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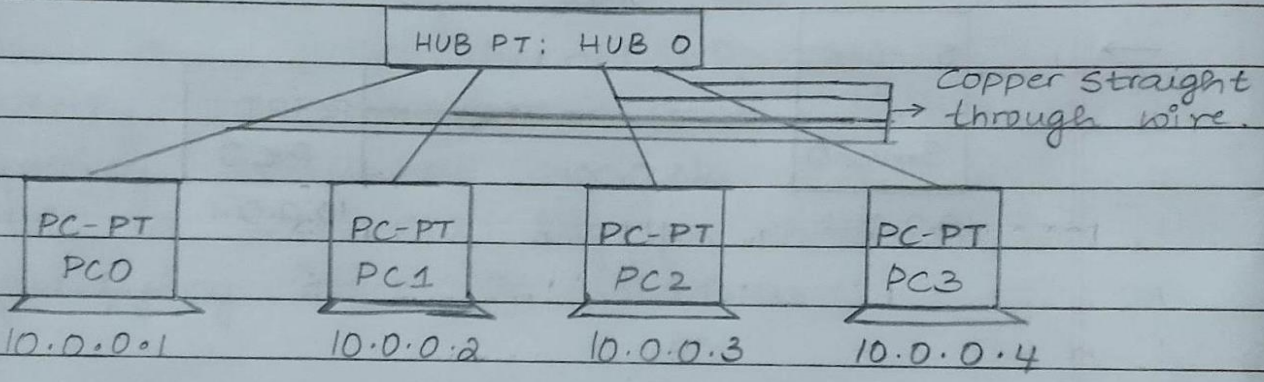
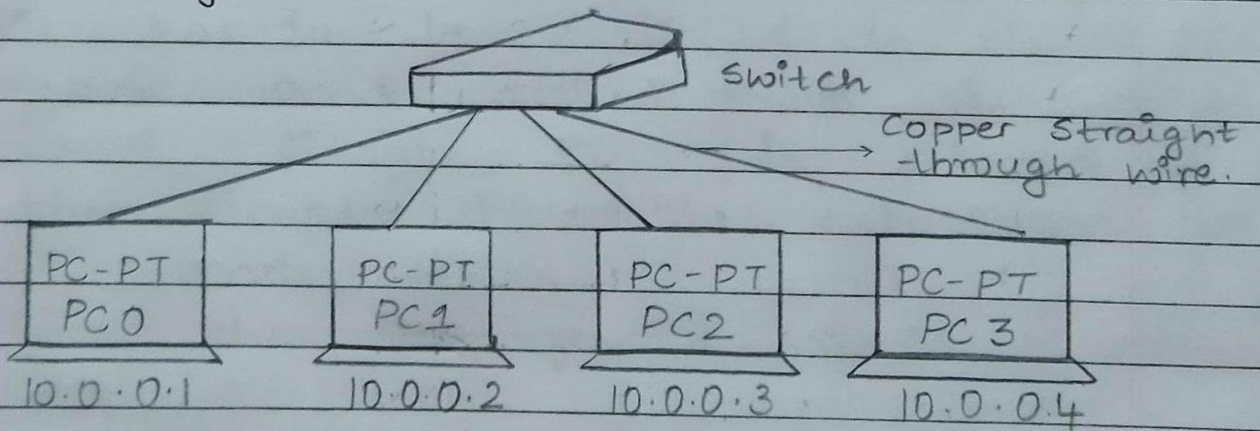
Aim :- Creating a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices

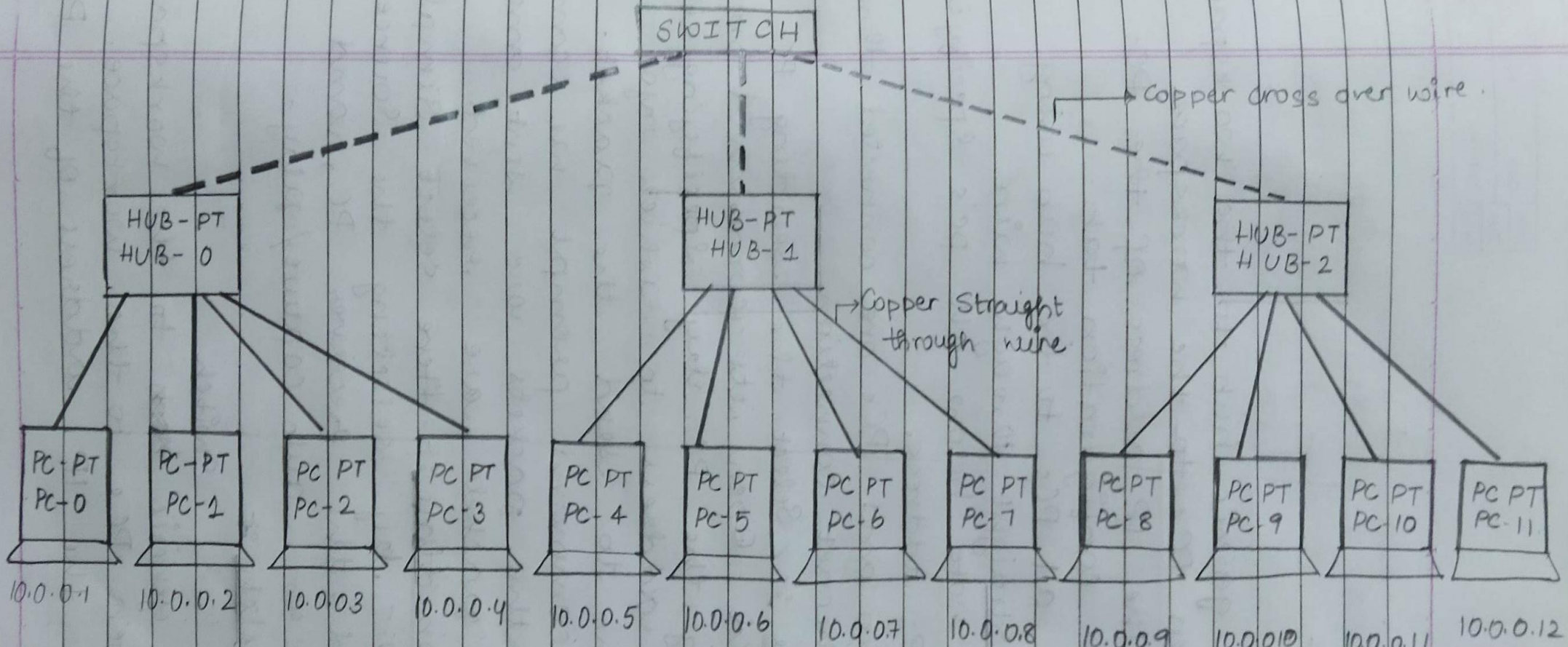
TOPOLOGY :-

*) **Using hub :-**



*) **using Switch :-**




SWITCH
Copper cross over wire.
HUB-PT HUB-0
HUB-PT HUB-1
HUB-PT HUB-2
Copper Straight through wire
PC-PT PC-0
PC-PT PC-1
PC PT PC-2
PC PT PC-3
PC PT PC-4
PC PT PC-5
PC PT PC-6
PC PT PC-7
PC PT PC-8
PC PT PC-9
PC PT PC-10
PC PT PC-11
10.0.0.1
10.0.0.2
10.0.0.3
10.0.0.4
10.0.0.5
10.0.0.6
10.0.0.7
10.0.0.8
10.0.0.9
10.0.0.10
10.0.0.11
10.0.0.12

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PROCEDURE:-

→ Using hub:-

*) Add a generic hub to the workspace.
*) Add seven PCs to the workspace.
*) Change the IP address of the PCs in their configuration tab.
*) Connect all PCs to the hub using copper Straight through wire
*) Add a note below all pc's specifying their IP address.
*) The hub and PCs are connected through fast ethernet connection
*) Real time :- Select the sending PC and Open its command prompt ping the PC by specifying its IP address to which you wish to send the packet.

In the command prompt we can see that the packets are sent and all the packets are received.

*) Simulation time :- Here select Simple PDU by selecting the Source and the receiver PC, and click on auto capture/play.

→ Using Switch :-

Switch

*) Add a generic ~~hub~~ to the workspace
*) Add seven PCs to the workspace.
*) Change the IP address of the PCs

in their configuration tab
*) Connect all PCs to the hub using copper Straight through wire.
*) Add a note below all PC Specifying their IP address.
*) Real time :- Select the PC from which you desire to send the packet, Open its command prompt and Ping the destination PC by Specify -ing its IP address.
*) Simulation time :- Here select Simple PDU and the pair of PC between which you desire and click on auto capture / play from the right panel.

→ Hybrid mode :-

*) Add a switch, 3 hubs and 12 PCs to the work space.
*) Connect all 3 hubs to the switch using cross over wire
*) Connect 4 PCs to each hub using Cross Straight through wire.
*) Update the IP address of the PCs from their configuration tab.
*) Add the note below the PCs Specifying their IP addresess.
*) Real time mode :- Select the PC you want to send the packet from, and open its

command prompt, Specify the destination PC by specifying the IP address, few packets are sent all of which are recived by the recieving PC.

