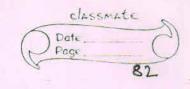


- · Füst one is Transmission Time Ltx) and second is propogation time Ltp).
- fl Now question, yet transmission Time (tx) Kya hota hai aux yet propogation time (tp) Kya hota hai 22.
- · Joh sabse fahale hum dekte har yet transmi--ssion time kya hota har &&
- 92 transmission time ka usually tx se refrusent Karte hai.
- Joh transmission Time kya hota hai ?? Ans. Transmission time is a time required to ful the data over the media (channel).
 - · Data ko media fan Hakne ka joh time lag Maha hai woh transmission time kahalala hai
 - Matlab Kya, jaise physical layer K pass data axailable hai , physical layer bibs ko reoltage lund pan convert karde hai. Joh saari bibs ek saath roltage level their top convert pani hogi.
 - * Pahali fahali bit hur fhir dusri hur fhire thisre hur -- so on.
 - Joh fahali bit jaischi lable far aang , wike baad data ki last bit ko cable far aane min



Kitana time lag Haha hai, yet finda time Kya Kahaliga aafka biansmission time.

Data ko cable fan rakne min time kyo lag raha hai because bits ko hum voltage hul min convert karrahai hai. Vs conversion mein hamko time lag Maha hai,

Aur wahi time hamara kya timu kahalayega bransmission time.

Dusra barameter hai erobogation ce'ay:

Et PROPOGATION DELAY:>
Ows: Now yet propogation dulay Kya hota hai ??
Ans > Propogation dulay is the time taken by single
bit to cover the distance between Sender
and Mulever.

Single bit ko Sender de Huieren tak jane min jitana time lag Haha hai won kya Kahalata hai hamara propogation delay.

Note that Single bit hai funa data to bravers.

Kanne Ka ton ki bank nahi horahi hai:

Joh aab frame ko sender se surere tak

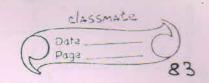
Jane minn kitana time lagega 23.

Agar hum last bit k time time combute

kar le, ki last bit sender se surere

tak kab bachuchegi, agar last bit pacau gay:

gara data already sache hi jayega.



Agan afka transmission time tx hai toh tx time min kya hoga, aafki last bit kaha f aajayegi cable fan.

· Last bit ko cable four aane min kitana time laga tx.

Utane time K baad woh aagey baregi. Usko distance cover Karne min Kirana time lagega. Bropogation time lageda : e Ep time lagega.

Joh last bit channel far kab aayi tx time fan , aun to time mein reieren k fass fache gayi.

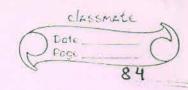
Joh last bit ko Hossexion ser sender tor sender Su Hucieven tak fachuchane mein kitana timi laga txx + 2p.

Itane time muin last bit factur gay: mattab sacra hi data factur gaya.

Hum kya kan Hahai PIT comfide kan Hahai hail RTT min Sabse sahali chij kya nayî tine ki hamko france ko kaha send karna hai sendur se Husevan tak send karna hai:

tx time mein frame ki last bit channel fan aays t tp time wo'r Kya hogi, braverse boke ruieren K fass bache gays.

Joh tx+tp lime min frame sender se rucierer



K fass fachu gayi.

Aab Hecieven us frame ko frocess karuga, frocuse karuga matlab, îmediately acknowledgement send karuga toh nahi, won sabse fahale frame ko frocess karega, check for error, agan frame min kohi error aayî hai toh woh negative ecknowledgement send karuga.

Aun agan Koni error nahi aayi toh fositive acknowledgement Send kanga sender ko.

Aun frame ke process Kanne wale time to hum.
Kya kahab hai frame processing Time:

- Eußpose af Ki frame min over jahi aayi, toh aab ruieru kya karuza aikjowlidgement ko geninati karega.
- Now you acknowledgement bhi kya hai data hi hai isko wire fan Hakega:
 - Now question yet hat frame to media far Nature to time aux me action whidement to media far raine ta time same hoga ti different hoga Es

Ans: Diffount hoga, Kyo diffount hoga & clata frame

Ki Sizi jada hogi usko Hakne min jada

timi lagega auri acknowled gement Ki sizi Choti

hogi toh usko Hakhani min kaam timi lagegagslige dono ka to biansmission timi diffount
hoga:

· Joh acknowledgement k beansmission time ko hum texa kaha dde hai.

