

UDP:-

classmate

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I fragment offset = 0

II fragment offset = 31

III fragment offset = ~~62~~ 62

IV fragment offset = 93

Ans →

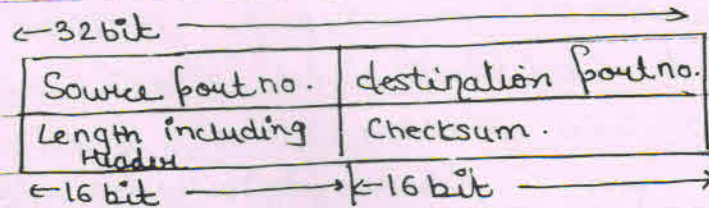
IV fragment offset = (124) ✓

UDP:-

- Stands for User datagram Protocol. It is connectionless unreliable protocol.
- There is no flow control mechanism and there is no acknowledgement for receiving packets.
- * But UDP provide error control upto some extent. Agar UDP detect kar leta hai error toh woh simply drop kardita hai use packet ko.
- * UDP, IP layer k upar sirf process-to-process communication wala feature add karta hai aur kuch add nahi karta hai.
- Jo UDP ki itani kam functionality hai toh hum isko use hi kyo karte hai, UDP k advantage kya hai toh pahala advantage it is simple protocol, simple to implement & therefore faster than TCP.
0, 31, 62, 93,
- * Small file ko send karne k liye useful hai, kyoki isme jaldi send hojayege.

UDP- Header Format:→

- It has fixed size header of 8 bytes and having restriction on packet length.



(*) Length including Header:→

Total ~~to~~ Length kitani possible hai
(including Header).

$$= 2^{16} - 1 = 65535 \text{ bytes}$$

$$\text{data} = 65535 - 8 = 65527$$

but actual mein yeh packet, IP header mein encapsulate hone wala hai wata ek packet ki size kitani holi hai = $2^{16} - 1$ including header

toh

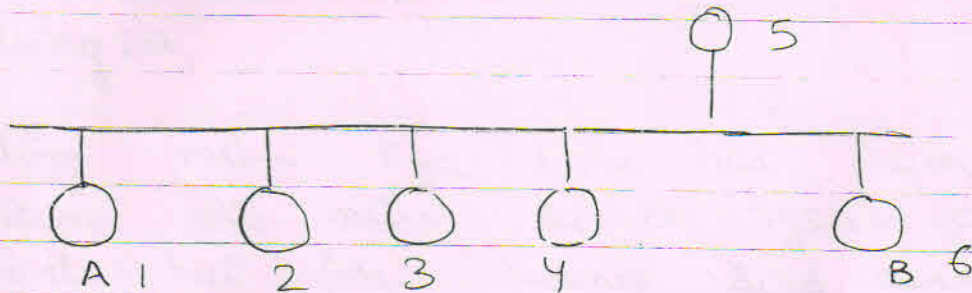
$$\text{Actual (Max data size)} = 65527 - \text{IP-header}$$

(*) Yahai checksum (Header + data) pare hota hai.

Access Control Protocol :-

- Access Control matlab kis system ko time dena hai aur kab dena hai transmission k liye, that is handle by Access control protocol.
- Now very first problem we are discussing is TDM (Time division multiplexing)
- TDM :-

IS protocol mein hum kya karde hai har system ko ek ~~first~~ time allocate karte hai, jab uska time slot aayega tabhi woh system data/frame send kar payega.



- In protocol mein kahi acknowledgment ka concept nahi hota hai.



Time Slot kitana bada hona chahiye, toh data ki last bit receiver tak

bachu jaye itana bada hona chahiye
(to avoid collision)

i.e Time slot = $t_x + t_p$

Now $\eta = \frac{\text{Usefull time}}{\text{cycle Time}} = \frac{t_x}{t_x + t_p}$

$$\eta = \frac{1}{1+a}$$

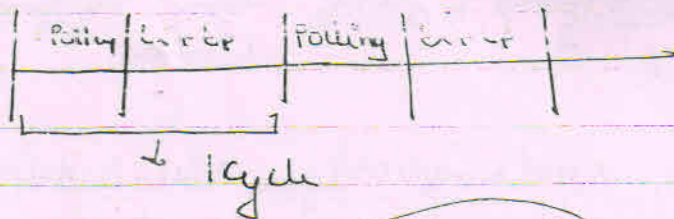
• Disadvantage:-

#. Agar Kisi System k pass data hai hi nahi send karne ko toh woh wala Time slot waste hojayega.

