Switches & Hubs

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Hub: Hubs are considered Layer-1 devices and are not rea
were used when ethernet switches did not exist. The hubs j
is connected to it and just hopes that the data reaches the d
electrical signal to all other nodes that are connected to the
frames, addresses etc and a hub is not a smart device and h
transmit data. Collison occurred a lot when using the hubs
the same time.

Switch: A switch is a Layer 2 smart device which is simila
hub. It can understand MAC addresses, keeps a table of the
and receiving frames.

Modern LAN switches uses *full duplex* to transmit etherne
hubs which uses half duplex.

- **Full Duplex:** Can send and receive at the same time
- **Half Duplex:** Can either send or receive at a time but c
  same point in time. If a node is sending its data, wait be

Nodes that use half duplex have an algorithm called **Carri
Detection (CSMA/CD)** which takes care of the cases whe
transmit at the same time.

lly in use in the modern world but they
ust broadcasts the bits to every node that
estination. It transmits in the form of
hub. There was no concept of ethernet
ubs used Half Duplex technique to
whenever two nodes transmitted data at

r to an hub but is more powerful than a
e MAC addresses and helps in sending

t frames using a switch unlike the older

annot perform both the actions at the
efore you send.

er Sense Multiple Access with Collision
re collision occurs when two nodes

transmit at the same time.

Ethernet Shared media - Hubs
Ethernet point-to-point - Switches

SWITCHES

1) The main function of a LAN switch is to forward the pa
   Switches use MAC addresses to perform this operation
   and decide whether to forward or filter (drop) the packe

2) The secondary function of a switch is to learn the mac a
   particular mac address

3) The third function of the switch is to prevent infinite lo
   this by using *Spanning Tree Protocol*

Known Unicast Frame Forwarding: As the name sugges
destination MAC address and the port associated with that
directly be connected to that port or that port might be conn
forward the packet to the destination.

In known unicast forwarding, since the switch has the mac
table / content-addressable memory table/ mac address tab
particular mac address, the switch checks its table and send
This is a unicast communication since the switch is directly

ackets from source to destination.
. They keep a table of the MAC address
et.

address and the interface associated to a

oops in the LAN and the switch achieves

sts, the switches in this case know the
MAC address, the destination can
nected to another switch which can

and port in its *"switching table / bridging*
ble", once a packet is received with a
ds it on the associated interface directly.
y sending to the destination.

Unknown Unicast Frames: Known unicast forwarding oc
information about the destination mac address but when th
about the destination mac address, the concept of flooding
address is called *Unknown Unicast Frame*

a. **Flooding:** When the switch does not have any inform
receives a frame, it basically delivers the frame to every
frame to every port is called flooding. When the switch
that the destination will reply back with its MAC addre
reply, it then stores the MAC address in its table

By default, every switch stores the mac addresses for 300 s
into the mac address table, what essentially happens is that
switch, it checks for the source mac address, if the mac add
adds the mac address into the table. If the mac address of t
the switch resets the aging-timer of that particular address
next 300 seconds, that entry is removed from the mac addr
full, the switch removes the oldest entry from the table no

ccurs when the switch has all the
e switch does not have any information
comes in. The frame whose destination

mation about the destination when it
y single port on the switch. Sending the
floods the frame to every port, it is likely
ess. When the switch receives back a

seconds. Once an entry has been made
every time a frame comes into the
dress is not in the table already, the switch
the source is already in the address table,
back to 0. If no packet comes in for the
ess table. If the entries in the switch are
matter what the aging-timer is.