

Hardware devices used in networking:

Cables ✓

repeaters ✓

• Hubs ✓

Bridge ✓

switch ✓

Router

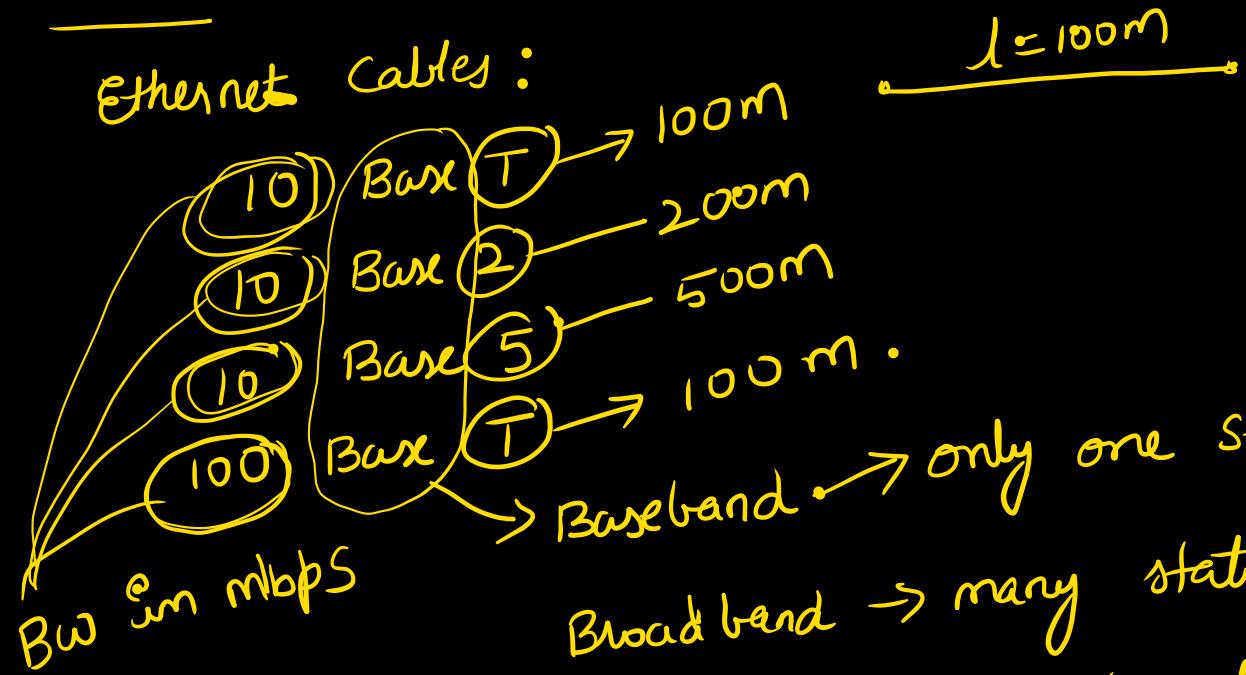
Gateway ✓

Firewall ✓

most important

Cables: we will focus on Ethernet

Ethernet cables:



BW in mbps

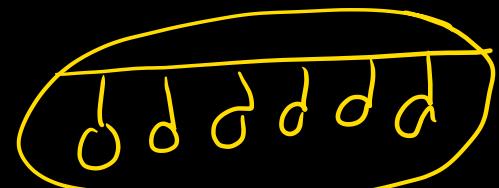
Baseband \rightarrow only one station can transmit at any time

Broadband \rightarrow many stations can transmit at the same time

Cables don't have any TCP/IP layers. They work at physical layer.

\rightarrow Attenuation \rightarrow Collisions are possible.

n stations can collide with
each other. \therefore Collision domain = n



Energy decrease.
 \therefore There is a limit on length.

Video on Front end → YouTube.

Frontend dev + Interview guarantee.

12000

at least 2 interviews

12000 - GST → Refunded.

Industry experts.

HTML, CSS, JS, React.

only 100 seats

FCFS

because we can't guarantee more

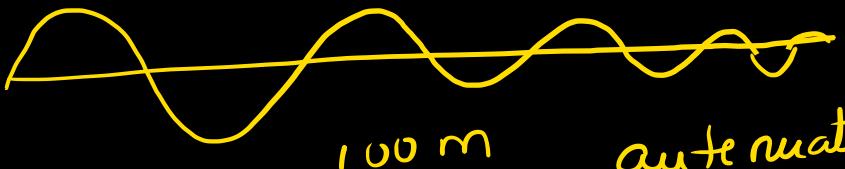
Keep JdS as a backup.

Repeater :

10 Base T range - 100 m

100 ms

Repeater

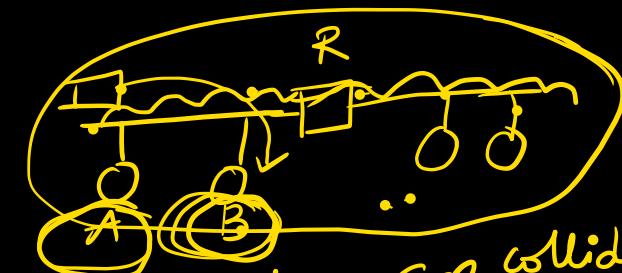


100 m

attenuation.

