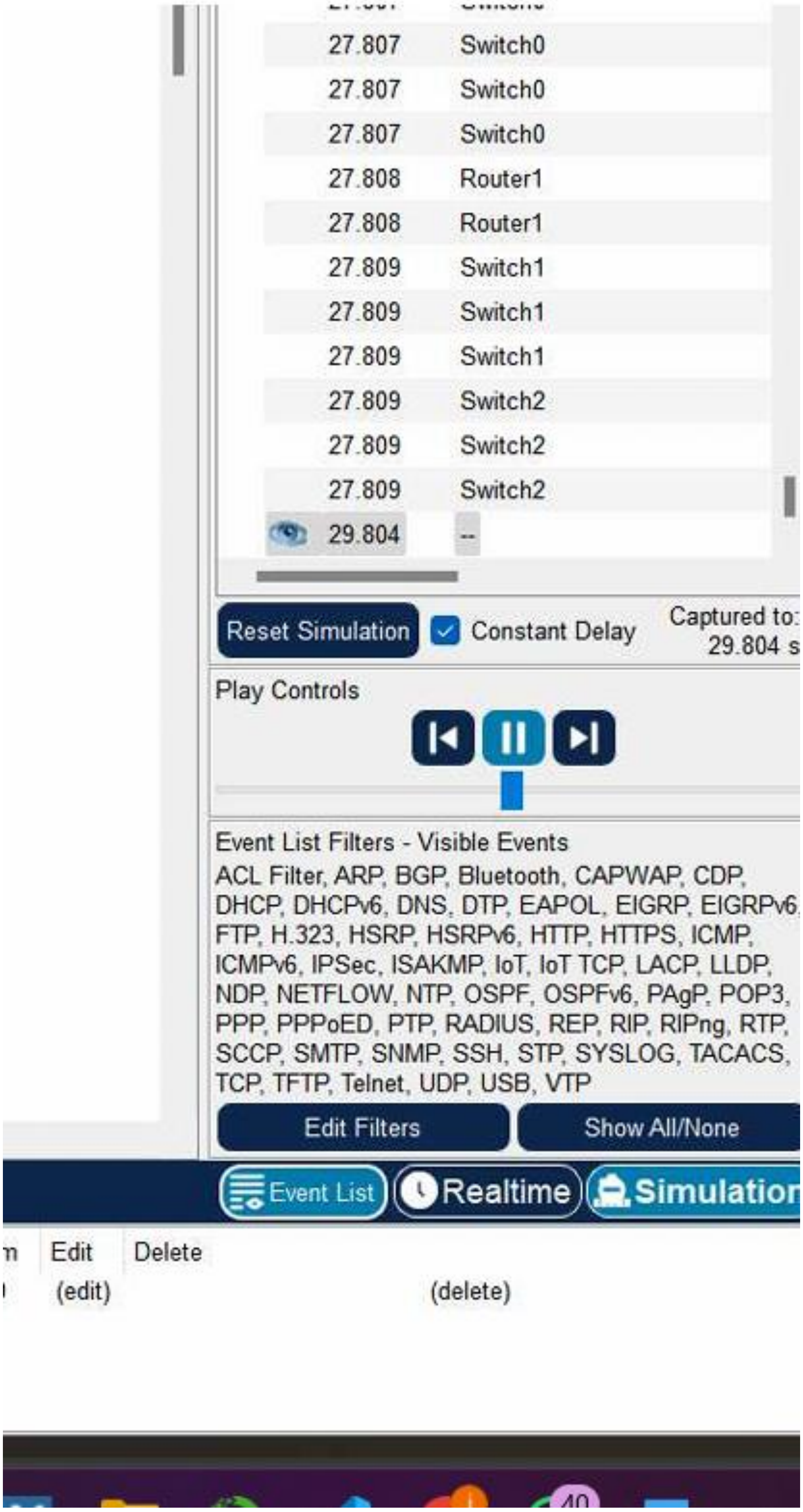

2960-24TT
Switch2
LAN1 : 192.168.1.0/24
LAN2: 192.168.2.0/24
819HG-4G-IOX
Router1
2960-24TT
Switch0
2960-24TT
Switch1
Server-PT
DHCPServer
Laptop-PT
Laptop0
PC-PT
PC0
Laptop-PT
Laptop1
PC-PT
PC1
PC-PT
PC2

