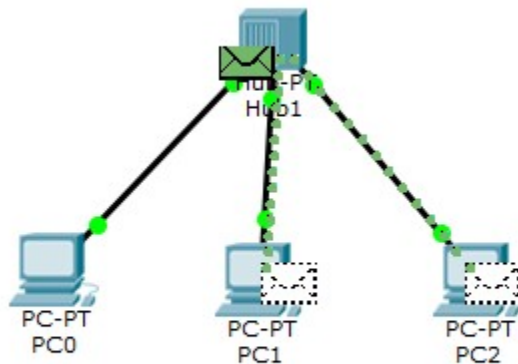


**LAB1: Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate the ping message.**

Topology with Hub as connecting Device:

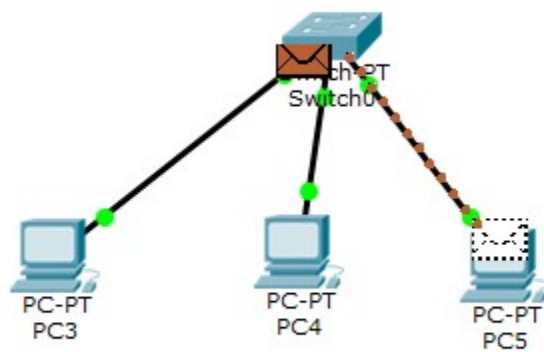


Simulation Panel					
Event List					
Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC0	ICMP	
	0.001	PC0	Hub1	ICMP	
	0.002	Hub1	PC1	ICMP	
	0.002	Hub1	PC2	ICMP	
	0.003	PC2	Hub1	ICMP	

Reset Simulation ☒ Constant Delay

Captured to: \*  
0.003 s

Topology with Switch as connecting Device:



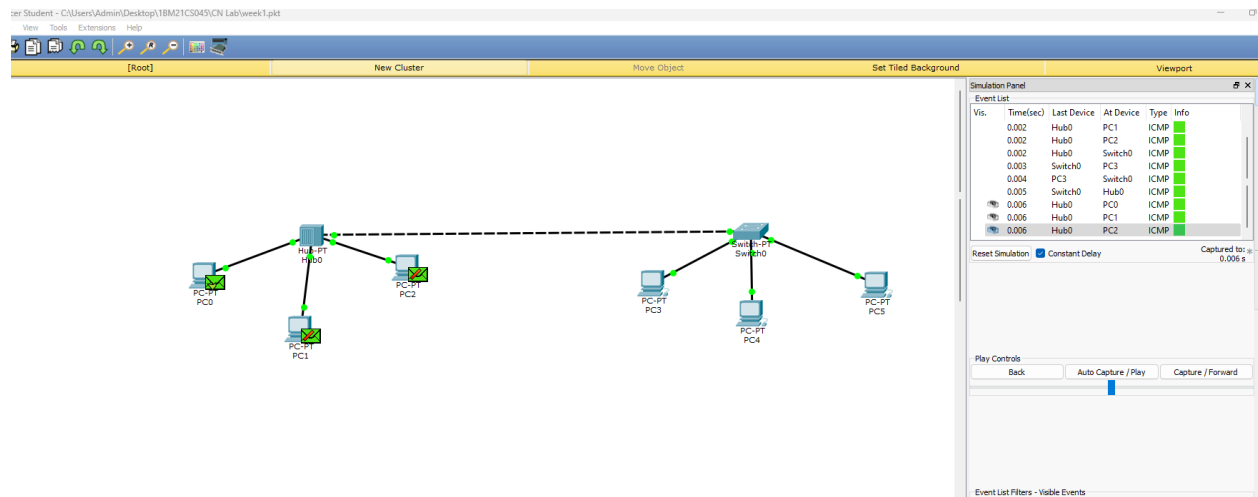
Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC3	ICMP	
	0.001	PC3	Switch0	ICMP	
	0.002	Switch0	PC5	ICMP	
	0.003	PC5	Switch0	ICMP	
	0.004	Switch0	PC3	ICMP	
	11.413	--	Switch0	DTP	

Reset Simulation ☒ Constant Delay Capturing... \*

## Topology with Switch and Hub together:



Q1 Create a log topology & stimulate sending a simple PDU from source to destination using a simple hub & switch as connecting domains.