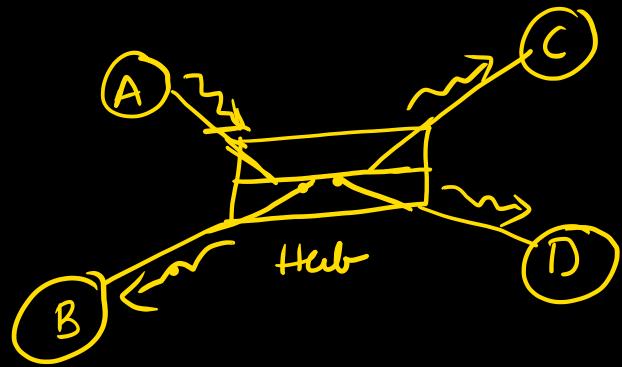
n stations

- It is used to connect two LAN segments.
- works at physical layer.
- Collision are possible inside repeaters.
- Range of LAN will be increased
- unnecessary increase in traffic.

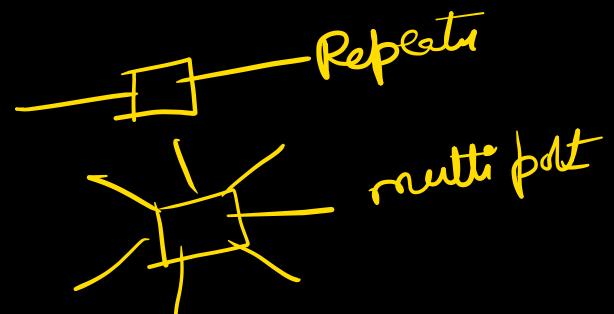


all n stations can collide with each other.
∴ collision domain in

Hub: multiport repeater.



All stations can collide with each other. \therefore Collision domain = n.



Traffic is very high.

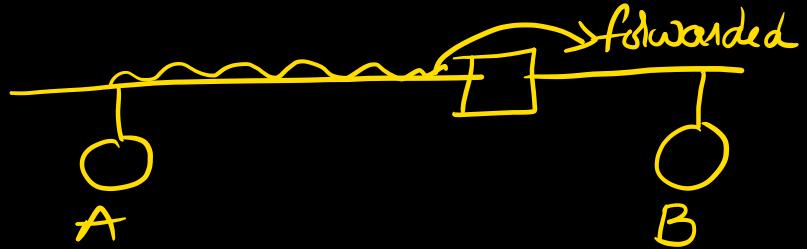
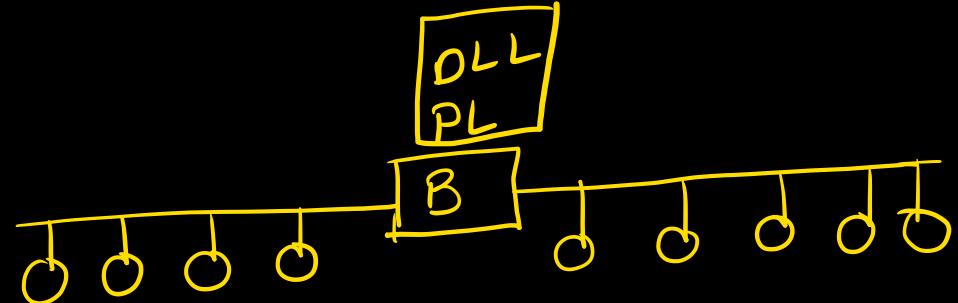
only PL is present.

Collisions are possible inside Hub

Packet will be flooded. → →

Adv: cheap.

Bridges:



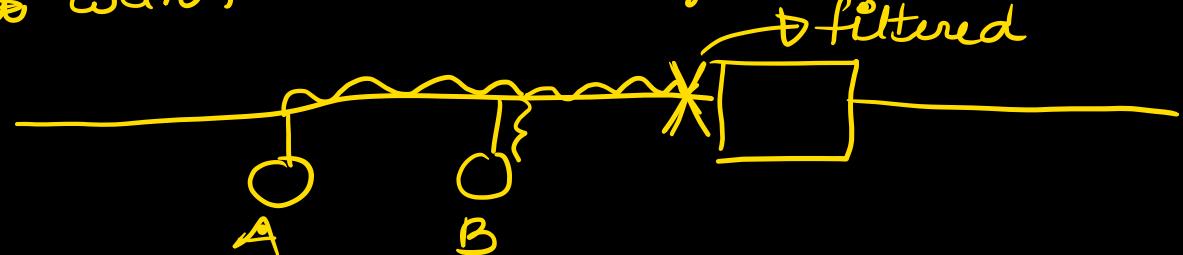
Bridge connects different lan segments

Bridge has PL and DLL

It can see MAC add
and take decisions.

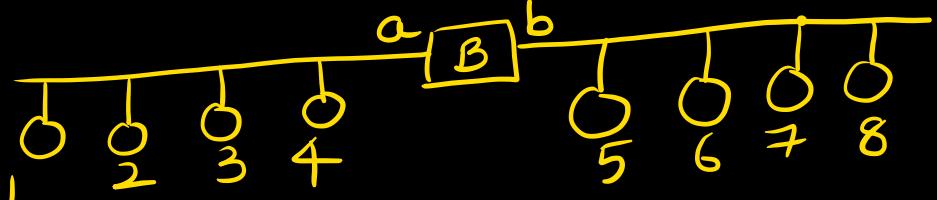
For example:

A ~~wants~~ wants to send message to B.



