

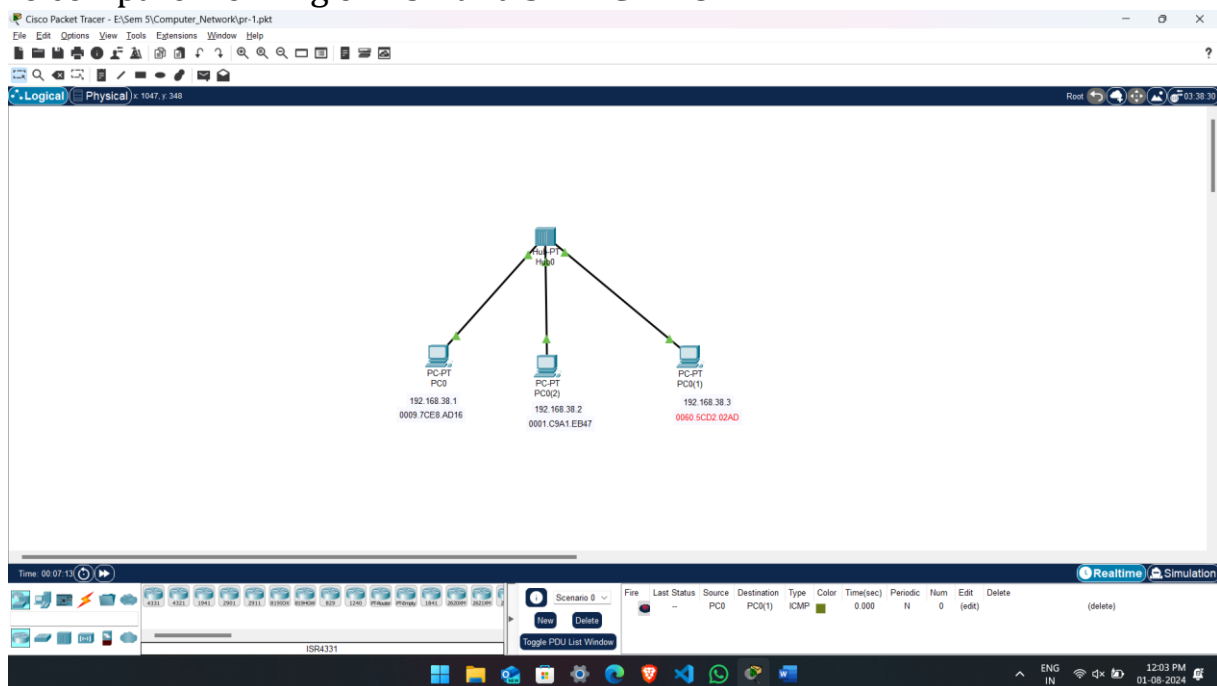
## Practical - 1

### Aim:

An organization named Green Tech Solution contains 2 departments: Production and Sales in the same premises. Each department has 3 users. Departments are connected with each other using switches. Report the changes in ARP table when any user from production department communicates with any user of sales department.

### Task 1:

To compare working of HUB and SWITCH HUB:



PDU Information at Device: PC0

OSI Model

Outbound PDU Details

At Device: PC0  
Source: PC0  
Destination: PC0(1)

In Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer2

Layer1

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 192.168.38.1, Dest. IP: 192.168.38.3 ICMP Message Type: 8