Hub : Physical layer

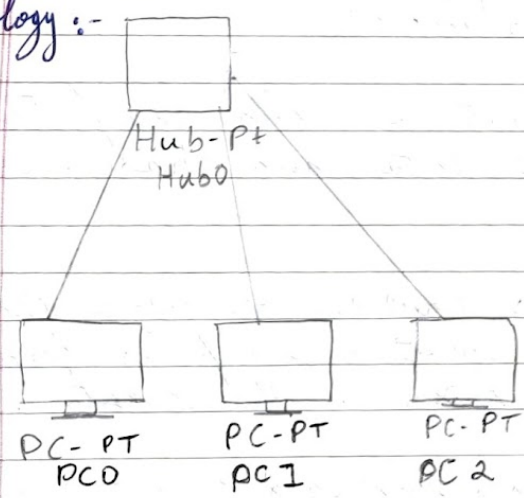
Switch : Data link layer

Hub : unicast - half duplex

Switch : Broadcast - Full duplex

Aim: To create topology & stimulate sending packets (simple PDU) from source to destination using Hub.

Topology :-



Hub-0 connected with 3 PCs.

Procedure:

Step 1: Select The network is started by selecting end services as 3 PC-PTs, i.e generic PC.

Step 2: Select Generic Hub, Hub-PT and place all of them in the workspace.

Step 3: Now, connect the 3 PCs to the Hub using Copper - Straight Through cable. PC0 - Port 0, PC1 - Port 1, PC2 - Port 2.

Step 4: Open the config <sup>window</sup> of all PCs and set the open FastEthernet0.

Set the IP Address of all the 3 PCs.

For ex: 10.0.0.1<sup>PC0</sup>, 10.0.0.2<sup>PC1</sup>, 10.0.0.3<sup>PC2</sup> respectively.

Step 5: Click on DNS server.

Step 6: Add a simple PDU from PC0 to PC2.

Step 7: In Simulation mode Click on Auto Capture / Play.

Observation: ~~PC0~~

→ PC 0 sends a packet to Hub 0.

→ Hub 0 sends the packet to both PC1 and PC2.

→ PC2 accepts the packet and sends acknowledgement to Hub 0. PC1 rejects it since it is not addressed to it.

→ The acknowledgement packet from Hub 0 is



sent to PC0 and PC1. PC0 accepts it and PC1 rejects it

Ping Output :- 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

Switch - 3 PCs

Procedure:

Step 1: The network is started by selecting end devices as 3 PC-PTS, i.e. generic PC.

Step 2: Select Generic switch-PT and place these devices in the workspace.

Step 3: Now, connect the 3 PCs to the switch using copper straight through cable.

Wire PC3 - Port 0, PC4 - In Switch:

PC3 - FastEthernet 0/1, PC4 - FastEthernet 1/1

PC5 - FastEthernet 2/1

In PC - choose FastEthernet0 connection

Step 4 - Open config window of all PCs and in FastEthernet0, set IP addresses.

PC3 - 10.0.0.4, PC4 - 10.0.0.5

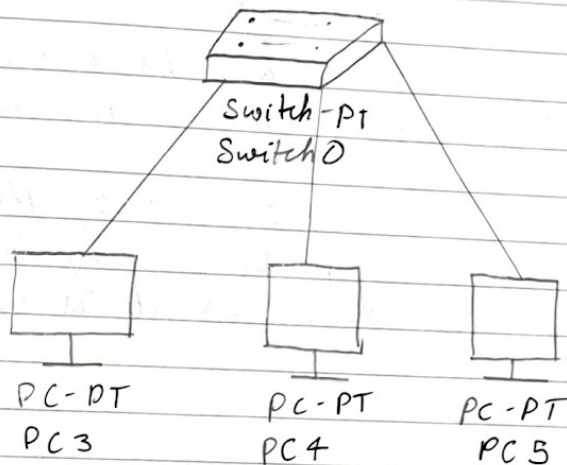
PC5 - 10.0.0.6

Then click on DNS server.