Bridges :

Static Bridge



~~Dynamic~~

Learning

or
Transparent Bridge

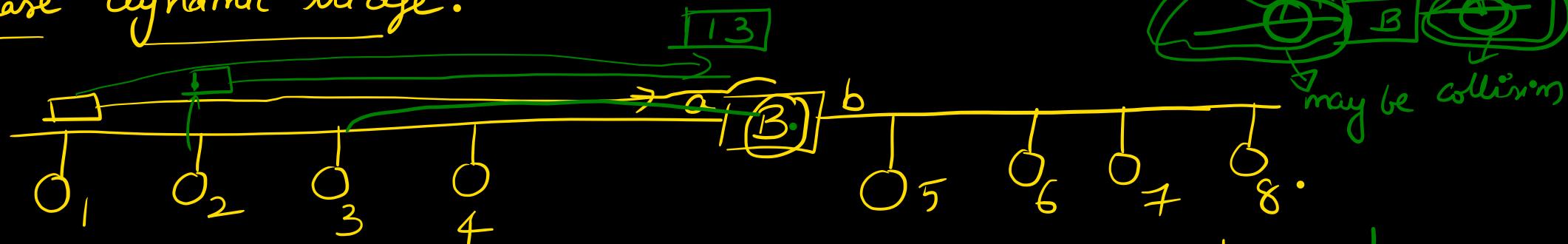
mapping table

MAC	Port
1	a
2	a
3	a
4	a
5	b
6	b
7	b
8	b

in static bridges, table is filled manually by admin

in dynamic bridge, Bridge will learn and fill the table

In case dynamic bridge:



When ① send the packet, the B will ~~learns~~ learns that ① is connected to 'a'. It learns.

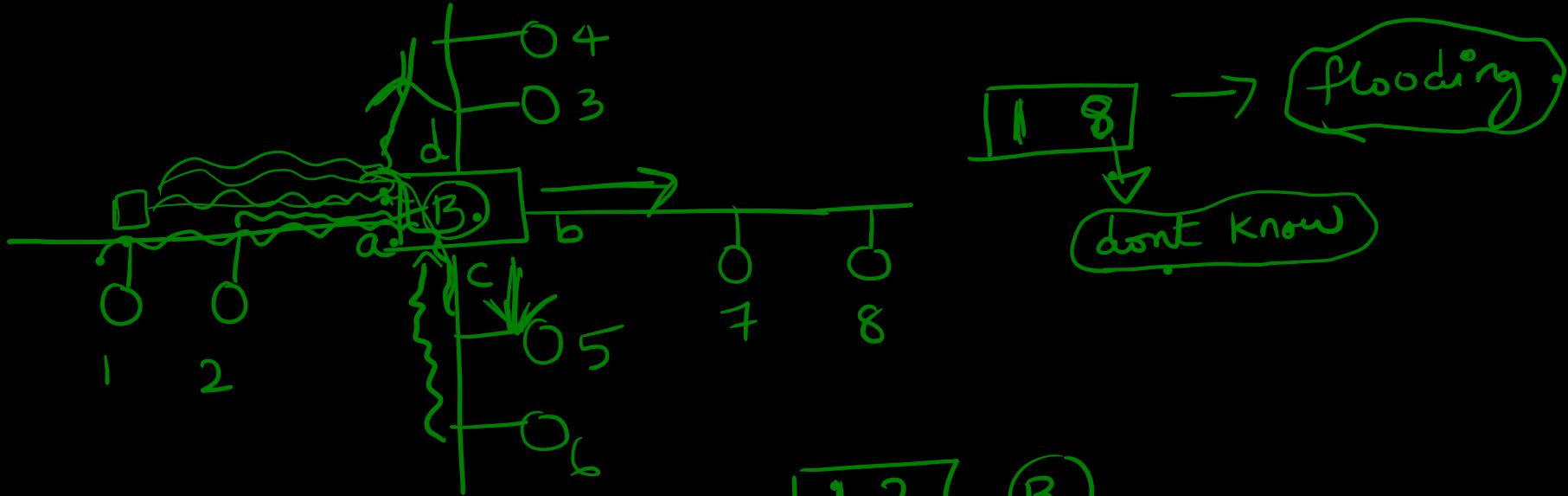
① sends to ③, B does not know ③. In that case it will flood.

Bridge: Filter, Forward, Flood

② no collisions inside a bridge.

∴ Collision domain is reduced.

MAC	Interface
1	a
2	a



mac	Interface at port
1	a
6	c
2	a

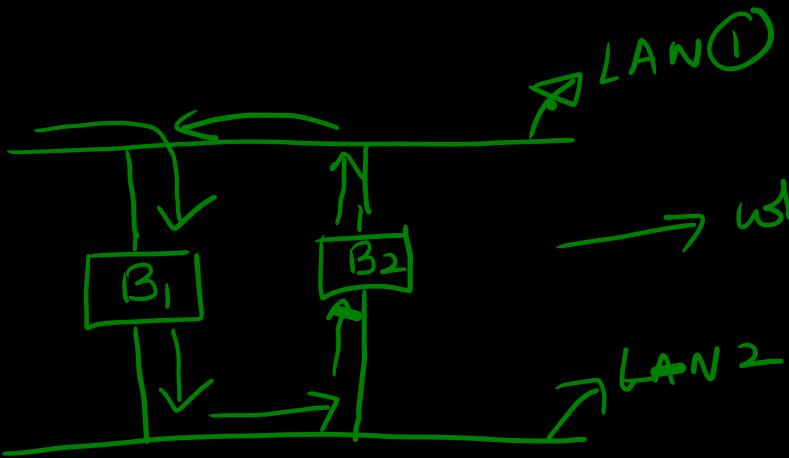
1 2
a a
B

so it will not forward.
It is called filtering.

1 6
a c
B

It will forward
to c.