Layer 2: Ethernet II Header 0009.7CE8.AD16 >> 0060.5CD2.02AD

Layer 1: Port(s): FastEthernet0

1. The Ping process starts the next ping request.

2. The Ping process creates an ICMP Echo Request message and sends it to the lower process.

3. The source IP address is not specified. The device sets it to the port's IP address.

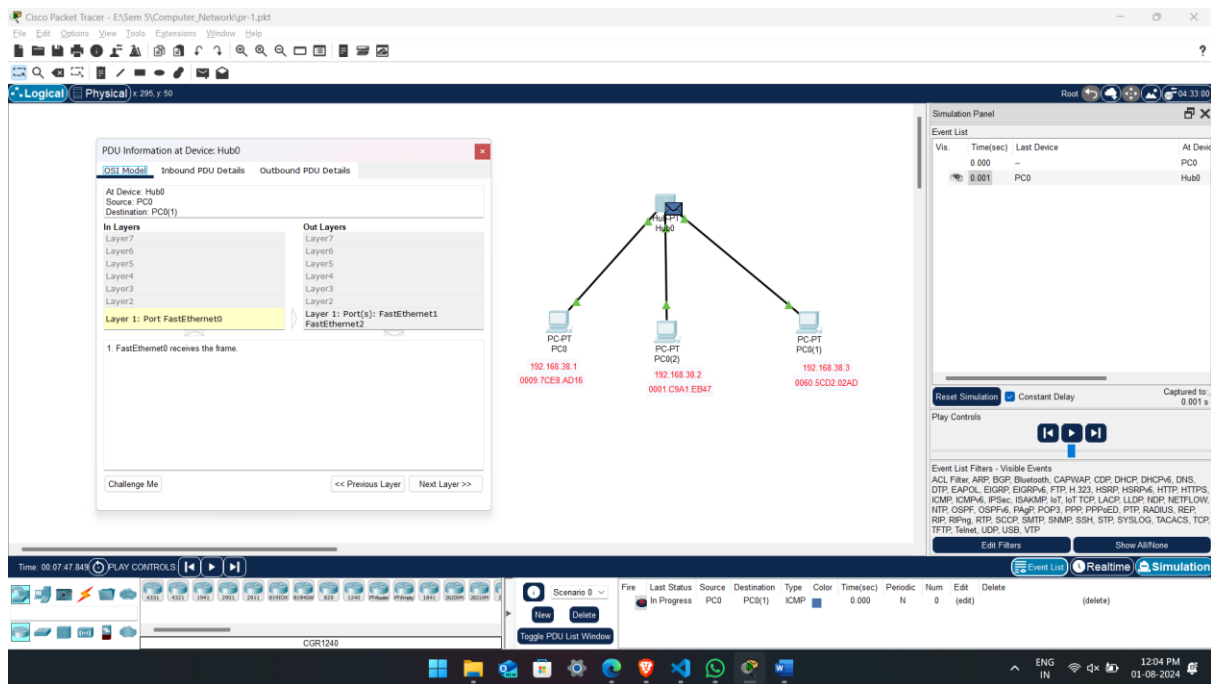
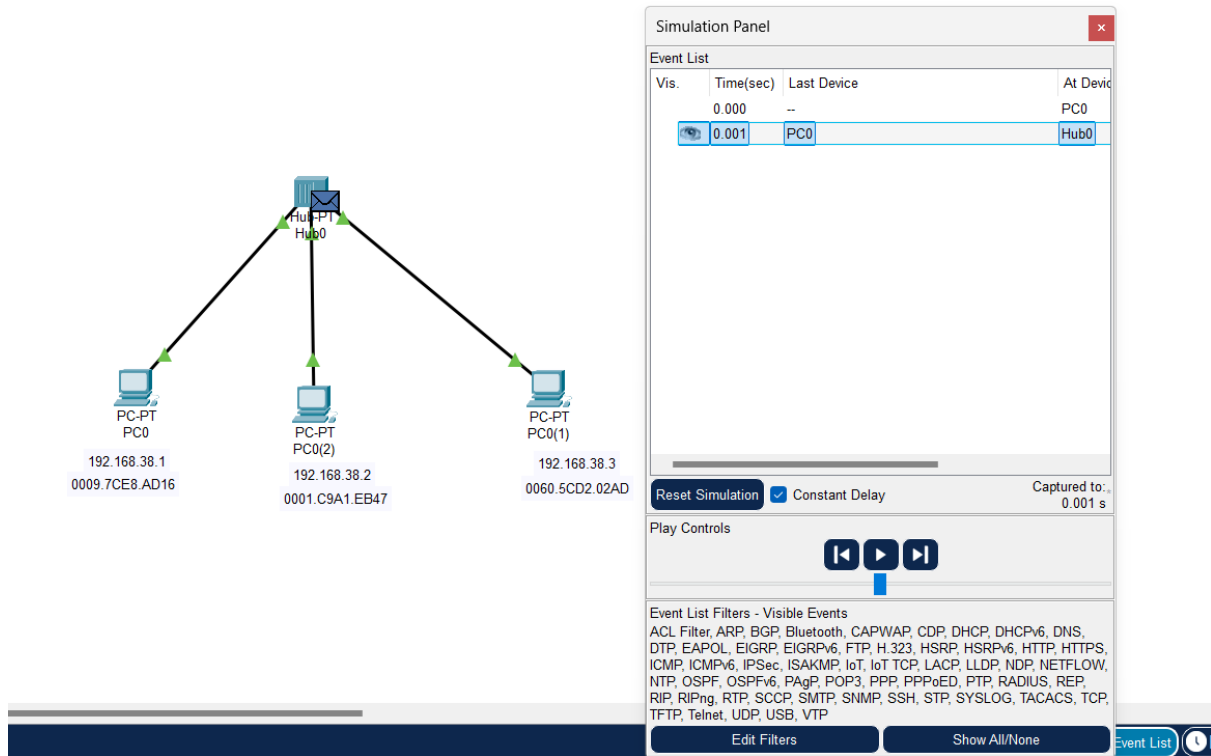
4. The device sets TTL in the packet header.

