

EE450, Spring 2021, zahid  
lecture #

Tuesday, March 9

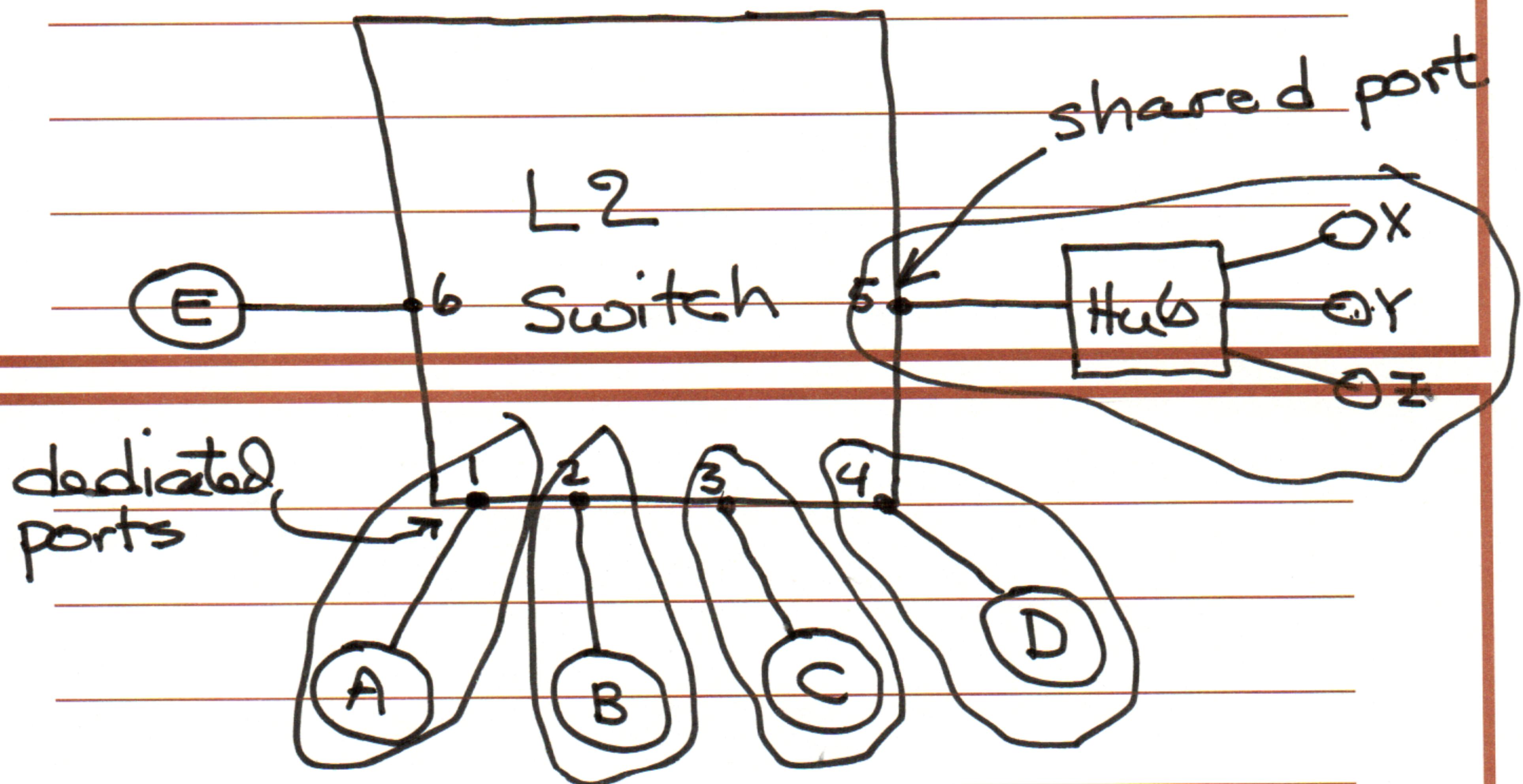
### L2 Switched Ethernet:

- L2 switches recognize (and forward) frames based on MAC addresses.
- L2 switches are transparent to end devices (hosts), i.e. the hosts have

no idea that a L2 switch exists  
unlike Routers.