To increase reliability, more bridges will be added within a network.



why 2 Bridges? → For more reliability.
even if one bridge is down, we have other bridge.

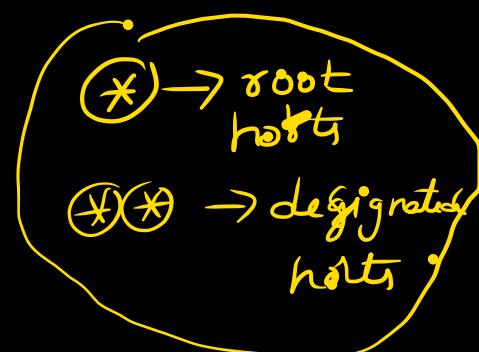
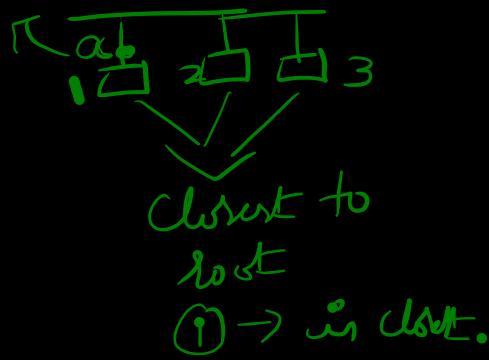
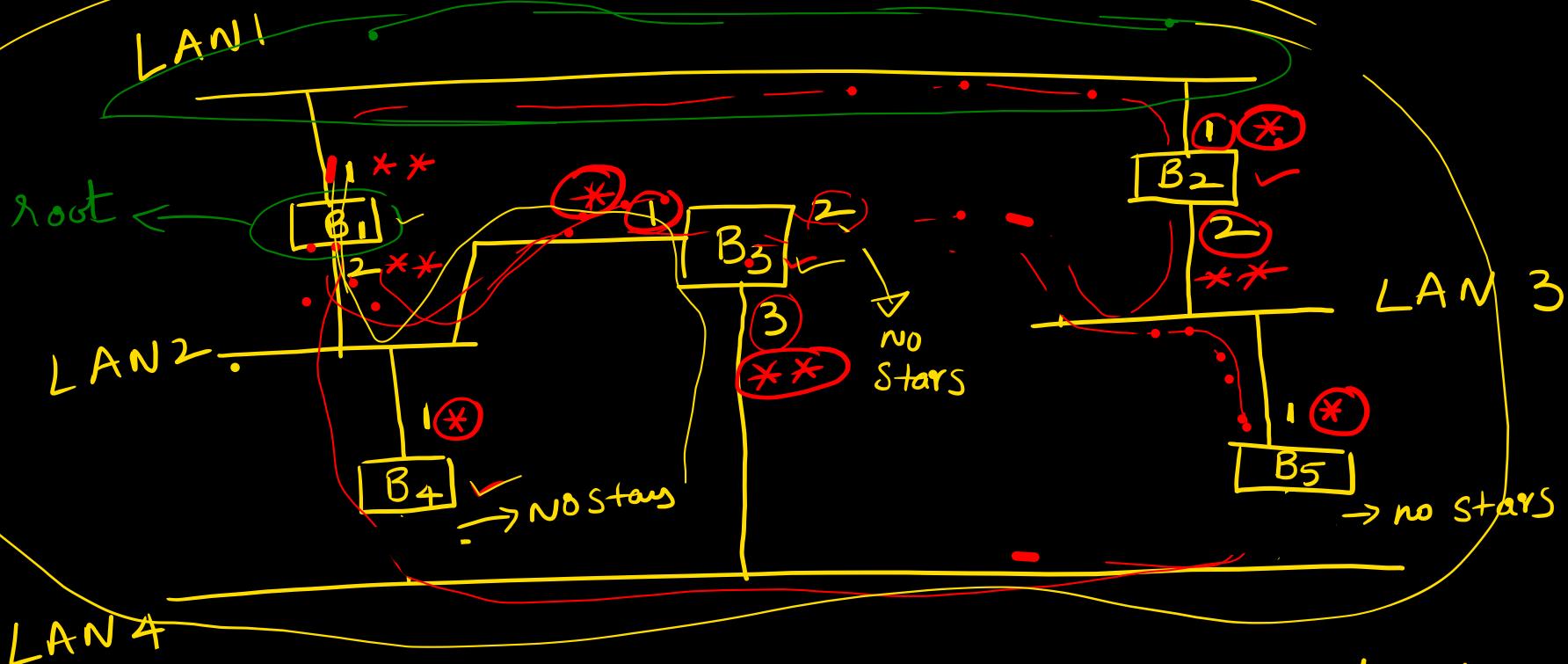
But disadv: loops.

So we use spanning tree algorithm:
to avoid loops.

Spanning tree algorithm:

- 1) Every bridge has a port in ID. The one with smallest ID is taken as root bridge.
- 2) mark one port of each bridge which is closest to root bridge as root port (*) .
- 3) Every LAN chooses a bridge closest to root as designated bridge for that LAN. make the corresponding port as designated port.
- 4) mark the root port and designated port as forwarding port and block remaining

no cycles \rightarrow spanning tree.