5. The destination IP address is in the same subnet. The device sets the next-hop to destination.

Challenge Me

<< Previous Layer

Next Layer >>



Name: Ayush Patel Enrolment: 22162171038 Class B Batch 55

Cisco Packet Tracer - E:\Sem 5\Computer\_Network\pr-1.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x:1208, y:121

**PDU Information at Device: PC0(2)**

OSI Model Inbound PDU Details

At Device: PC0(2)  
Source: PC0  
Destination: PC0(1)

**In Layers**

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header  
0009.7CE8.AD16 >> 0060.SCD2.02AD
- Layer1: Port FastEthernet0

**Out Layers**

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1

1. FastEthernet0 receives the frame.

Challenge Me << Previous Layer Next Layer >>

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device
	0.000	--	PC0
	0.001	PC0	Hub0
	0.002	Hub0	PC0(1)
	0.002	Hub0	PC0(2)

Reset Simulation Constant Delay Captured to: 0.002 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, PAgg, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:07:47.850 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC0 PC0(1) ICMP 0.000 N 0 (edit) (delete)

CGR1248

ENG IN 12:06 PM 01-08-2024

Cisco Packet Tracer - E:\Sem 5\Computer\_Network\pr-1.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x:1209, y:181

**PDU Information at Device: Hub0**

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Hub0  
Source: PC0  
Destination: PC0(1)

**In Layers**

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1: Port FastEthernet1

**Out Layers**

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1: Port(s): FastEthernet0 FastEthernet2

1. FastEthernet1 receives the frame.

Challenge Me << Previous Layer Next Layer >>

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device
	0.000	--	PC0
	0.001	PC0	Hub0
	0.002	Hub0	PC0(1)
	0.002	Hub0	PC0(2)
	0.003	PC0(1)	Hub0

Reset Simulation Constant Delay Captured to: 0.003 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, PAgg, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:07:47.850 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC0 PC0(1) ICMP 0.000 N 0 (edit) (delete)

CGR1248

ENG IN 12:07 PM 01-08-2024

Name: Ayush Patel Enrolment: 22162171038 Class B Batch 55

Cisco Packet Tracer - E:\Sem 5\Computer\_Network\pr-1.pkt

Logical Physical x: 1291, y: 184

PDU Information at Device: PC0(2)