- L1 switches are plug & play devices i.e. they do not need configuration unlike routers. They learn MAC addresses on their own.
- L2 switches isolate collisions domains but it doesn't isolate broadcast domain

- L2 switches ports can be dedicated or shared.
- L2 switches support FDX communication as well Simultaneous communication.



every port of a switch constitute a segment of the LAN

The whole thing is just one network.

Inside the Switch there is a Data base « MAC Forwarding Table »

MAC <sub>addr</sub>	Port #
A	1
B	2
C	3
D	4
X	5
Y	5
Z	5

→ Shared port.

Case 1: Forwarding Mode (When source & dest. are located on diff. Segments)

A → B

Switch recognizes that A & B are located on different segments of the LAN. Switch will forward the frame to port 2 ONLY.

Note B can send to A at same time. This is FDX comm.

& sometimes C ↔ D ⇒ multiple connections (Simultaneous)

i.e. dropping

Case 2: Filtering Mode (when source & destination are located on same segment).

X → Y

L2 switch will drop (i.e. filter) this frame & doesn't forward it to any port.

Case 3: Flooding Mode. ← when the destination node is unknown

Suppose a node E connect to to port 6 of the Switch (after the network admin configured the table).

port 6 of the Switch (after the network admin configured the table).

L2 Switch doesn't contain the MAC add of E in its table.

A → E

L2 Switch will flood all of its ports with that frame except the port where the frame came from.

Broadcasting is Similar to Flooding

but it ~~→~~ has different meaning.

here A is broadcasting a frame.  
(i.e. Destination MAC add is  
FF : FF : . . . : FF)

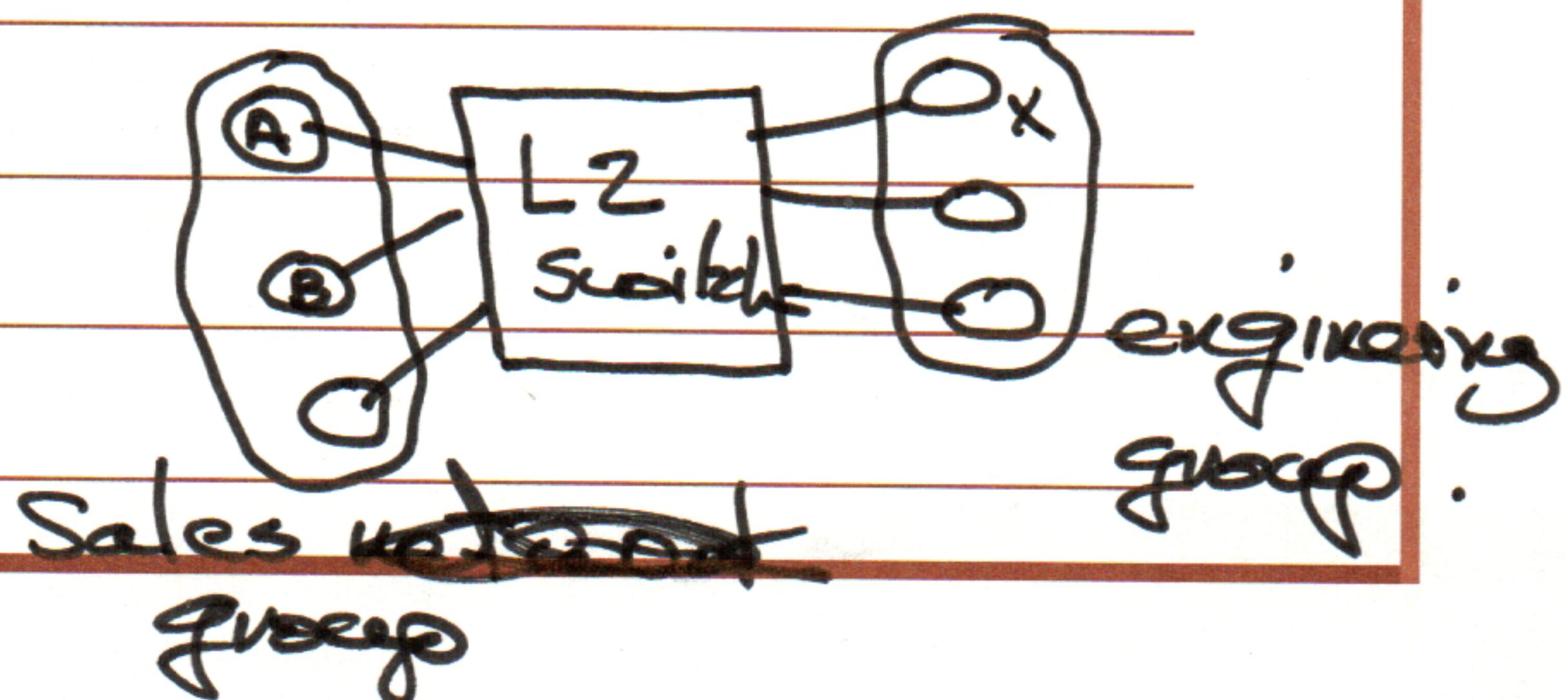
L2 switch will forward this frame  
to all ports except the one