*) Simulation mode:- Add a Simple PDU by seleding the pair of PC and click on autocapture from right most pannel.

OBSERVATION:-

HUB:-

Learning Outcome:-

→ When a source node sends a packet in the network, the hub receives the packet and sends broadcast over the network, i.e, it sends data to all the end devices in the network and the node whose IP matches with the Specified address accepts the packet and acknowledges it, rest node just Ignores the message.

→ The connection between the hub and the end devices is Established using ~~cross over wire~~ Copper straight through wire as they belong to different layers of networking

Result:-

PC > ping 10.0.0.5

Pinging 10.0.0.5 with 32 bytes of data:

Reply from 10.0.0.5: byte=32. time=2ms

Reply from 10.0.0.5: byte=32 time=0ms

Reply from 10.0.0.5: byte=32 time=0ms

Reply from 10.0.0.5: byte=32 time=0ms.

Ping Statistics for 10.0.0.5:

Packets: Sent = 4, received = 4, loss = 0.

SWITCH:- Learning Outcome:-

→ When a Source device sends the message to the Switch once the connection is established, which takes some time known as learning time. After the Switch gets the packet, it initially broadcasts the packet to all end devices to locate the destination. Once the destination is located then the message is sent only to it further.

→ The connection between the Switch and end devices is established using copper straight wire as they belong to different network layers.

Result:-

PC> ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=1ms

Reply from 10.0.0.1: bytes=32 time=3ms

Reply from 10.0.0.1: bytes=32 time=0ms

Reply from 10.0.0.1: bytes=32 time=0.ms

Ping statistics for 10.0.0.1
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss).

HYBRID NETWORK:-

Learning Outcomes:-

→ The switch and hub are connected through copper cross over as they belong to the same layer but hub and PCs are connected through copper straight through as they belong to different network layer.

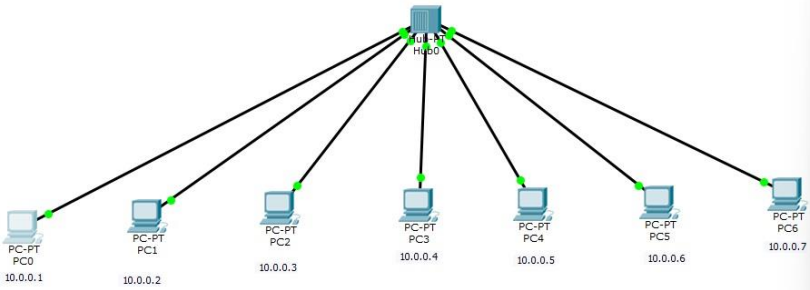
→ the message from the source PC is sent to the switch that sends the message to the hub having destination PC, but the hub broadcasts the message to all its end devices and only the refered/ destination PC sends back the acknowledgement.

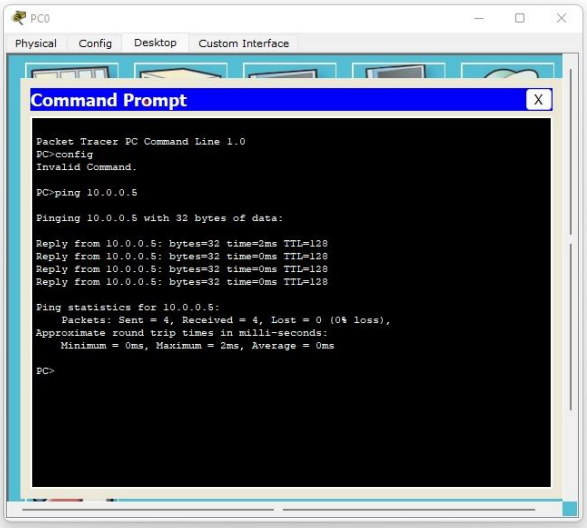
Results:-

Ping 10.0.0.7
Ponging 10.0.0.7 with 32 bytes of data:
Reply from 10.0.0.7 : bytes=32 time=1ms TTL=128
Reply from 10.0.0.7: bytes = 32 time = 0ms TTL=128
Reply from 10.0.0.7: bytes = 32 time = 0 ms TTL=128
Reply from 10.0.0.7: bytes=32 time = 0 ms TTL=128