At Device: PC0(2)  
Source: PC0  
Destination: PC0(1)

In Layers  
Layer7  
Layer6  
Layer5  
Layer4  
Layer3  
Layer2: Ethernet II Header  
0060:SCD2:02AD -> 0009:7CE8:AD16  
Layer1: Port FastEthernet0

Out Layers  
Layer7  
Layer6  
Layer5  
Layer4  
Layer3  
Layer2  
Layer1

1. FastEthernet0 receives the frame.

Challenge Me << Previous Layer Next Layer >>

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device
	0.000	-	PC0
	0.001	PC0	Hub0
	0.002	Hub0	PC0(1)
	0.002	Hub0	PC0(2)
	0.003	PC0(1)	Hub0
	0.004	Hub0	PC0
	0.004	Hub0	PC0(2)

Reset Simulation Constant Delay Captured to: 0.004 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, Ist, Ist TCP, LACP, LLDP, NBP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RFP, RFPv6, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show AllNone

Time: 00:07:47.850 PLAY CONTROLS

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

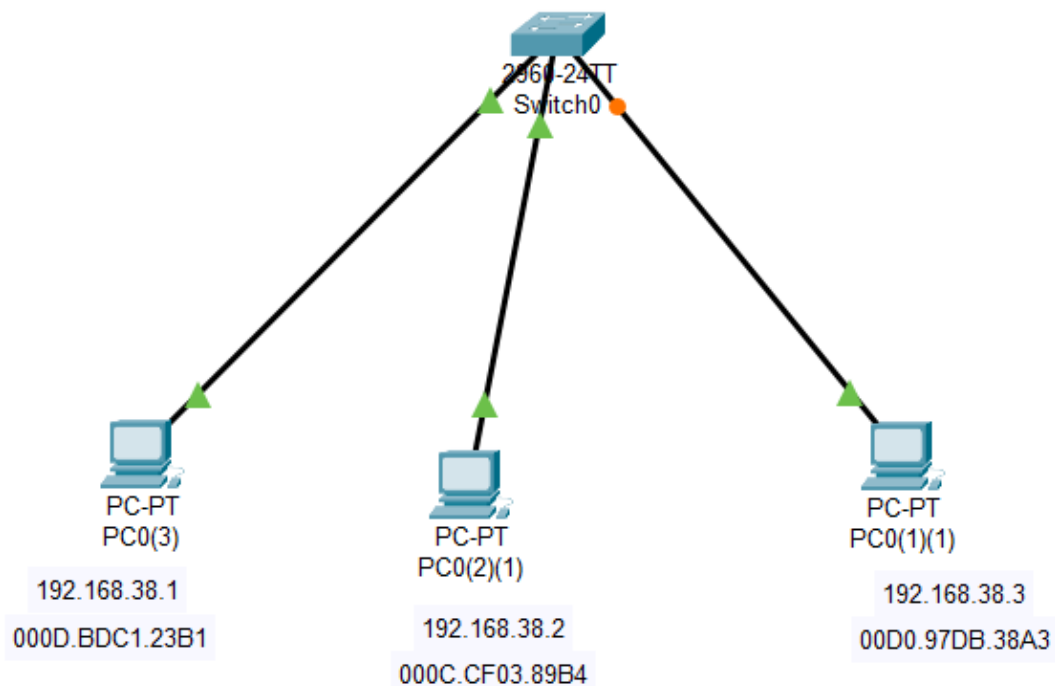
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC0(1)	ICMP		0.000	N	0	(edit)	(delete)

Toggle PDU List Window

CGR1248

ENG IN 12:07 PM 01-08-2024

SWITCH:



## Task 2:

To verify the role of Address Resolution Protocol (ARP) in a network of an organization.

The image displays a Cisco Packet Tracer simulation environment. The main window shows a network topology with a central switch connected to three PCs. A command window on the left shows the configuration of the switch, including setting interfaces to 'up' and displaying the MAC address table. The right panel shows the Event List with ARP events. The bottom panel shows the PDU Information at Device: PC0(3), detailing the ARP request packet structure and the simulation controls.