it came from (Just like flooding).

→ L2 switch doesn't isolate  
Broadcast domain (a broadcast

domain is the set of all nodes receiving  
this broadcast.

This is terrible!



VLAN

Virtual LAN

Sales ~~department~~  
group

## Learning L1 Switches:

How do L2 switches build their MAC add forwarding Table?

MAC <sub>addr</sub>	Port #
A	1
C	3
B	2
X	5
E	6

initially empty.

A → B

L2 switch learns where A is but he doesn't know where B is  
 $\Rightarrow$  Flooding mode.

C → D

Flooding

B → A

Forwarding mode

X → Y

E → ? Flooding mode.

This learning process will continue until the database is completed.

What does a node (i.e. host) have to do for the L2 switch to learn its MAC add/port#?

Answer: Send a frame (to any other device) and the Switch will learn your MAC add and port# where you are connected!

host node

- Switches can connect different rate segments because it has buffers associated with every port.

Some ports

support 10Mbps

Some ports

support 100Mbps

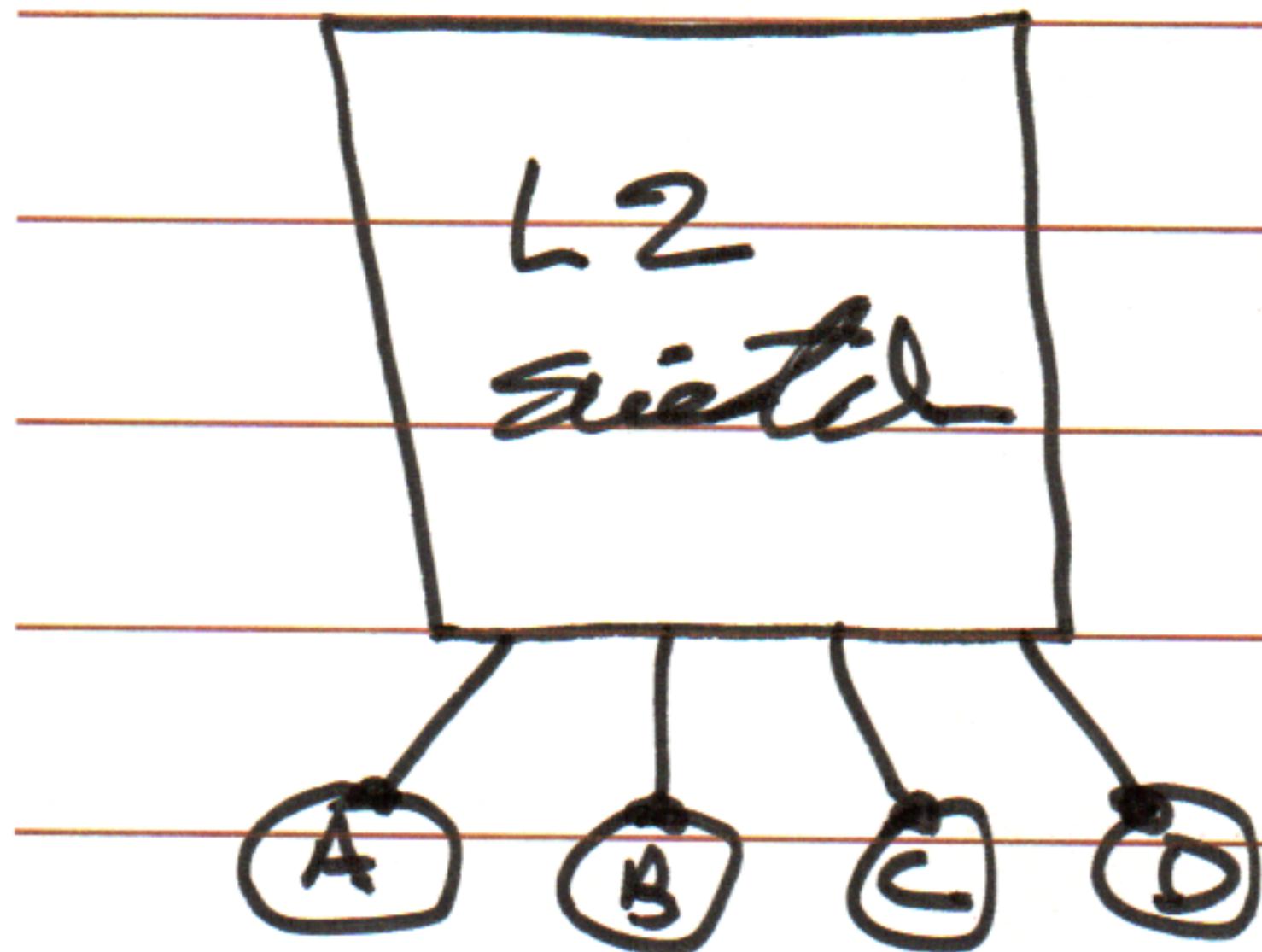
L2  
switch

10/100/1000

Some ports

support 1Gbps

(9)