• Reservation policy - (Pahle se time reservation karna)

Polling:-

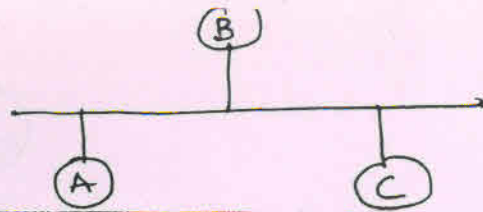
• Polling mein kya hota hai, hum un system ko mein se ek system choose karke hai joh frame send karne chahata hai.



$$\eta = \frac{t_x}{\text{Poll} + t_x + t_p}$$

• disadvantage

→ Starvation



Consider the following situation:-

- A system wants to send data to C at the same time C ko bhi data send karna hai B ko.
- A ne bhi data channel par rakha aur C ne bhi data channel par rakha to kya hogaya collision hoga, dono frame collide hojayege.

⇒ How to avoid this collision:->

- To avoid this collision many protocols are there which work at MAC layer.
- Two of them we asked discussed is TDM and Polling.
- Now another one is CSMA.
- CSMA stands for Carrier Sensing Multiple Access protocol.
- Carrier sensing matlab yeh channel ko sense karega.
- Multiple Access matlab agar collision hota hai toh kuch der tak wait karega then fir se retransmit karega.

Working :-

In CSMA protocol koi bhi system transmit karne se pahle channel ko sense karuga, if it is found channel free to hi woh data transmit karuga otherwise nahi karuga. otherwise it will wait for some random time.

- Sense kaise karta hai ??

Generally hum 0 ko $+0V$ se voltage level mein represent karte hai aur 1 ko $+5V$ se.

- If agar koi ~~under~~ unstandard voltage level found hota hai channel free means there is a collision in the channel.

Ques: Kya yeh protocol collision free protocol hai ??

- Agar two users ek saath sense karta hai to dono user ko channel free miliga aur woh data transmit karogay aur collision hogayega. So this protocol is not a collision free protocol.
- Carriere ko sense kiya free tha dono ne ek saath sense kiya, free tha dono collide hogaye. now sender ko kaise pata chalega ki uske hi frame collide hue hai ??

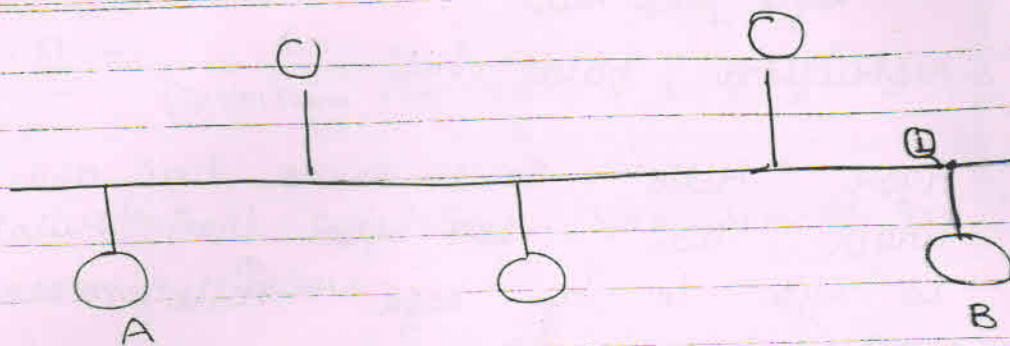
Ans- Joh sender ko pata hi nahi chalta hai ki frame collide bhi hue hai, isliye

nahi chlega because transmission k baad collide hui hai. Since ~~again~~ ~~collide~~ hogayi toh sender ko pata hi nahi chlega ki collision bhi hua hai.

- There is no concept of ACK here in CSMA or CSMA/CD.

To resolve this problem some updation on CSMA protocol was done and new protocol came into existence i.e CSMA/CD protocol.

- Here CD stands for collision detection.
- Is protocol mein transmission k time bhi channel sense krta hai, ki collision hua hai ki nahi.
- In this protocol sender itself detect the collision now sender kaise pata krta hai ki collision hua hai ki nahi??
- Agar woh transmit kr hi rha hai aur collision hojata hai toh bol hi dega ki uski hi frame collide hui hai, lekin transmission band kr dega to collision detect nahi kar payegey hum.
- Now aab hum dekhte hai hum collision kab detect kar payegey -



- Worst case ke kar chal raha hai hai hum A ko last station B ko frame send karke hai, toh A kab tak send karke hai ke agar collision hua hai toh woh detect hojaye.
- A ne send kiye aur A ke first bit '1' par aagayi, now B ne channel sense ke usko is time free milgi channel so B ne frame send ke now A & B ke frames collide hogayi, now woh collisional frame agar A tak pahuch jayegi toh A detect kar sakta hai collision provide that A ko utani dur tak send karna parega.

$$i.e \quad t_x \gg t_p + t_p$$

\checkmark → collision frame
 B tak A tak pahuchne
 jana k liye k liye

$$\Rightarrow t_x \gg 2t_p$$

$$\frac{\text{Length}}{R} \gg \frac{2 \times D}{S}$$

CSMA/CD mein minimum frame length par

* CSMA/CD ring topology par bhi work kar sakta hai usually bus topology kiya jata hai

classmate

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Instruction hota hai.