**Command Window Output:**

```
Press RETURN to get started!  
Switch>show mac-address-table  
Mac Address Table  
-----  
Vlan    Mac Address      Type    Ports  
----    -  
Switch#
```

**Event List:**

Vis	Time(sec)	Last Device	At Device	Type
Visible 0.000	-	PC0(3)	PC0(3)	ICMP
Visible 0.000	-	PC0(3)	PC0(3)	ARP

**PDU Information at Device: PC0(3):**

OSI Model: Outbound PDU Details

At Device: PC0(3)  
Source: PC0(3)  
Destination: Broadcast

In Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Out Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Layer 2: Ethernet II Header  
0000.BD01.23B1 >> FFFF.FFFF.FFFF ARP  
Packet Src. IP: 192.168.38.1, Dest. IP: 192.168.38.3  
Layer 1: Port(s): FastEthernet0

1. The ARP process constructs a request for the target IP address.  
2. The device encapsulates the PDU into an Ethernet frame.

**Simulation Panel:**

Reset Simulation Constant Delay Captured to: 0.000 s

Play Controls: [Play] [Pause] [Stop] [Fast Forward] [Rewind]

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, iSCSI, LACP, LLDP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

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The screenshot shows the Cisco Packet Tracer interface. On the left, the 'CLI' window for 'Switch0' displays the following commands and output:

```
Switch0> enable
Switch0# configure terminal
Switch0(config)# interface FastEthernet0/1
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# interface FastEthernet0/2
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# interface FastEthernet0/3
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# end
Switch0# show mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
Switch0#
```

The network diagram shows a central switch connected to three PCs (PC0/3, PC0/2, PC0/1). The PCs have IP addresses 192.168.38.1, 192.168.38.2, and 192.168.38.3 respectively. The switch has MAC addresses 000D.E0C1.23B1, 000C.CF03.89B4, and 00D0.97D8.38A3.

The 'Simulation Panel' on the right shows the 'Event List' with the following entries:

Vis	Time(sec)	Last Device	At Device	Type
Visible	0.000	-	PC0(3)	ICMP
Visible	0.000	-	PC0(3)	ARP

The 'Play Controls' section shows the simulation is running at 'Constant Delay' with a 'Captured to: 0.000 s'.

The screenshot shows the Cisco Packet Tracer interface. On the left, the 'CLI' window for 'Switch0' displays the following commands and output:

```
Switch0> enable
Switch0# configure terminal
Switch0(config)# interface FastEthernet0/1
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# interface FastEthernet0/2
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# interface FastEthernet0/3
Switch0(config-if)# no shutdown
Switch0(config-if)# exit
Switch0(config)# end
Switch0# show mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
Switch0#
```

The network diagram shows a central switch connected to two PCs (PC0/2, PC0/1). The PCs have IP addresses 192.168.38.2 and 192.168.38.3 respectively. The switch has MAC addresses 000C.CF03.89B4 and 00D0.97D8.38A3.

The 'Simulation Panel' on the right shows the 'Event List' with the following entries:

Vis	Time(sec)	Last Device	At Device	Type
Visible	0.000	-	PC0(3)	ICMP
Visible	0.000	-	PC0(3)	ARP

The 'Play Controls' section shows the simulation is running at 'Constant Delay' with a 'Captured to: 0.001 s'.