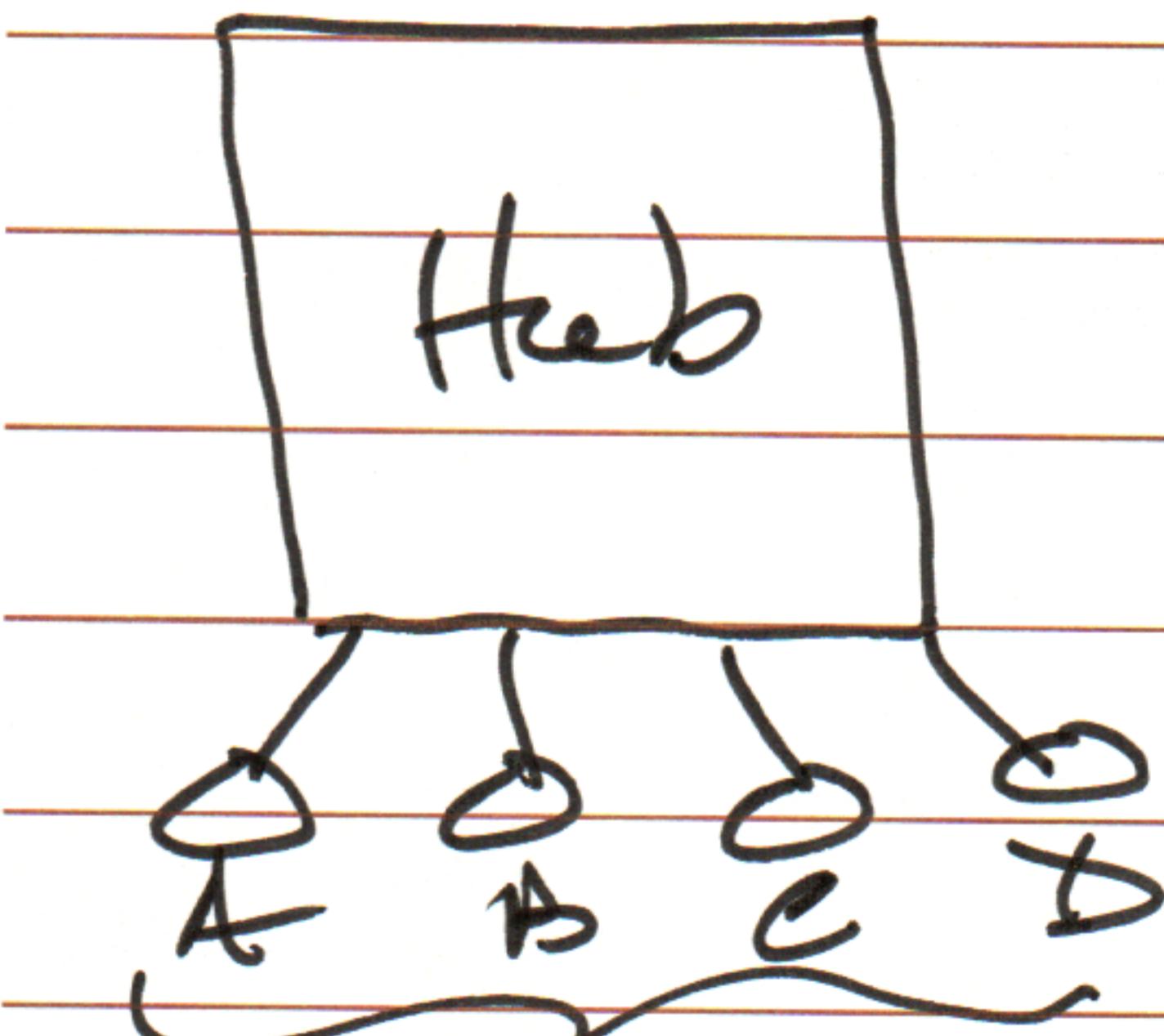


If every port  
supports 10Mbps

Each host will  
get the Fc all  
10Mbps

Switch aggregates throughput