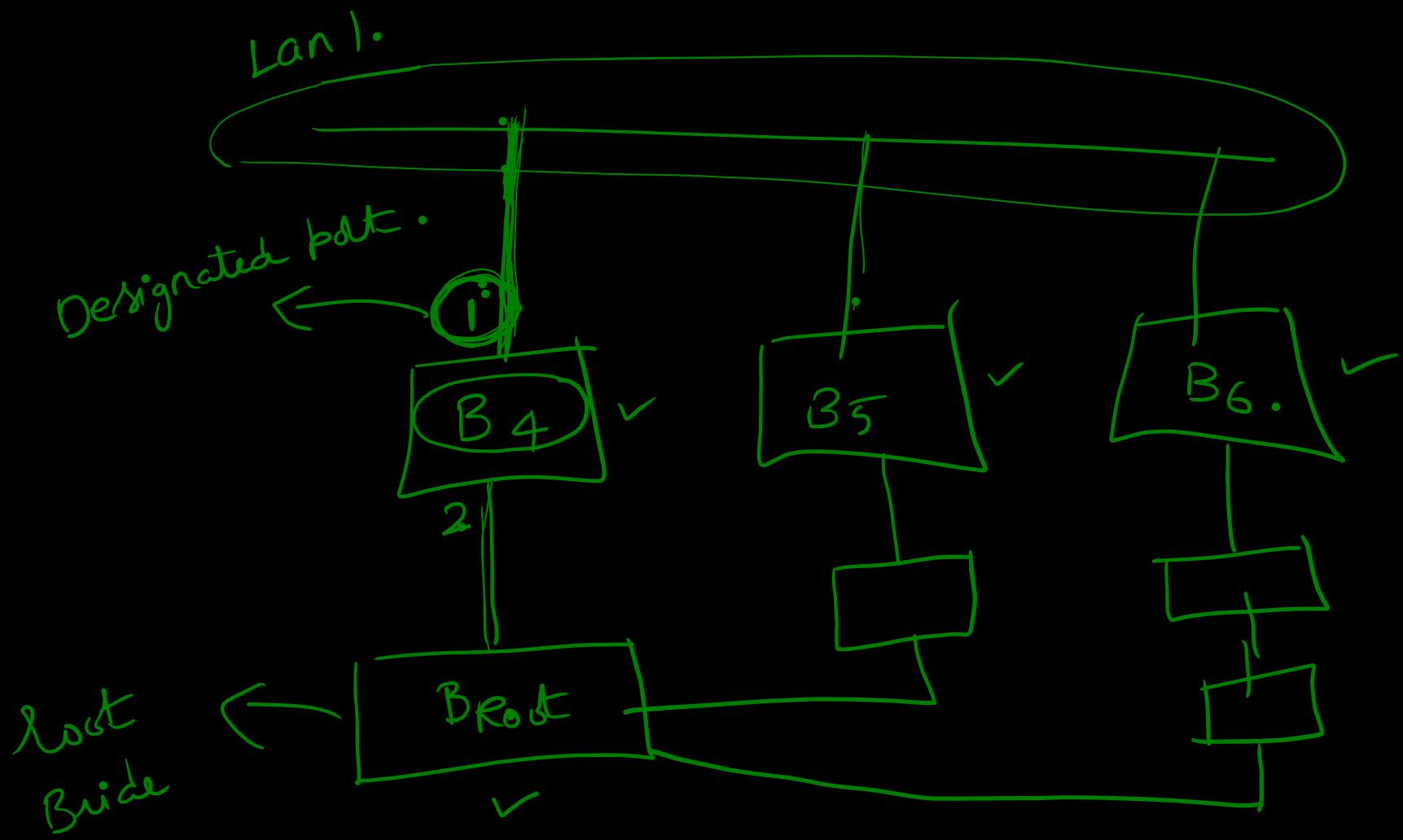


Lan 4: B₄ B₃ B₅ \rightarrow B₄, B₃ are close to root
 \rightarrow So take small number \rightarrow

\rightarrow B₃

\therefore Port 3 of B₃ is designated host

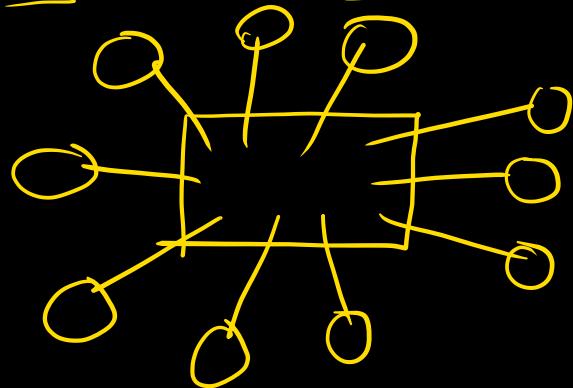
block all other



'2' is not connected
LAN.
'1' is connected.

Switch:

PL and DLL



16 - port

32 port

64 port

128 port

:

:

No collisions inside
a switch.