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Cisco Packet Tracer - ESem 5\Computer\_Network\gn-1.pkt

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch>enable
Switch#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
Switch#clear
% Incomplete command.
Switch#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
1     000d.bdc1.23b1    DYNAMIC   Fa0/1
Switch#
Vlan  Mac Address      Type      Ports
----  -
1     000d.bdc1.23b1    DYNAMIC   Fa0/1
Switch#
```

Copy Paste

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
0.000	-	PC(3)	PC(3)	ICMP
0.000	-	PC(3)	PC(3)	ARP
0.001	PC(3)	Switch0	Switch0	ARP
Visible 0.002	Switch0	PC(2)(1)	PC(2)(1)	ARP
Visible 0.002	Switch0	PC(1)(1)	PC(1)(1)	ARP

Reset Simulation Constant Delay Captured to: 0.002 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, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:12:03.411 PLAY CONTROLS

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC(3) PC(1)(1) ICMP 0.000 N 0 (edit) (delete)

Toggle POI List Window

Automatically Choose Connection Type

ENG IN 12:50 PM 01-08-2024

Cisco Packet Tracer - ESem 5\Computer\_Network\gn-1.pkt

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch>enable
Switch#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
Switch#clear
% Incomplete command.
Switch#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
1     000d.bdc1.23b1    DYNAMIC   Fa0/1
Switch#
Vlan  Mac Address      Type      Ports
----  -
1     000d.bdc1.23b1    DYNAMIC   Fa0/1
Switch#
Vlan  Mac Address      Type      Ports
----  -
1     000d.bdc1.23b1    DYNAMIC   Fa0/1
Switch#
Vlan  Mac Address      Type      Ports
----  -
1     000d.97db.38a3    DYNAMIC   Fa0/3
Switch#
```

Copy Paste

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
0.000	-	PC(3)	PC(3)	ICMP
0.000	-	PC(3)	PC(3)	ARP
0.001	PC(3)	Switch0	Switch0	ARP
0.002	Switch0	PC(2)(1)	PC(2)(1)	ARP
0.002	Switch0	PC(1)(1)	PC(1)(1)	ARP
Visible 0.003	PC(1)(1)	Switch0	Switch0	ARP

Reset Simulation Constant Delay Captured to: 0.003 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, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:12:03.412 PLAY CONTROLS

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC(3) PC(1)(1) ICMP 0.000 N 0 (edit) (delete)