40Mbps

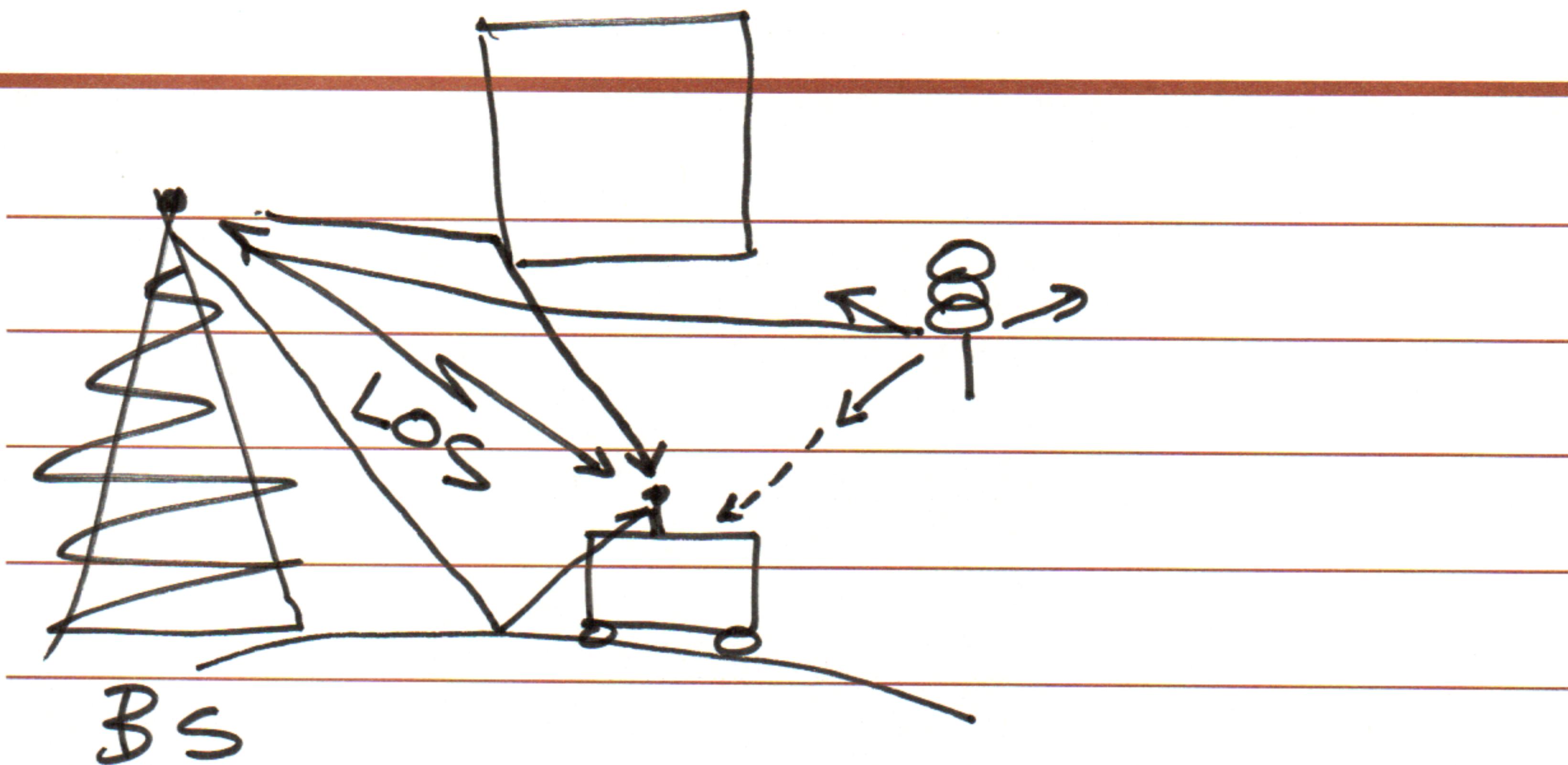


every port supports  
10Mbps

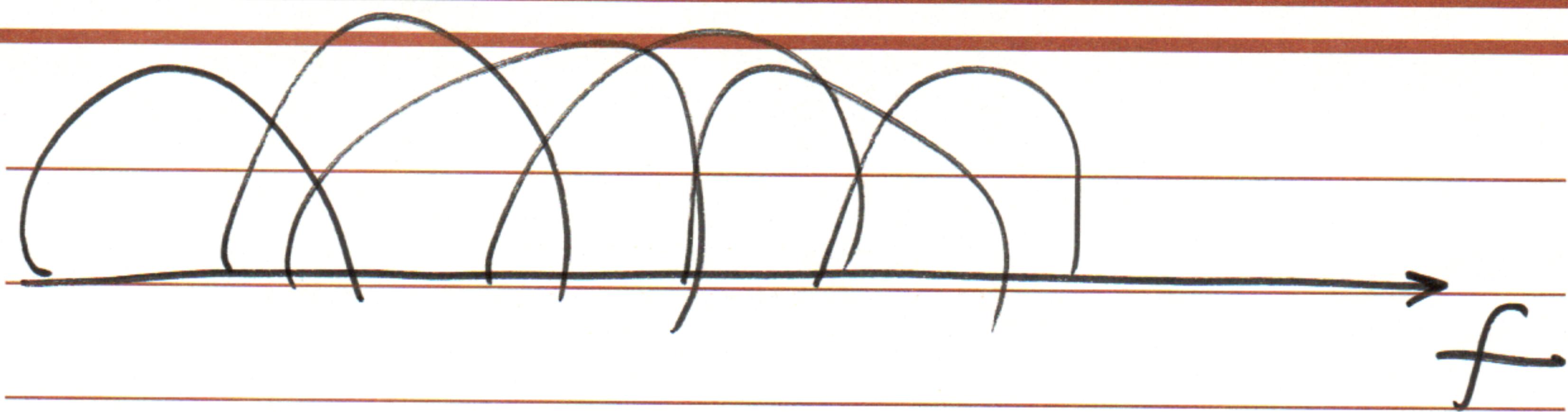
each host gets  
on the average  
only 2.5Mbps

sharing  
the available  
resource

aggregate  
throughput  
is 10Mbps



LOS : Line of Sight.



don't overlap