

Q1) Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping message.

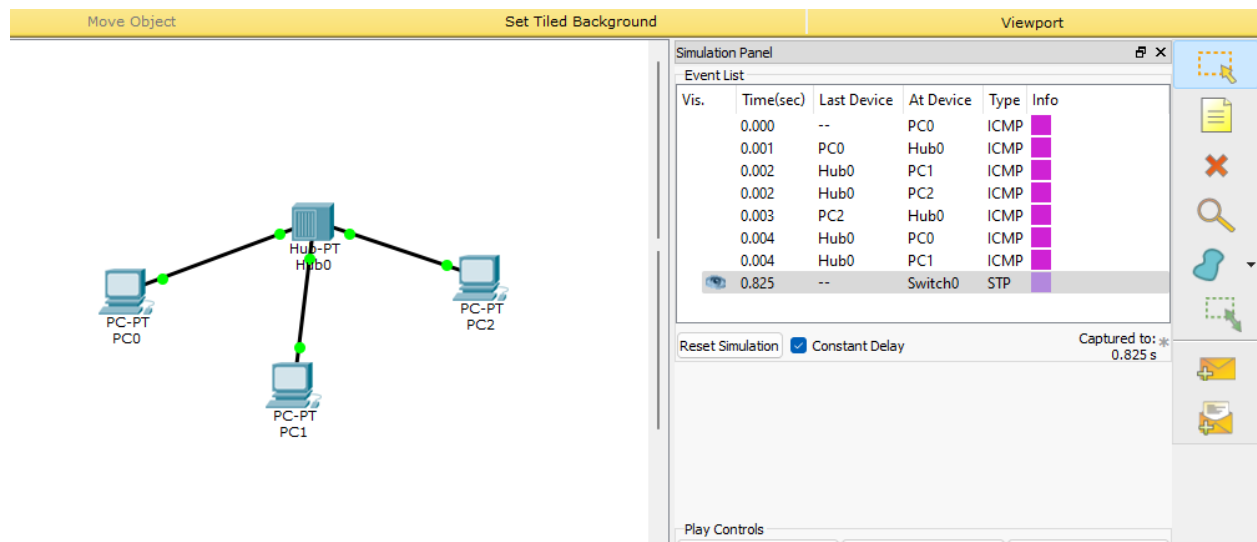


Fig 1: Topology with hub as connecting device

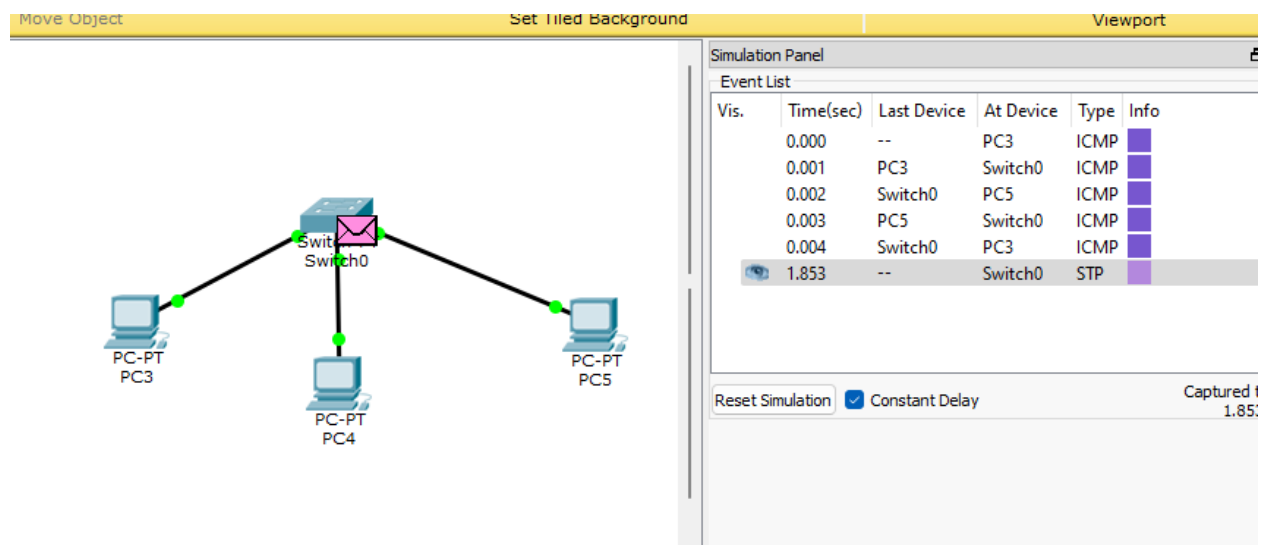


Fig 2: Topology with switch as connecting device

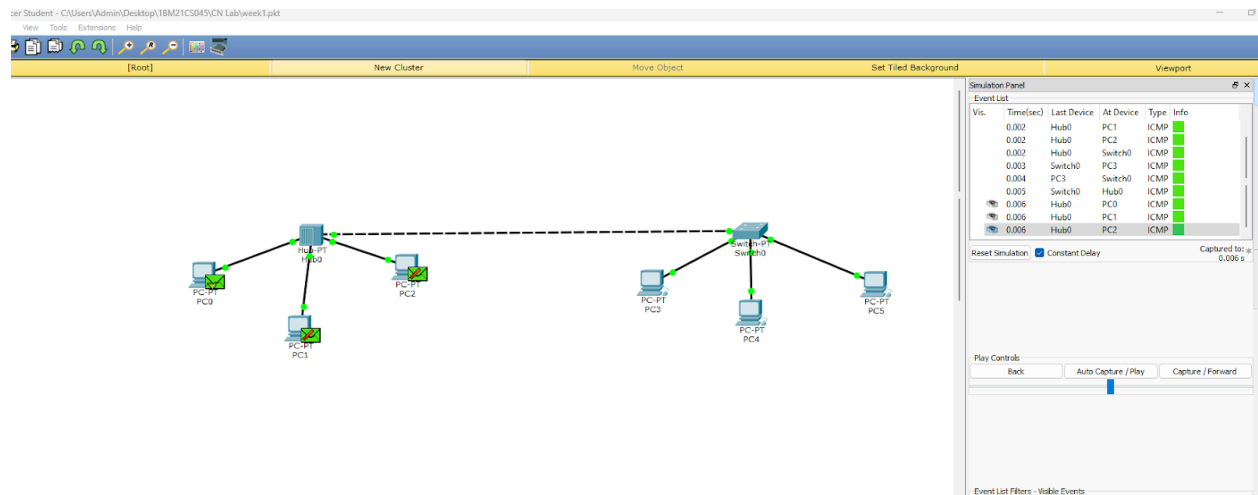


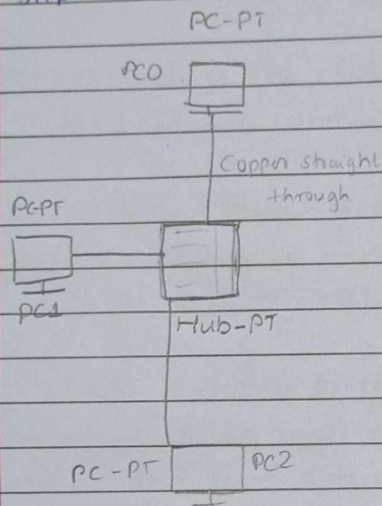
Fig 3: Topology with switch and hub connected

15/6/23

Q1 Create a topology and simulate sending a simple PDU from source to destination using a simple hub and switch as connecting domains

~~Step~~ Aim: To observe the sending of simple PDU from source to destination using hub and switch.

~~Step~~



Hub.

Step 1: The network is started by selecting end devices as PC-PT. 3 PC-PTs are chosen.

Step 2: Select Hub-PT as connecting devices and place all of these in workplace.

Step 3: For connection, Copper straight through cable is chosen and this hub and ^{PC0, PC1 and PC2} PCs are connected using port 0, port 1, and port 2 respectively.

Step 4: Open PC configuration windows of ~~all~~ all PCs one-by-one and open config window set IP address for each device in FastEthernet0. Set the DNS server. PC0 is set to 10.0.0.1, PC1 to 10.0.0.2 PC2 to 10.0.0.3.

Step 5: Add a simple PDU from PC0 to PC2.