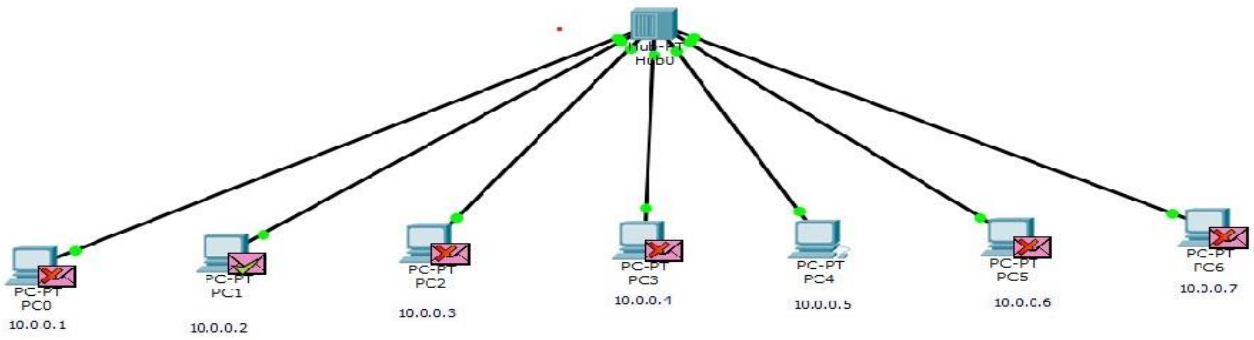
Ping Statistics for 10.0.0.7:
Packet: sent = 4, Received = 4, lost = 0 (0% loss)
Minimum = 0ms, Maximum = 1ms, Average = 0ms.