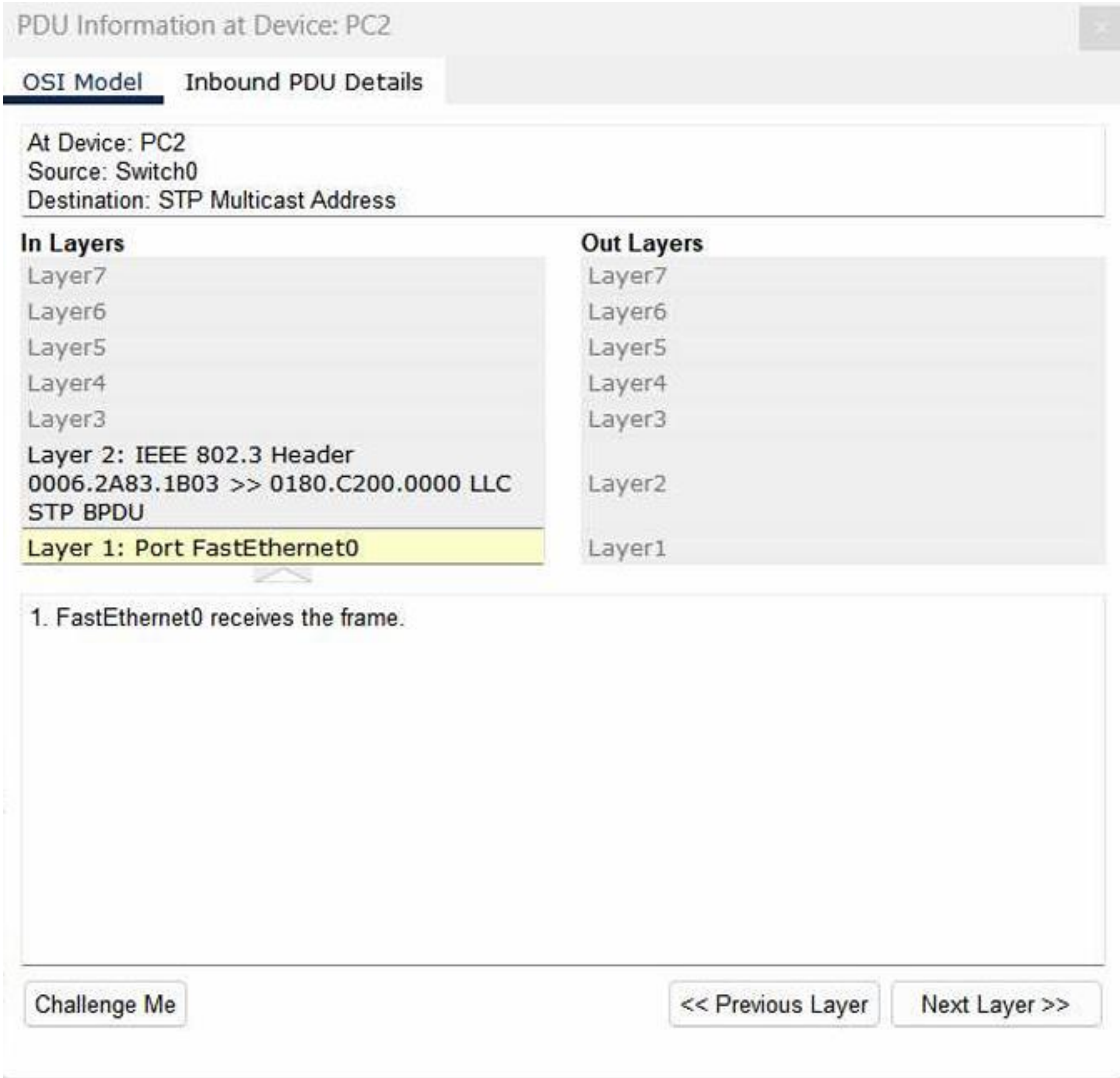
ACTIVITY 3

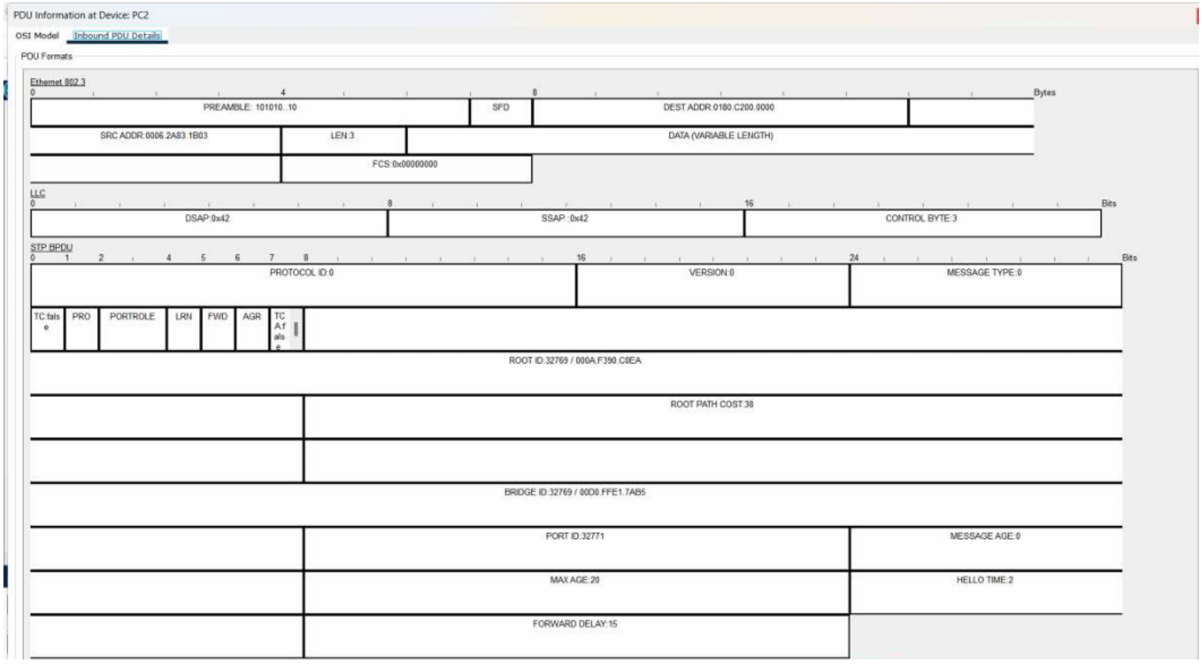
1.


LAN3 : 192.168.3.0/24
PC-PT
PC3
Printer-PT
Printer0
Laptop-PT
Laptop2
2960-24TT
Switch2
LAN1 : 192.168.1.0/24
LAN2: 192.168.2.0/24
819HG-4G-IOX
Router1
2960-24TT
Switch0
2960-24TT
Switch1
Server-PT
DHCPServer
Laptop-PT
Laptop0
PC-PT
PC0
Laptop-PT
Laptop1
PC-PT
PC1
PC-PT
PC2


DHCPServer
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface FastEthernet0
Service On Off
Pool Name serverPool
Default Gateway 0.0.0.0
DNS Server 0.0.0.0
Start IP Address : 192 168 1 0
Subnet Mask: 255 255 255 0
Maximum Number of Users : 512
TFTP Server: 0.0.0.0
WLC Address: 0.0.0.0
Add
Save
Remove
Pool Name | Default Gateway | DNS Server | Start IP Address | Subnet Mask | Max User | TFTP Server | WLC Address
serverPoolthree | 192.168.3.1 | 0.0.0.0 | 192.168.1.0 | 255.255.255.0 | 20 | 0.0.0.0 | 0.0.0.0
serverPooltwo | 192.168.2.1 | 0.0.0.0 | 192.168.1.0 | 255.255.255.0 | 20 | 0.0.0.0 | 0.0.0.0
serverPoolone | 192.168.1.1 | 0.0.0.0 | 192.168.1.0 | 255.255.255.0 | 20 | 0.0.0.0 | 0.0.0.0
serverPool | 0.0.0.0 | 0.0.0.0 | 192.168.1.0 | 255.255.255.0 | 512 | 0.0.0.0 | 0.0.0.0
Top