Step 3 - Add a Simple PDU from PC 3 to PC 5.

Step 6: In Simulation mode Click on Auto Capture / Play.

Topology.



Ping Output in real time mode: In PC 3

PC > ping 10.0.0.6

Pinging 10.0.0.6 with 32 bytes of data:

Reply from 10.0.0.6: bytes = 32 time = 0ms TTL = 128

Reply from 10.0.0.6: bytes = 32 time = 0ms TTL = 128

Reply from 10.0.0.6: bytes = 32 time = 0ms TTL = 128

Reply from 10.0.0.6: bytes = 32 time = 0ms TTL = 128

Ping statistics for 10.0.0.6:

Repackets: SetSent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 0ms, Average = 0ms.

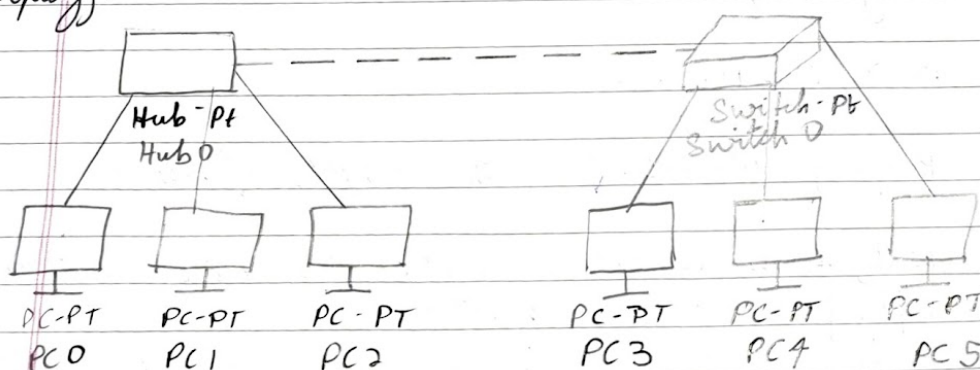
### Observation

PC 3 to PC 5

- PC 3 sends a packet to Switch 0.
- Switch 0 sends the packets to all devices (PC 4, PC 5) in first time.
- PC 5 accepts and sends acknowledgment.
- Switch sends it to all and PC 3 accepts.
- From next time Switch learns the devices if it sends packets only to correct source devices as it is smart device.

Aim: Connecting Hub and Switch.

Topology:





## Procedure

Step 1: Previously obtained Hub topology and switch topology are connected using Copper-cross over cable  
Port 3-hub to FastEthernet 3/1.

Step 2: Add simple PDU from PC0 to PC3.

## Ping output

ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes = 32	time = 1ms	TTL = 128
Reply from 10.0.0.4: bytes = 32	time = 0ms	TTL = 128
Reply from 10.0.0.4: bytes = 32	time = 3ms	TTL = 128
Reply from 10.0.0.4: bytes = 32	time = 0ms	TTL = 128

Ping statistics for 10.0.0.4:

Packets : Sent = 4, Received = 4, Lost = 0 (0% lost),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 3ms, Average = 1ms

Observation: PC0 to PC3

- PC0 sends PDU to packet to Hub 0. #
- Hub 0 sends the packets to all PC1, PC2 and Switch.
- Switch sends the packets to all PC3, PC4, PC5 at first instance.
- PC3 accepts the packet and it is sent

PC0 via Hub 0. But Hub 0 also sends it to PC1 and PC2 as well where it is rejected.

- On the second instance, PC0 sends packet again to Hub 1. It sends to all P1, PC2, ~~PC3~~, ~~PC4~~ and Switch. Switch sends to only PC3 as it has already learnt about the device and acknowledgement is sent via Hub 0. Hub 0 sends it to all, where PC0 accepts it and so on.

NP  
15/6/2023