Collision domain = 0

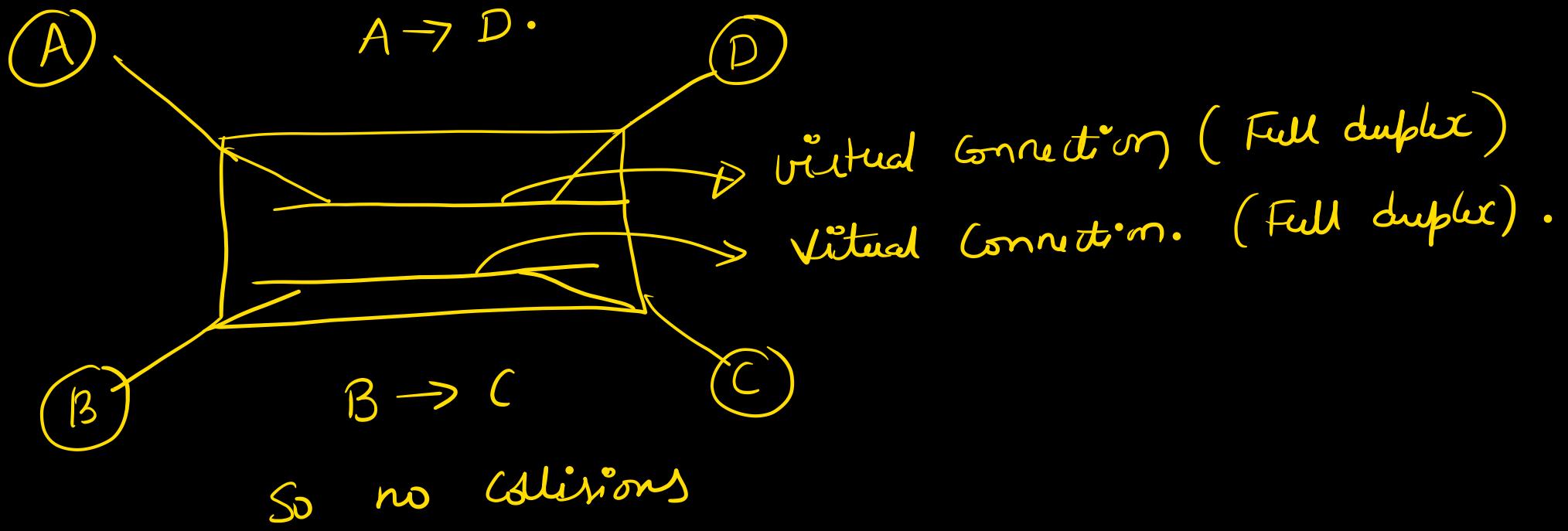
No collisions at all.

Switch is like bridge but more ports.

Switch can see mac address so traffic is
reduced.

Dis ad:

Costly.



Wire + Hub + Repeater + Bridge + Switch

will not stop
Broad cast packets.

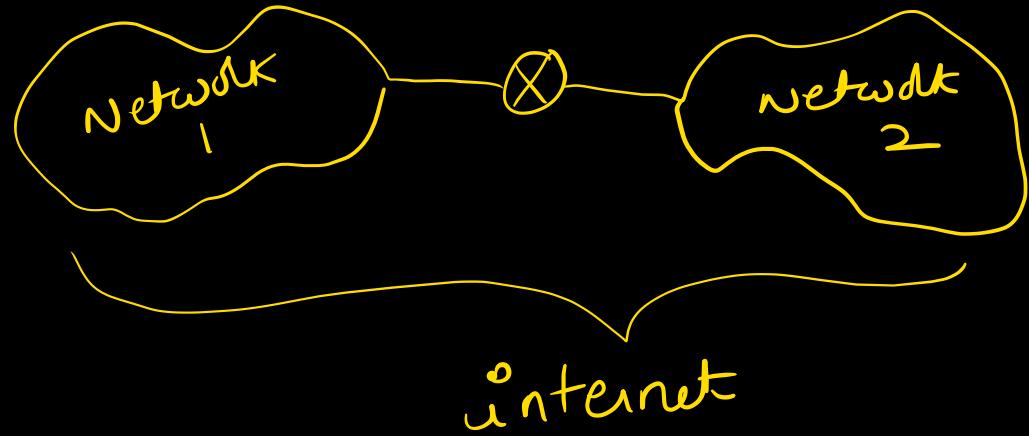
One network

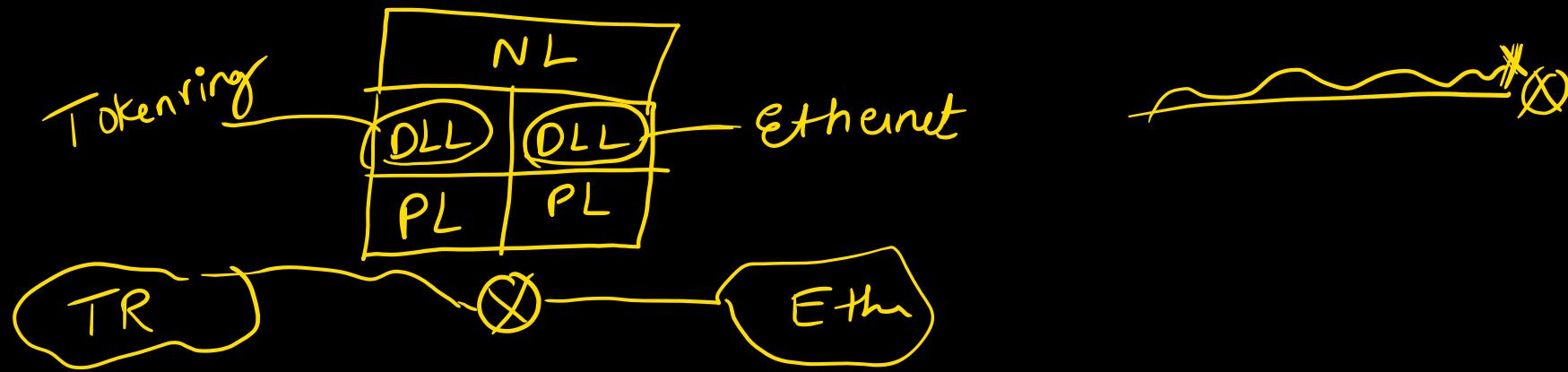
Cannot separate
networks.

