Efficiency of delayed Token release:

- Case I:- When only one station wants to transmit

$$\eta = \frac{t_x}{(t_x + t_p) + (t_{xA} + t_p)}$$

$(t_x + t_p)$ → frame; $(t_{xA} + t_p)$ → Token

- Case II: When every station wants to transmit

$$\eta = \frac{t_x}{(t_x + t_p) + (t_{xA} + t_p/N)}$$

$(t_x + t_p)$ → frame; $(t_{xA} + t_p/N)$ → token

802.5 LAN Standard is delayed token Release

↳ Maximum efficiency given by early token release.

Fast E

		Minimum dist
Normal Ethernet	10Mbps	2500m
Fast Ethernet	100Mbps	250 m
Gigabits Ethernet	1Gbps	25m
Ten Gigabits Ethernet	10Gbps	2.5m

- In early token release, the station release a token as soon as it complete the frame transmission, than what will be the priority of token released, ?

Ques: Ring mein bit delay kitana hona chahiye but ring mein bit delay kyo hona chahiye ??

Ans→ Isliye hona chahiye, token ring mein ek concept hota hai ki token pure ring mein accomate hona chahiye.

- Kabhi overlap nahi hona chahiye matlab agar ek system K pass first bit hai token frame ki to uske pass last bit of token nahi hona chahiye.
- Har system k pass kuch na kuch bits honi chahiye token ki.
- In other words, token ek jagah store nahi hona chahiye.
- Agar token ki length waise to 3byte hote hai matlab 24 bits to ring mein 24 bits ka delay to hona chahiye.
- Suppose har system token ko padta hai aur copy bhi karta hai toh padne mein aur copy karne mein mein bhi time lagta hai toh every system introduce delay.
- Suppose har system ka 1 bit delay produce karte hai agar four system hai toh 4 bit ka delay produce karega.

- Suppose 1 bit apki 20m mein aarahai hai matlab apke puri wire ki length 400m ka hona chahiye,
- 20 bit ka delay produce karne k liye because 4 bit ka delay toh system mein produce kar diya hai par baki bacha hua 20 bit wire produce karegey.
- Agar wire ki length 200m hi hai toh yeh 10 bit ka delay produce karegey total delay kitana hua 10+4 = 14 bits.
- Baaki ka 10 bit ka delay monitor introduce karega ring mein.
- Token ki overlapping hatane k liye ring should produce delay of token frame i.e 3 bytes.

Total delay in ring = Size of token frame

= Wire k karan delay + System k karan delay

+ Additional delay provided by monitor.

Diffrent Networking Devices:

- Joh device jis layer ka hai woh us layer ki functionality se deal kar sakta hai.

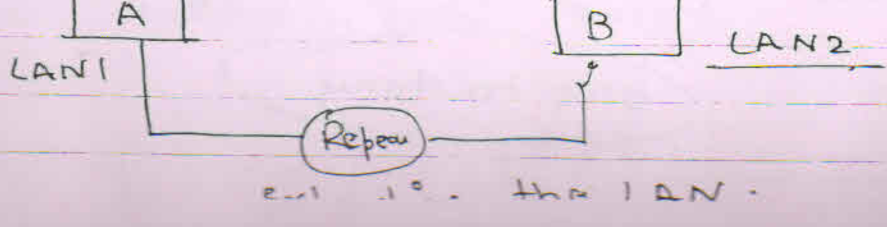
For example:→

Physical layer k device hai hub and Repeater. Hubs and Repeaters make use of voltage level which is the functionality of physical layer.

- Hubs ~~can~~ and Repeaters can overcome all the functionality of voltage level.
- But hubs and Repeaters ko yeh nahi pata ki woh aagey ja k frames mein convert hogey.

Repeators :→

- It is used to filter noise.
- Repeators connect diffrent segments of LAN
- A repeator is a generator not an amplifier because amplifier don't distinguish between noise and signal it amplify both noise and signal but repeator extract the signal and removes all noise and regenerate signal.