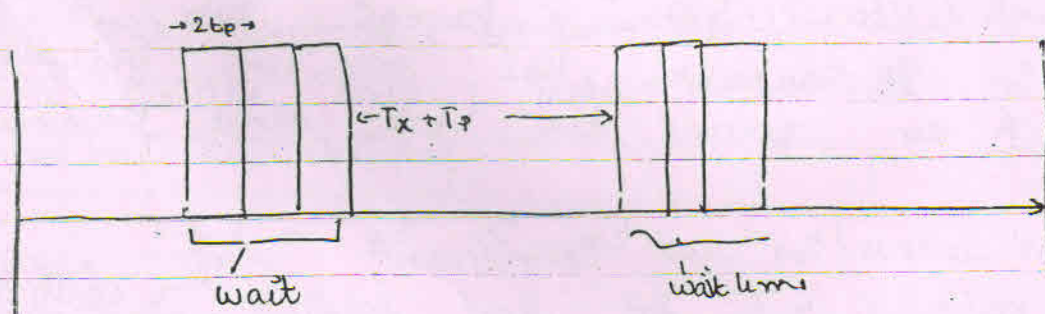
- Agar "Hello" send karna hai aur minimum length hai 100 bytes then "Hello" is only 10 byte to kya hoga "Hello" message send nahi kar sakte ??

- Kar sakte hai, us case mein hamko kuch garbage append karna parega and that garbage is known as padding.

Now efficiency of CSMA/CD protocol or (Ethernet)

- Efficiency kaise nikalte hai hum,

$$\eta = \frac{\text{Useful time}}{\text{Total cycle time.}}$$



- Agar ek system ko send karna hai frame may possible ki usko wait karna pare kyoki abhi channel free nahi hai.

- Joh kitane slot tak wait karna parega, it depends. 1 slot = 2 tp because

$$\eta = \frac{t_x}{(\text{Collision slot}) \times 2t_p + t_x + t_p}$$

Now this collision slot depends on many factors

So after ~~data~~ calculation we get.

No. of Collision slot = e

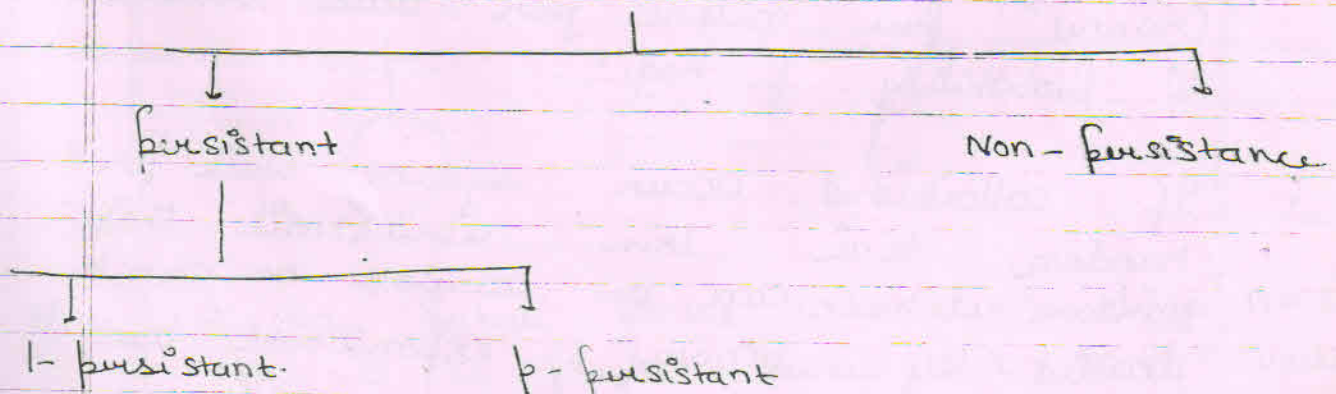
$$\Rightarrow \eta = \frac{t_x}{e \times 2t_p + t_x + t_p} = \frac{1}{1 + 6.44e}$$

$$\eta = \frac{t_x}{t_x + t_p[1 + 2e]}$$

- This protocol is suitable for LAN not for MAN & WAN.

#

CSMA/CD



- persistent CSMA/CD:-

→ Agar ek baar channel ko sense karne start