LAN

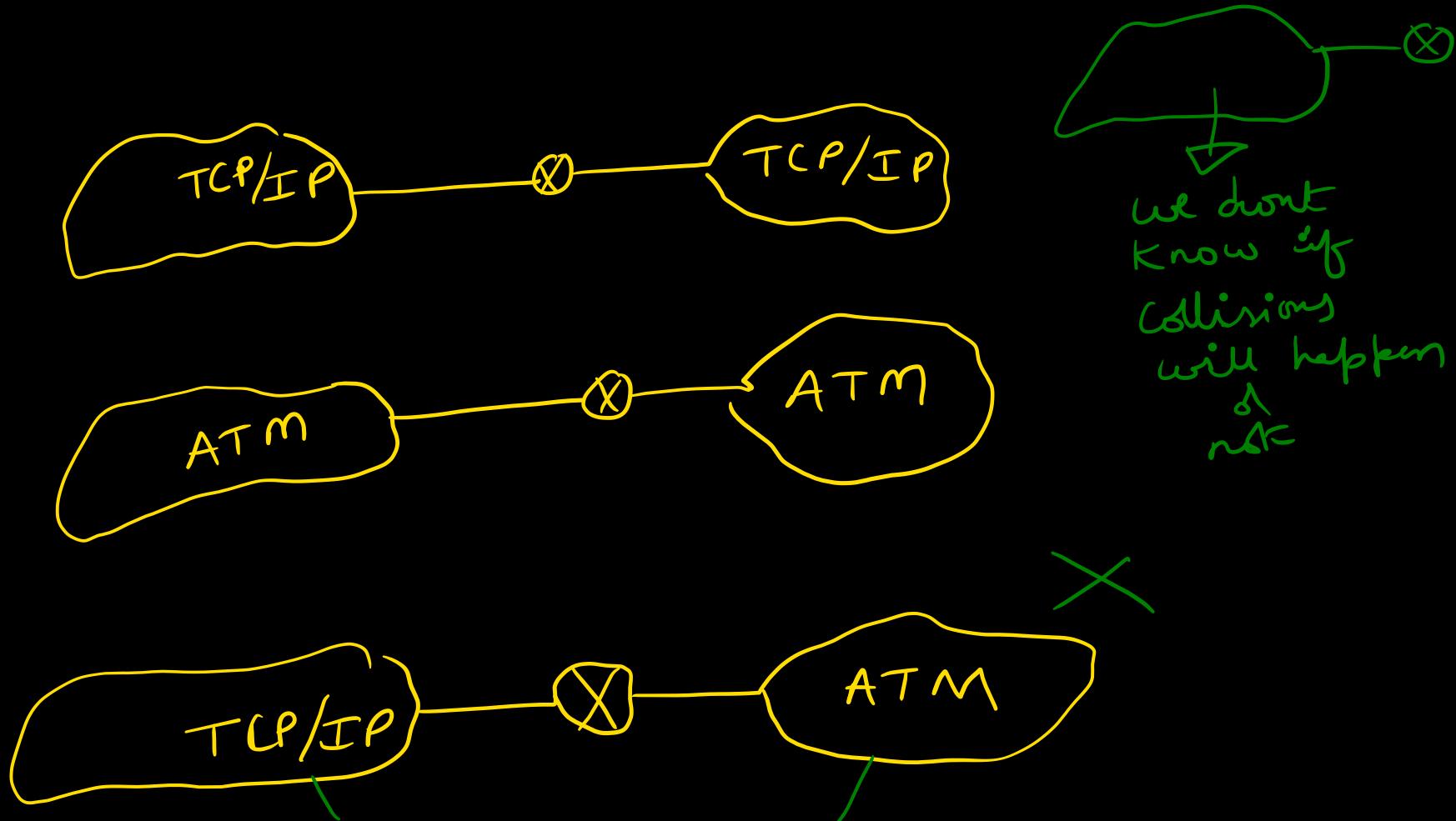
Broad cast domain is
not reduced.

Router: → Routers can divide networks and create internet.





- * Routers can connect N/w which have different protocol at DLL.
- 1) Forwarding 5) NO collision inside a router.
 2) Filtering ∵ Collision domain is reduced.
 3) Flooding
 4) Routing 6) Router will stop Broadcast packets
 ∵ Broadcast domain → Reduced