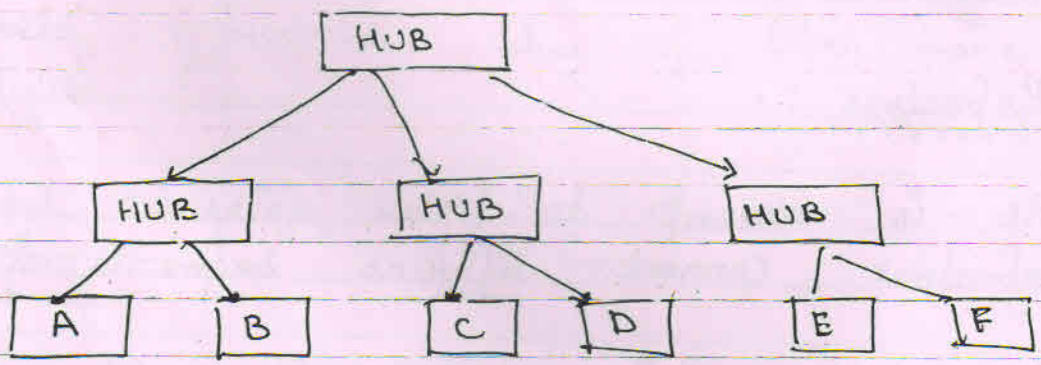


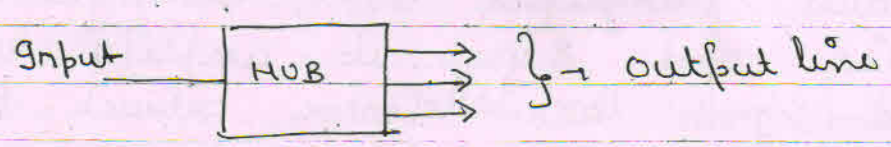
... the LAN.

- Repeators regenrate Every frame it recievos.
- Repeator mein ek incoming line hoti hai aur ek outgoing line hoti hai.

HUB :→

- Multiport Repeator is known as hubs.
- Hubs can be used to create multi-lurk heirichal of LAN.
- Noise ko filter karega aur regenrates the frames.

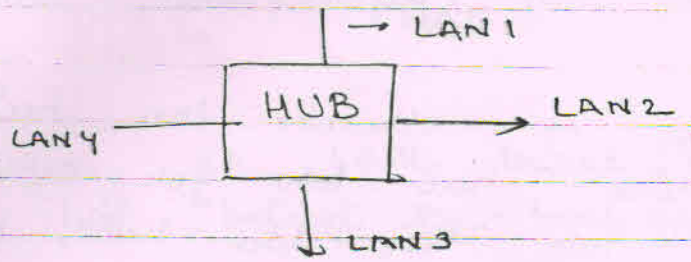




one input line and many output lines.

one to Many

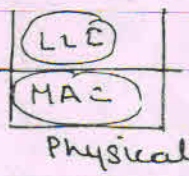
- Hub is a broadcasting device (Jis line se aaya hai us line ko chor kar sab line par data send kar dega)



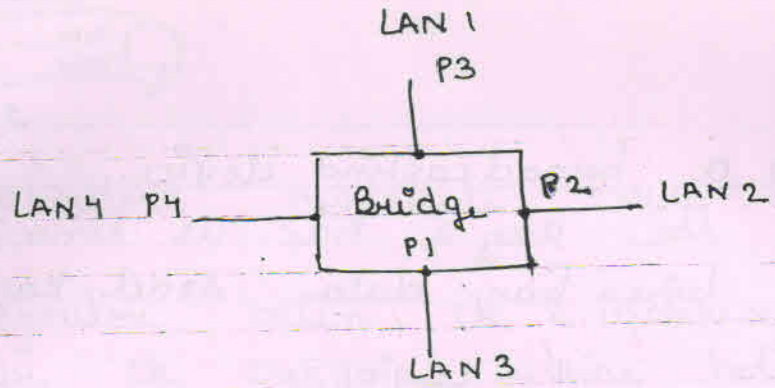
Bridges :-

Bridge can be used to connect two different LAN's or the segment of very large LAN.

- EK Lan ethernet protocol par work karta hai aur dusra token ring par, toh ek frame format se dusre frame format mein convert karne ka kaam bhi bridge karta.



- Data-link Layer par work karta hai bridge.
- This device is more intellent then hub/Repeaters but costly than hubs/Repeaters.
- Agar Hub use kiya toh woh hamesa broadcast karega but agar bridge use kiya toh woh hamesa broadcast nahi karega.



- Hum Agar ek ethernet lan hai aur ek token ring hai toh yeh conversion (frame convert toh kar deta hai, but this conversion take times and many problems occur after conversion.

- Pahala problem :→ and most serious problem.

