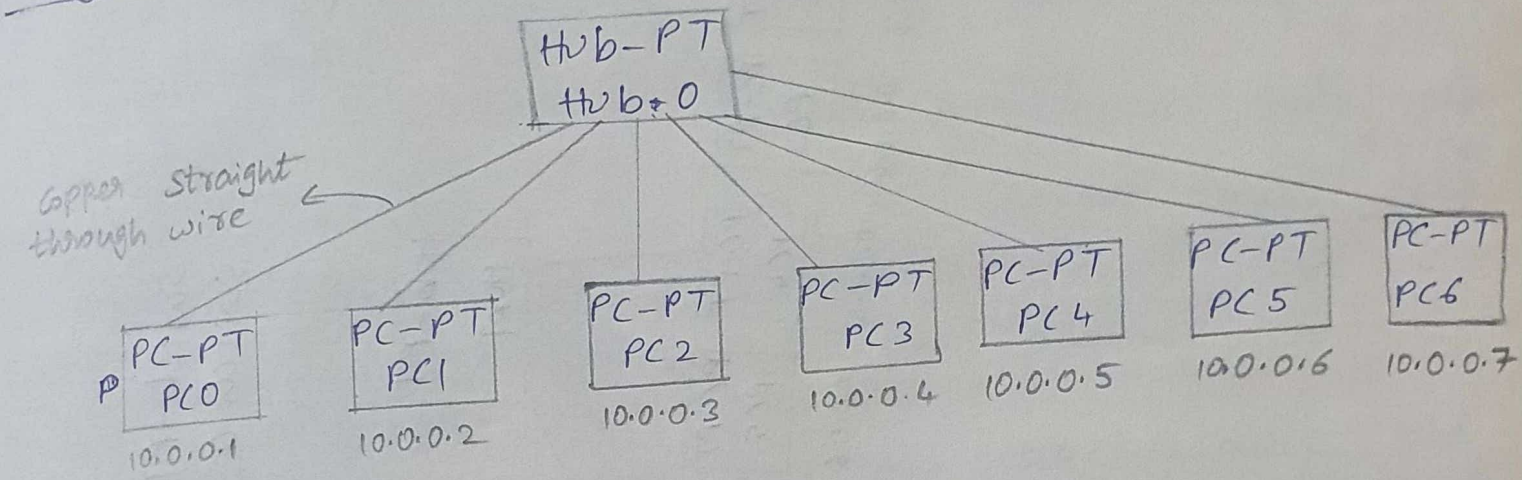
10/11/22

Lab - week - 1

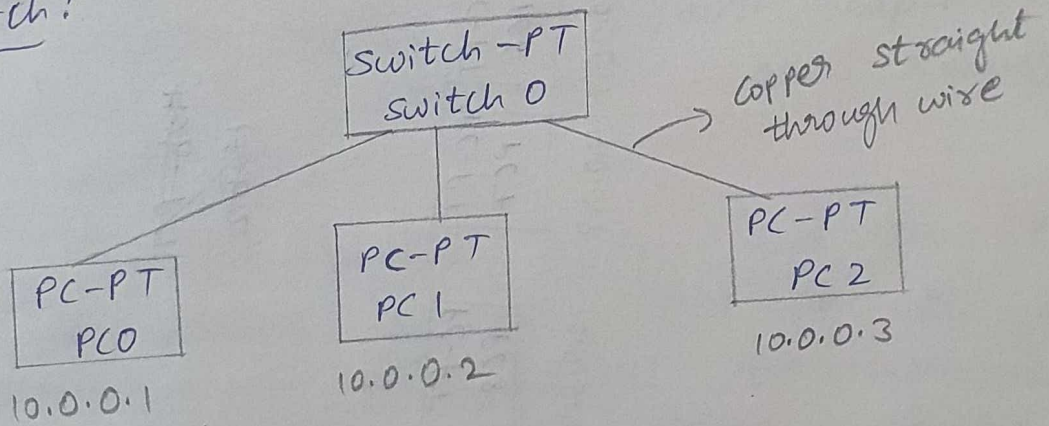
Aim: Creating a topology and simulate sending a simple PDU from source to destination using simple hub and switch as connecting domain.

Topology:

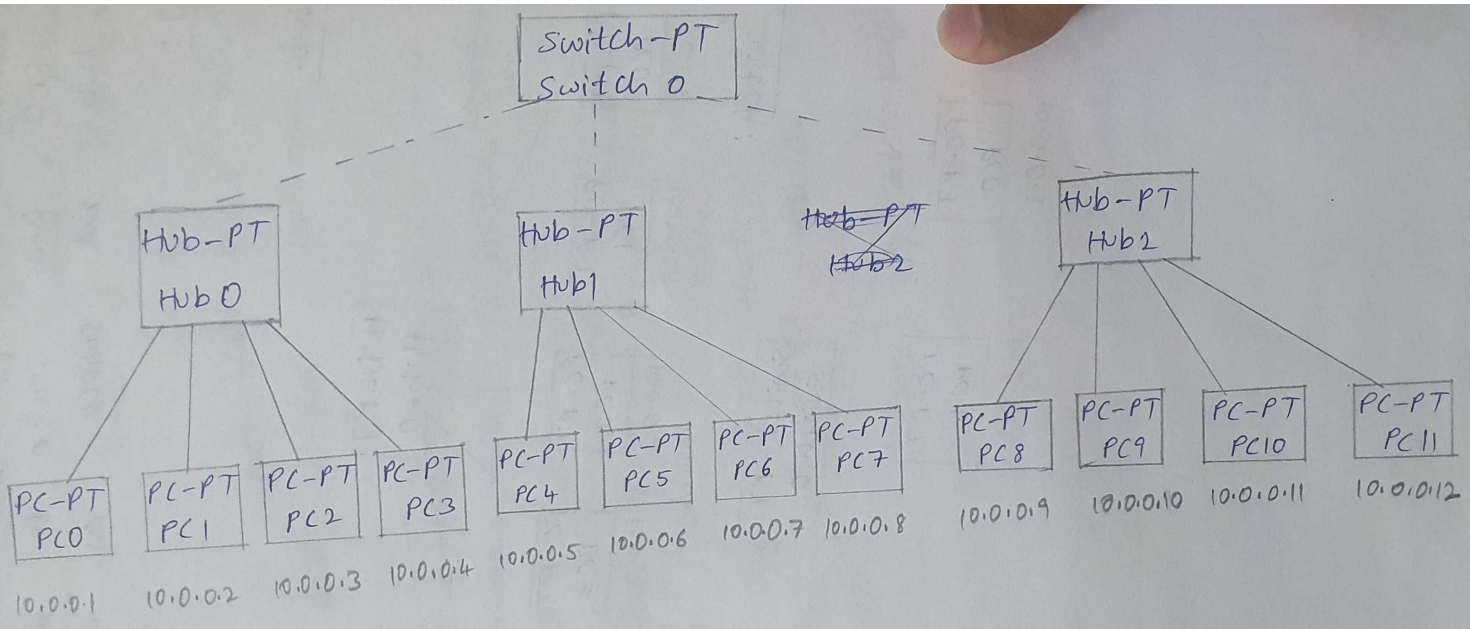
using hub:



using switch:



Hybrid (using hubs and switches)



Procedure:

Using Hub: 1) Add generic hub and seven PCs to workspace
2) Configure the IP address of each PC in configuration tab. Ensure that IP is different for each device.
3) Connect all PC's to hub using copper straight wire.
4) Hub and PC is connected to each other's fast ethernet connection.
5) If no. of ports is insufficient then add extra port by clicking on device. Turn off device and add necessary ports
6) Write the IP's of all devices in note below the device.

Real time: Select source PC and in desktop tab, select command prompt option. In command prompt type ping 10.0.0.3. This pings PC2 and response is generated in PC0.

Simulation time: Select simple PDU and select source and destination computer. clicking on auto capture option allows us to see how ports are transferred to and from device.

Using switch: i) Add generic switch and then PCs to workspace.
ii) Configure IP addresses of each PCs in the configuration tab. Ensure that IP is different for each device.
iii) Connect all PCs to switch using copper straight through wire.
iv) If no. of ports are insufficient then add extra ports by clicking on device. Turn off device and add necessary ports.
v) write IP's of all devices in note below the device.

Real time: Select source PC and in the desktop tab. Select Command prompt option. In Command prompt option, Ping destination PC by specifying its IP.

Simulation time: Select simple PDU and select source and destination Computer. clicking on auto Capture option allows us to see how packets are transferred.

Hybrid mode: i) Add a switch, 3 hubs and 12 PC's to workspace.

ii) Connect three hubs to switch and 4 PC's to each of the hubs using copper cross over and copper straight through wires respectively.

iii) Configure the IP of each of the PC in configure and add a note below each PC containing IP addresses

iv) Real time mode: Select PC you want to send packet from and open its command prompt. specify destination PC by specifying its IP address. A response is sent by destination PC to source PC.

Simulation mode: Add a simple PDU by selecting the pair of PC and click on auto capture from right panel.

Observation:

→ Hub:

Learning outcomes: i) when source sends a packet in network the hub ~~servic~~. source the packet and ends broad cast over the network, i.e., it sends data to all the end devices in network and mode where it matches with the specified address accepts the packet and acknowledge it. Remaining nodes ignore the message.

ii) Comm^{n}. b/n. hub and end devices is established through copper straight through wire as they belong to different layers.

iii) No. of ports can be added if needed by clicking on the device and adding the necessary ports.

Result: PC > ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3 : byte = 32 time = 0ms

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Reply from 10.0.0.3 : byte = 32 time = 0ms

Ping statistics for 10.0.0.3

Packet sent = 4, received = 4, lost = 0

→ Switches:

Learning outcomes: i) when source device sends a message to the switch once a connection is established, which takes some time called learning time, the switch receives the packet. It initially broadcasts the packet to all connected devices to locate the destination. Once the destination is located the message is sent only to that device.

ii) Connection between the switch and end device is established using copper straight though as they belong to different network layers.

iii) No. of ports can be added if needed by clicking on device and adding the necessary ports.

Result:

PC > ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3 : bytes = 32 time = 0 ms

Reply from 10.0.0.3 : bytes = 32 time = 0ms

Reply from 10.0.0.3 : bytes = 32 time = 0 ms

Reply from 10.0.0.3 : bytes = 32 time = 0ms

Ping statistics for 10.0.0.3

Packets : Sent = 4, Received = 4, lost = 0

→ Hybrid mode:

Learning outcomes: i) Switch and hub are connected through copper cross over as they belong to the same network layer but PC and hubs are connected through copper straight through as they belong to different network layers.

ii) message from source PC to destination is sent through the hub which then sends to all its connected PC's and the switch. The switch then sends the message to all its connected PC. The destination PC acknowledges that it has received the message by sending a acknowledged back to the source PC.

iii) The no. of ports can be added if needed by clicking on device and adding the necessary ports.