

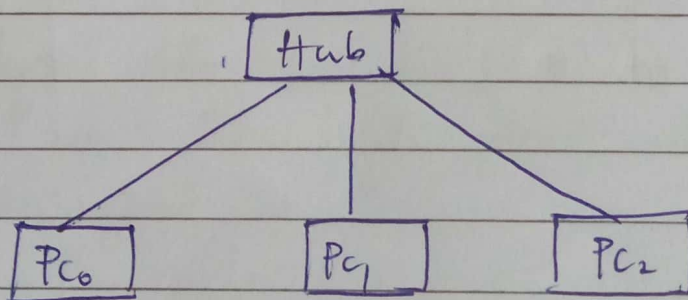
Experiment - 1

Creating a topology and simulate sending a simple PDU from source to destination using hub & switch as connecting Devices.

Hub: Hub is a device that has multiple ports, that accepts ethernet connection from network devices.

- The purpose of hub is to connect all of network devices together on an internal network.
- It is considered not to be intelligent because it does not filter any data as to where the data is supposed to be sent and that's because only thing the hub knows is when a device is connected to one of its ports.
- So when a data packet arrives at one of the ports, it is copied to all of the other ports.
- It not only creates security concerns, but also creates traffic on the network which wastes Bandwidth.

OBSERVATION



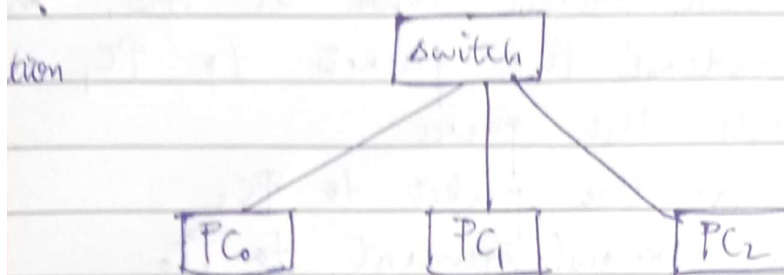
If Pc_0 wants to communicate with Pc_2 , Pc_1 also will receive the data packets, even though it is not intended ^{to} be received, as the purpose of hub is to rebroadcast the packets to all of the devices in the network. from source



Switch: Similar to Hub.

Is a network device that has multiple ports that accepts Ethernet connections from n/w devices. Switch is intelligent beco it learns physical addresses of the devices that are connected to it and stores these physical addr called Mac addresses in its table.

So when a data packet is sent to switch, its only directed to intended destination port.



Here if PC₀ wants to communicate with PC₂, data packets arrive at switch and then switch will look at its table of Mac addresses and matching ports and deliver data to the correct port, and data packet will only be forwarded to PC₂ rather than PC₁.

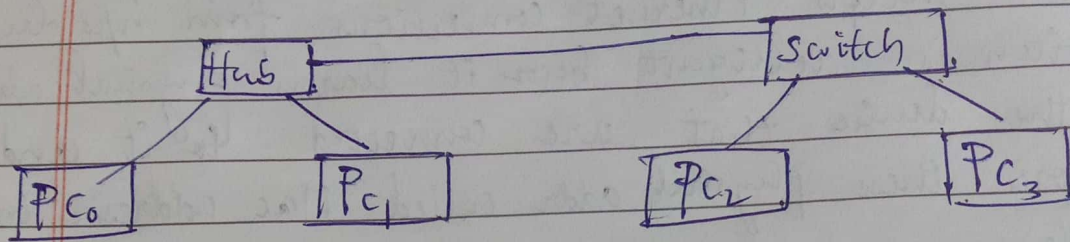
They reduce unnecessary network traffic.

Therefore.

Hub only detects that a device is physically connected to it.

Switch can detect specific devices are connected to it, since it keeps a record of the MAC addresses of those devices.

Topology of Switch and Hub.



$PC_0 \rightarrow PC_3$

- Here if PC_0 wants to communicate with PC_3 , initially, data packets arrive at Hub, and
- Hub rebroadcast the packets to PC_1 and switch.
- PC_1 rejects the packet.
- Switch sends the packet to PC_3 .
- PC_3 sends acknowledgement to PC_0 .

Configuration of IP addresses to network devices

$PC_0 \rightarrow 10.0.0.1$, $10.0.0.10$

$PC_1 \rightarrow 10.0.0.1$, $10.0.0.20$

$PC_2 \rightarrow 10.0.0.1$, $10.0.0.30$

$PC_3 \rightarrow 10.0.0.1$, $10.0.0.40$