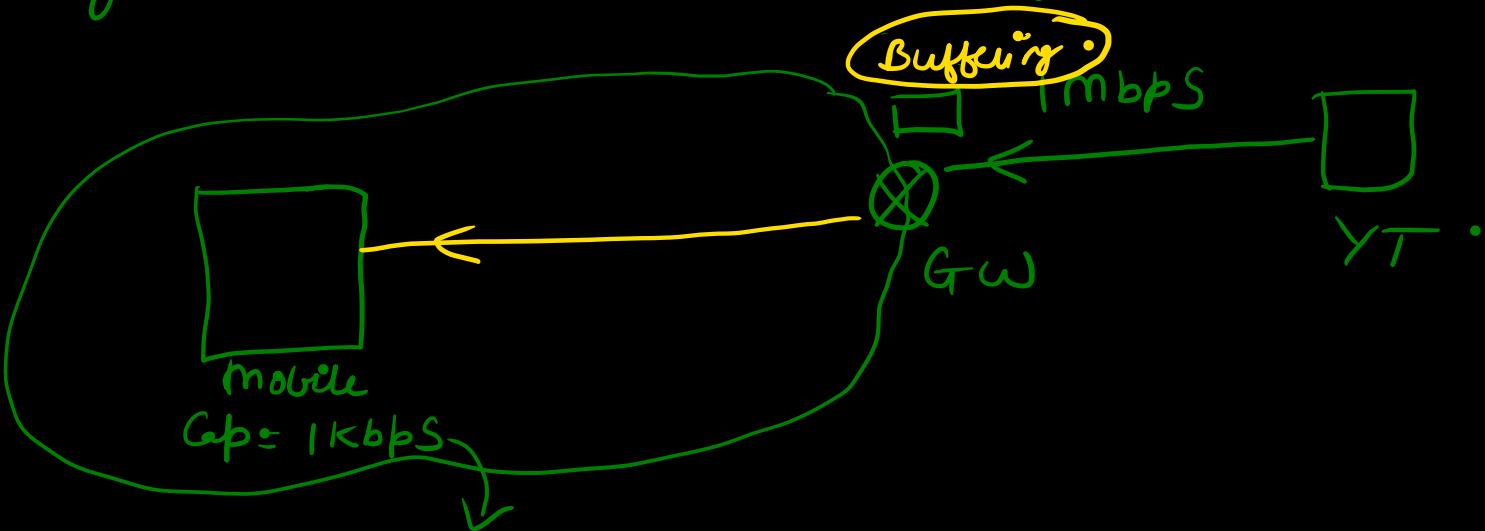


Both have
diff protocols at NL and Router has
only one N/w
layer.

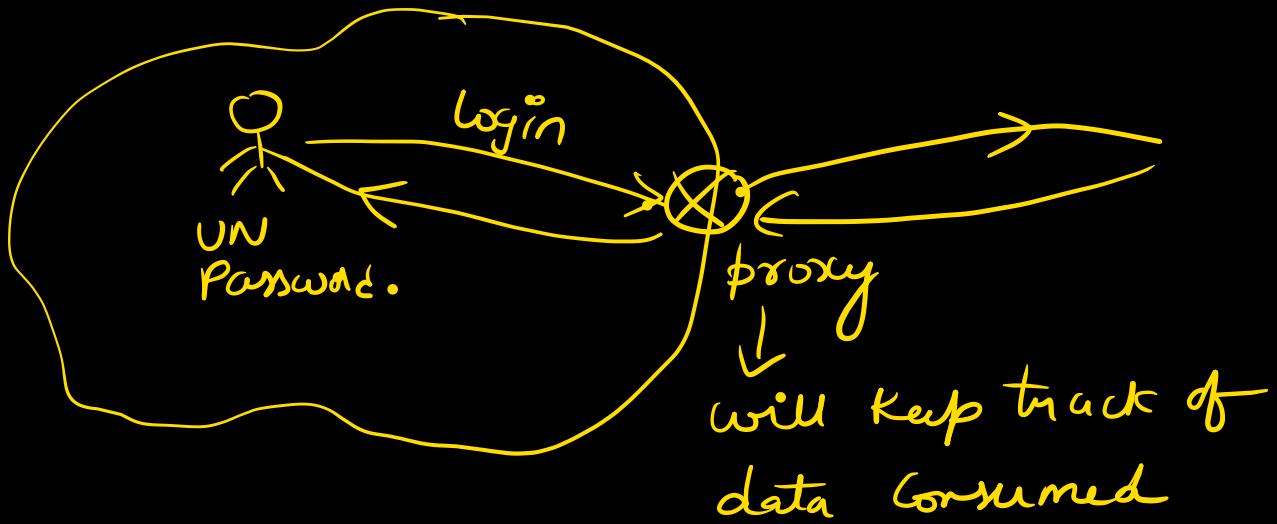
we don't
know if
collisions
will happen
at NLK

GW can act as proxy. < Caching
accounting.

Ex: Let your mobile be connected to youtube.



In your college rule is no student should use < 1GB / week.



I worked in Cisco \rightarrow MI GW
 mobile Internet $\xrightarrow{\quad}$ Gateway. \times

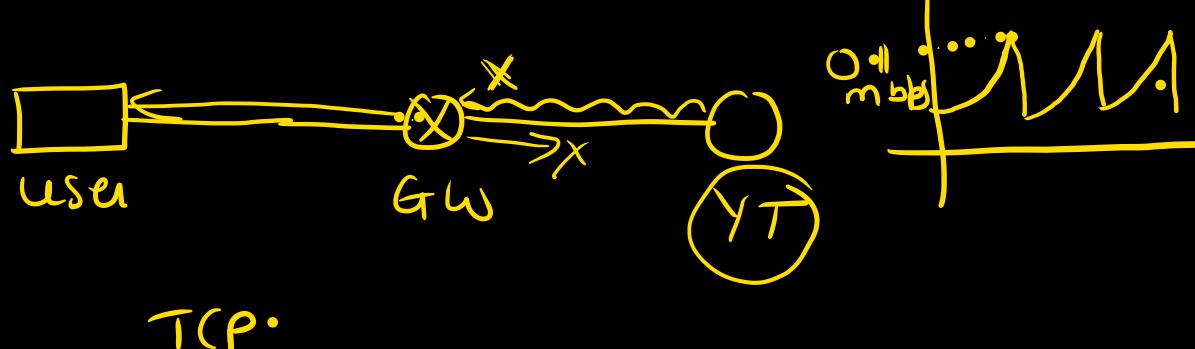
my job was not to waste data.



Ex: If $V = 1 \text{ MB}$, $Durah = 10 \text{ sec.}$
 then we want to show user
 only $\frac{1 \text{ MB}}{10 \text{ s}} = 0.1 \text{ Mbps}$
 But sever send at 10mbps.



\times NOT required



M1TG → Gateway .. } learnt CN.

ASR5K → Router }



can do NAT: Network address translation