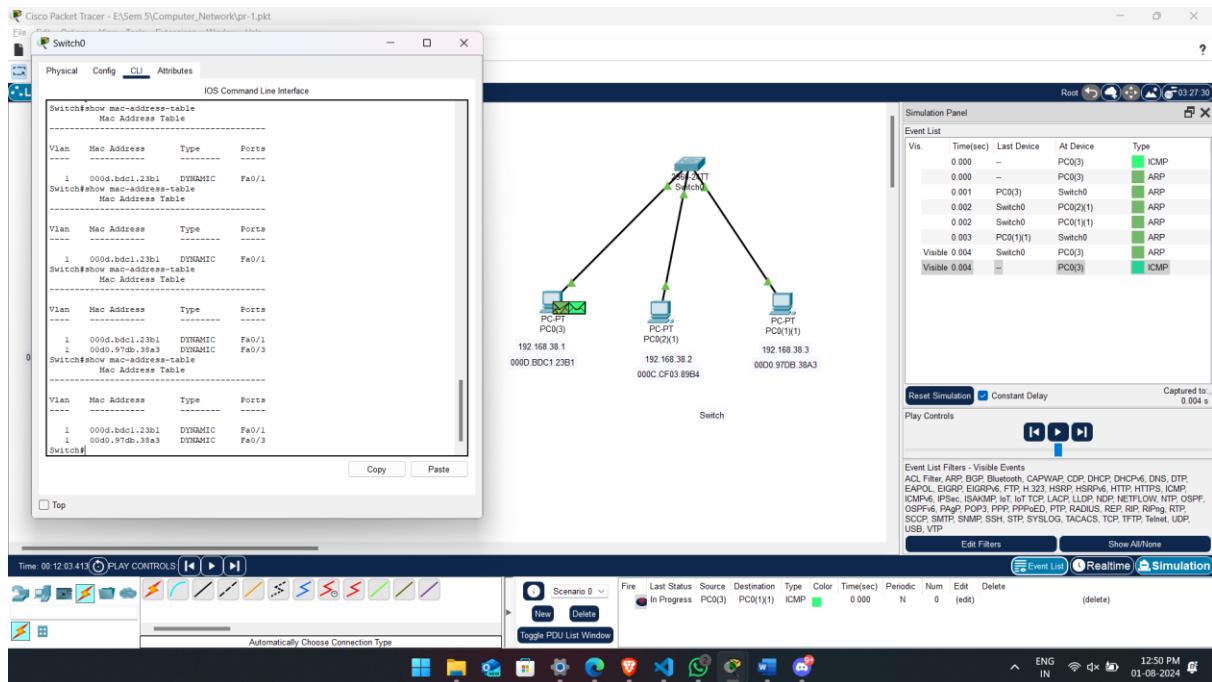
Toggle POI List Window

Automatically Choose Connection Type

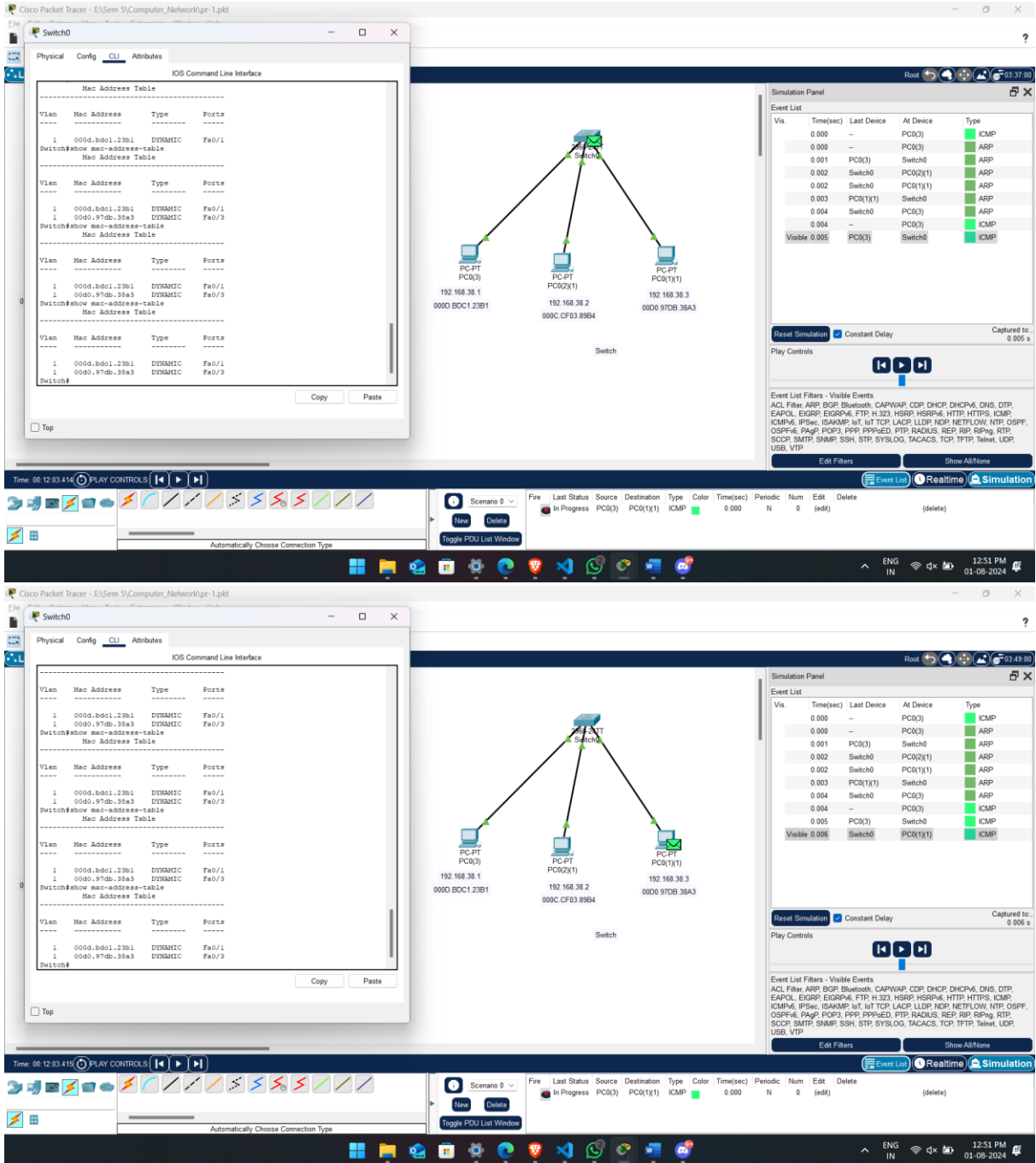
ENG IN 12:50 PM 01-08-2024



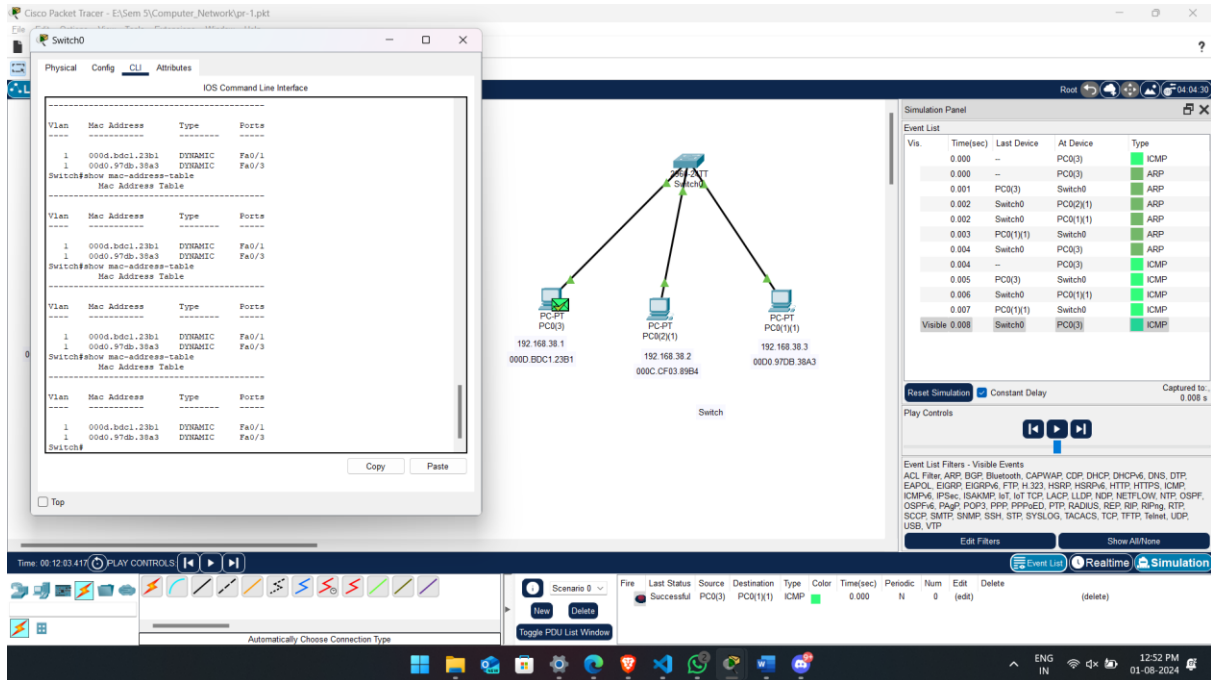
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## Conclusion:

In simulating a Cisco Packet Tracer, we have shown that switches are better than hubs in terms of networking performance. Unlike hubs that randomly broadcast data to all devices causing congestion and slowing down the system, switches direct packets toward certain devices resulting into fewer collisions thereby increasing speed.