27.807 Switch0
27.807 Switch0
27.807 Switch0
27.808 Router1
27.808 Router1
27.809 Switch1
27.809 Switch1
27.809 Switch1
27.809 Switch2
27.809 Switch2
27.809 Switch2
29.804 --
Reset Simulation
Constant Delay
Captured to:
29.804 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Event List
Realtime
Simulation
Edit
Delete
(edit)
(delete)


PDU Information at Device: PC2
OSI Model
Inbound PDU Details
At Device: PC2
Source: Switch0
Destination: STP Multicast Address
In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: IEEE 802.3 Header 0006.2A83.1B03 >> 0180.C200.0000 LLC STP BPDU
Layer 1: Port FastEthernet0
Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1
1. FastEthernet0 receives the frame.
Challenge Me
<< Previous Layer
Next Layer >>


PDU Information at Device: PC2
OSI Model
Inbound PDU Details
PDU Formats
Ethernet 802.3
Bytes
PREAMBLE: 101010..10
SFD
DEST ADDR:0180.C200.0000
SRC ADDR:0006.2A83.1B03
LEN:3
DATA (VARIABLE LENGTH)
FCS:0x00000000
LLC
Bits
DSAP:0x42
SSAP :0x42
CONTROL BYTE:3
STP BPDU
Bits
PROTOCOL ID:0
VERSION:0
MESSAGE TYPE:0
TC:false
PRO
PORTROLE
LRN
FWD
AGR
TCA:false
ROOT ID:32769 / 000A.F390.C0EA
ROOT PATH COST:38
BRIDGE ID:32769 / 00D0.FFE1.7AB5
PORT ID:32771
MESSAGE AGE:0
MAX AGE:20
HELLO TIME:2
FORWARD DELAY:15

QUES 5 AND 6

ICMP Message Format and Details

ICMP Message Format:

The Internet Control Message Protocol (ICMP) message format consists of the following fields:

1. **Type:** Indicates the type of the ICMP message (e.g., Echo Request, Echo Reply).

2. **Code:** Provides further information about the type (e.g., for Type 3 (Destination Unreachable), Code 0 means "Network Unreachable").

3. **Checksum:** Error-checking data to ensure the message has not been corrupted.

4. **Identifier:** Used to match requests and replies (mainly for Echo Requests and Replies).

5. **Sequence Number:** Used to identify multiple messages or packets of the same type.

6. **Data:** Contains additional information relevant to the ICMP message type, such as the payload of an Echo Request or Reply.

ICMP Message Types:

- **Type 0:** Echo Reply

- **Type 3:** Destination Unreachable

- **Type 8:** Echo Request

- **Type 11:** Time Exceeded (used by traceroute)

Changes in ICMP Messages between Ping and Traceroute

Ping:

- **Type:** 8 (Echo Request) for sending, 0 (Echo Reply) for responses.

- **Code:** Generally 0 for both Echo Requests and Replies.

- **Purpose:** Used to check if a host is reachable and to measure round-trip time.

Traceroute:

- **Type:** 11 (Time Exceeded) for reporting hops along the path to the destination.

- **Code:** Typically 0 for TTL Expired in Transit.

- **Purpose:** Determines the path packets take to reach the destination by sending packets with incrementally increasing TTL (Time-to-Live) values and recording the ICMP Time Exceeded messages returned by intermediate routers.

Behavior in Traceroute vs. Ping

- **Ping:** Sends Echo Request packets to the destination and waits for Echo Reply packets. It measures the round-trip time and checks reachability.

- **Traceroute:** Sends packets with increasing TTL values. Each router along the path decrements the TTL and, when it reaches zero, sends back an ICMP Time Exceeded message. This process helps in mapping out the route by identifying each hop between the source and destination.