- Sabhi 802 LAN protocol mein maximum and minimum length par restriction hai, toh

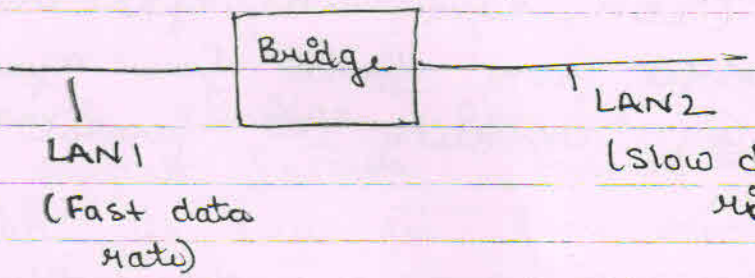
- Toh ek token ring 50000 Byte ka max frame send karsakte hai toh ek frame bridge k pass gaya now conversion hua toh ethernet mein 1500 byte se jada ka data ek frame mein nahi jasaktee toh kya yaha frame split hoge, bridge kahi splitting ka kaam nahi karta hai, toh bridge simply us frame ko discard kar deta hai / drop kar deta hai.

- Toh basically is problem ka kahi solution nahi hai bridge simply dropped that frame.

Second problem :→

A second problem is that interconnected LAN do not necessarily run at the same data rate.

- Joh agar ek LAN bahut fast send kar raha ~~hai~~ ~~bridge~~ ~~ko~~ → ~~to~~ aur ek LAN bahut slow,



bridge pahale puri frame read karega then send karega, toh may possible ki bridge out of buffer hojaye fast data rate ek side se aarahe hai isliye toh kuch frame discard hojayegi isproblem k karan.

Third problem :-

→ Ethernet mein koi priority ka concept nahi hota but Token Ring mein hota hai toh Token ring se Ethernet par data send kiya toh priority will be lost.

Joh hum ek hi universal frame format kyo nahi use karte. There is no valid technical reason for this incompatibility.

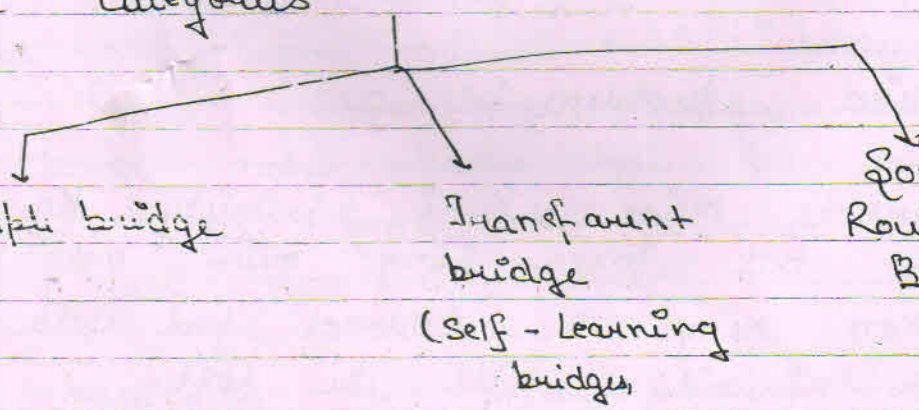
- It is just that none of the corporation supporting the standard frame format.

- As a result any coping between different LAN requires reformatting which takes CPU time requires a new checksum calculation & introduce the possibility of undected error due to bad bits in the bridge memory.

- Agar (IBM, Xerox, GM) yeh thin committee ek ~~format~~ frame format par agree hojaye toh yeh converting ki jarurat hi nahi paregi.

→ Bridges maintain the table of Mac-addresses (physical address) for forwarding discussion.

- On the basic of maintaining the mac-address table bridges are classified into three Categories



Simple Bridges:-

- Easy to implement.
- Entire table of bridge is maintain manually

- For maintaining table we have to implem-ent program for that.

Drawback:→

- LAN mein kuch bhi change hoga toh manually change karna hoga bridge ki table mein.

Self: Learning Bridges:- (Transparent bridge).

- Transparent bridge operates in promiscuous mode, matlab hamesa frames accept karega jab bhi us Lan jis lan ~~mein~~ ~~kuch~~ se woh attach hai unme transmission horaha hai.

- Self-learning bridge maintain the Mac-address itself.

- Source address ko learn karke, mac-address ki table banti hai.