HUBS-----REAL TIME

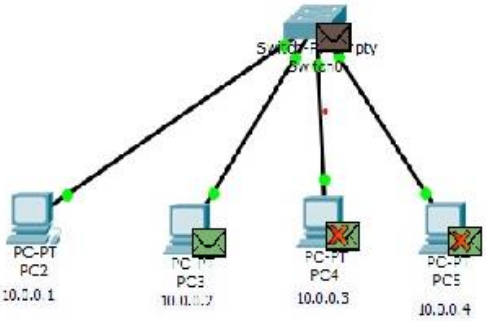


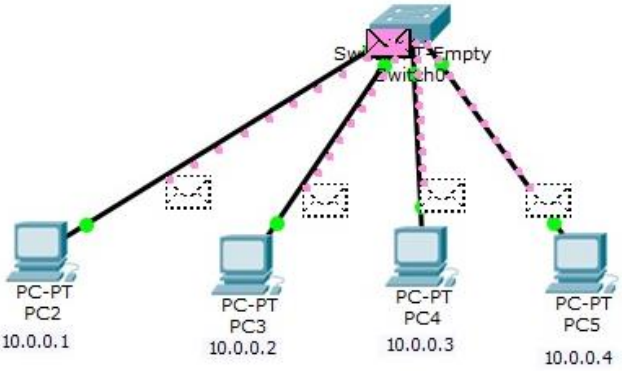


HUBS----- STIMULATION

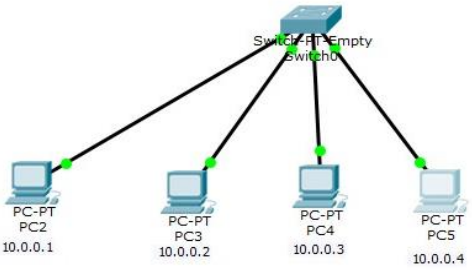


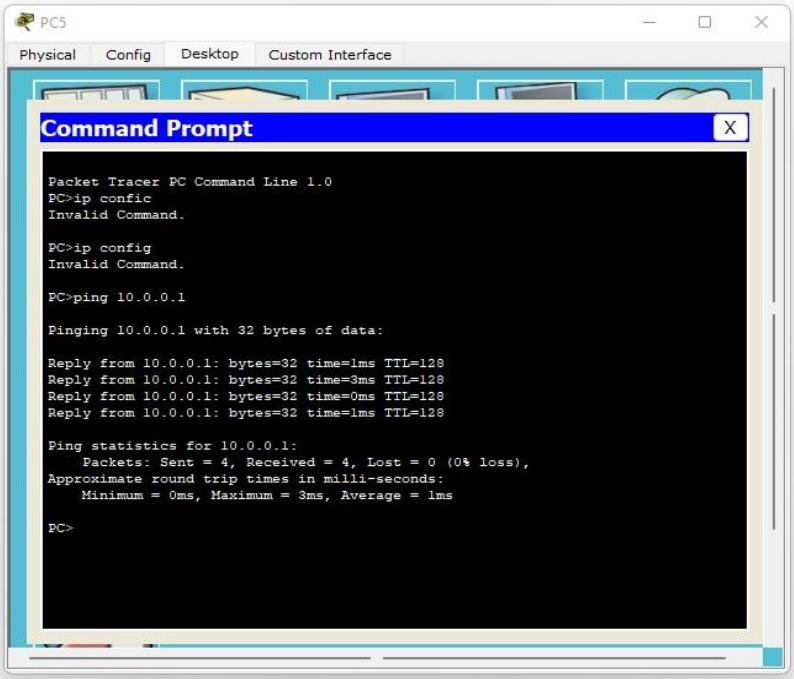
SWITCHES----------REAL TIME



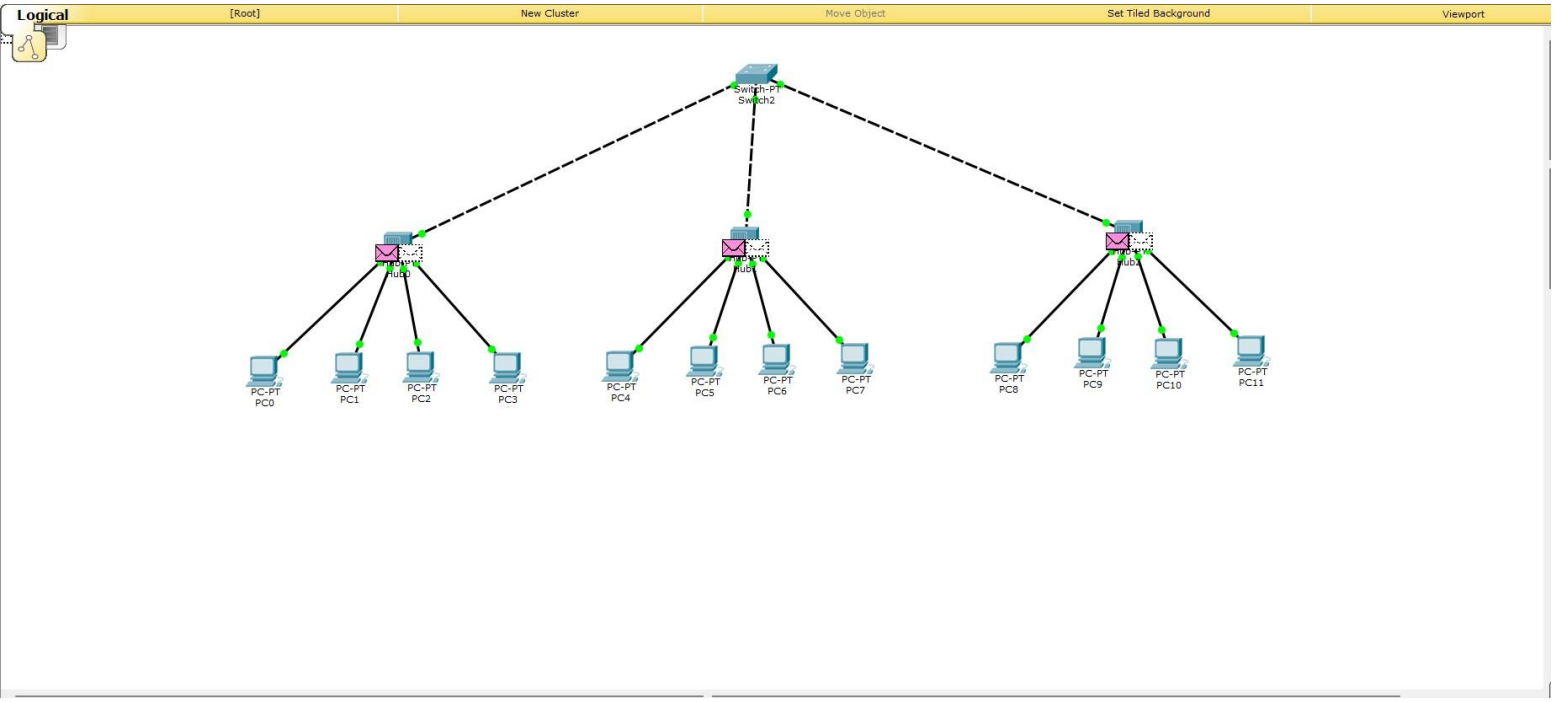


SWITCHES----------STIMULATION





HYBRID NETWORK----------REAL TIME



HYBRID NETWORK----------STIMULATION