Step 6: In Simulation mode click on Auto Capture/play

Step 7: Observation →

PC0 sends packet to hub and hub sends it to both PC1 and PC2. ✕

PC1 discards the message while PC2 accepts it

PC2 sends acknowledgement packet back to Hub

Hub again sends it to PC0 and PC1

PC1 discards it and PC0 accepts it

Pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3: bytes 32 time=0ms TTL=128

Reply from 10.0.0.3: bytes 32 time=3ms TTL=128

Reply from 10.0.0.3: bytes 32 time=0ms TTL=128

Reply from 10.0.0.3: 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 = 0 ms, Maximum = 3 ms, Average = 0 ms

Step: Switch

Step 1: For end device use 3 PC-PT as PC3, PC4, and PC5.

Step 2: Switch ~~PC-P~~ is the connecting domain

Step 3: Copper straight through is used for connection on PC side chose FastEthernet (C)

PC3 connected to FastEthernet 0/1,

PC4 to FastEthernet 0/1

PC5 to FastEthernet 2/1 of switch

Step 4: Config IP address of PC3 to 10.0.0.4

PC4 to 10.0.0.5 PC5 to 10.0.0.6

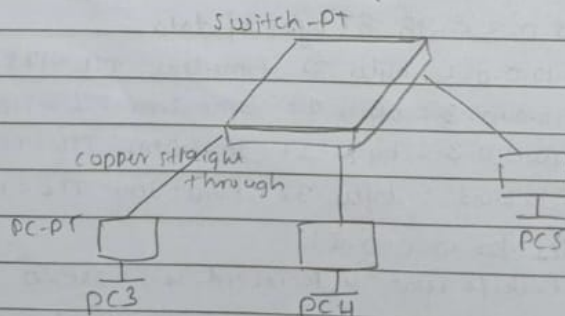
set DNS server for each

Step 5: Add simple PDU from PC3 to PC4

Step 6: ~~SE~~ Click Auto capture/play

Observation:

PC3 sends packet to switch which is further sent to both PC4 and PC5 in first round ~~But~~ PC4 discards it and PC5 accepts



Ping in real time mode. from PC3 to PC5

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:

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

Approximate round trip times in milliseconds:

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

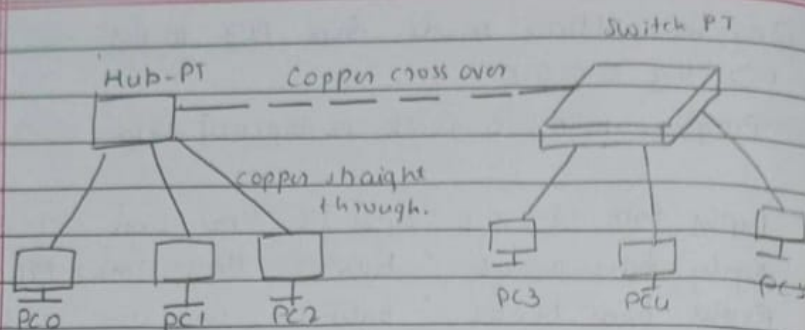
Observation in simulation mode

PC3 sends packet to switch and it sends to both PC4 & PC5 in first round.

PC4 rejects PC5 accepts and send acknowledge to packet to both PC3 & PC4

PC4 discards it PC3 accepts it.

Now when PC3 sends packet it sends only to PC5. Thus switch is a smart device.



Step 1: Previously drawn ~~be~~ Hub topology and switch topology are connected through copper cross over. In hub port 3 is used in switch FastEthernet 3/1 is used.

Step 2: Add simple PDU from PC0 to PC3.

ping to 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% loss),

Approximate round trip times in milliseconds:

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

Observation:

In simulation mode PC0 sends packet to hub

Hub sends it to PC1, PC2 and switch.

Switch broadcasts it to PC3, PC4 and PC5

PC1, PC2, PC4 and PC5 discards them.

PC3 accepts and sends acknowledgment to switch to hub through switch.

Hub broadcasts it to all 3 PCs

Only PC0 accepts it and others discard.

In second round PC0 sends ^{packet} message to hub

It's broadcasted to PC1, PC2, switch.

Now switch ~~broadcasts~~ ^{unicast} it only to PC3.

Thus switch is smart device.

N
15/6/2023