Joh txa time mein hamara acknowledgement kaha aagaya cable far aagaya.

txa time min acknowledgement ki last bit Kaha aagayi cable for aagayi.

Plup usko aab jana hai toh jane num kitana time lagega to lagega.

Joh txa + tp time mein kya hoga, acknowledgement kaha se kaha tak fachu jayega from rucievui to Sender:

Now yet sab milak hamana kya banta hai nound - Trip - time.

RIT = Exitp + Exitp

RTT = Ex + Ep + Frame Processing + txA + tp

tou trame

for acknowledgement

yaha overlaffing min kaam horaha hai.

But usually, ex toh frame processing time nahi given hota hai, i.e negliable hoter hai, toh agan frame- processing time given nahi hai toh E usko consider nahi Karna hai. Aux acknowledgement bhe bohuk chota hota hai, top uske beansmission time ko ejenually consider paris Kiya jata hai.

Agan given hai toh aafko add kanna hai, agan nahi given hai toh unko consider nahi kanna hai.

Now aab RTT Ka formula Kya ban gaya

RTT = tx + 2 tp

Now aab hum dekte hai how to comfute transmission time, tx koise nikalna hai

tx = <u>Length</u> of data = <u>L</u>

Data bransfur Hate R

 $k_{\chi} = \frac{L}{R}$

Data bransfor Mate Kause given Mahati hai, jaise >

Loo Mb ps = 100 Mega bits feir Second

- Network min bytes nahi Chalta hai bits hi
- Agan Mbps ka agan 'b' Small min hai toh difinitly it is Megabits : Aun Agan ye B' cafital min hai (MBps) toh it will be

87.

Mega bytes: yet convensions hai.

Mb → Mega bits MB → Mega Bytus I Mbbs = 106 bits per second

I Gbbs = Log bbs

I Kbbs= 103 bbs

Dues: Find the bransmission Time for Loso byte frame

Anso

 $t_x = \frac{L}{R} =$

Hure L = 1000 bytes = (1000 * 8) bits

L= 8×103 bils

R= 100 × 106 bits pur second

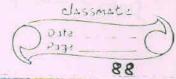
 $t_{x} = \frac{L}{R} = \frac{8*10^{3}}{100*10^{6}} = 8*10^{-5} = 80 \mu s$

Now aab hum dekte hat how to comfute propogation delay, to Kaise nikalna hai.

tp = Distance between two Stations Signal Grofogation Speed.

tp = D S

Signal propogation Speed mattab apki joh waveform Signal propogation Speed mattab apki joh waveform bannahai hai woh waveform aagey kis Speed Su propogati horaba hai.



Ows:- The distance between two station is Loop km. and signal braverse at the speed 2/3 of the Solution:

 $tp = \frac{Distance}{Signal} = \frac{(1000 * 1000)}{2 * 3 * 108} = \frac{1 = 0 * 5 * 5 * 108}{200}$

Ans \Rightarrow tp = 1 x 10 5 = 5ms = 5 * 10⁻³ Sec = 5ms.

 $\frac{\text{Lp} = 5 \text{ ms}}{\text{Speed of light} = 3 \times 10^8 \text{ m/s}}.$

Now Stop and wait protocol clien hai kya kahala hai, woh yeh Kahata hai ki serdun should wait for the time slightly quater than RTT agan utani dur min acknowledgement nahi aaya, toh serdun should rutuansmit the frame.

Now is protocol lifein problem Kya hai, Bahali Broblem Kya aayi the Ki Sender. Kitani der wait Kare,

Joh us broblem ko. Solution hamne kya inkala Ki RTT time tak lag-bag wait kare.

Now dusni problem kya aciti hai stop and wait mein aun hum uska kya solution Mikal te hai:

Sender ne fabrale & frame sind Ke, now rusever

ne us frame Ko accept karliga aun uska acknowledgement send Kirga, likin woh acknowledgement network min lost hogaya:

Lost hogaya tah sender us frame ko rutransmit Koruga, now sender ne från se us frame ko send Kar diya.

Joh Kya Huieren Ko frakti frame Ko accept karna. Chahiye tha, toh nahi Kyo?? Because it is dulphitate frame.

Par rivierer toh yahi Samje ga ki Kohi nayi frame Sender ne Send Ki hai.

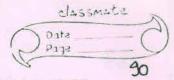
Joh Stop and wait min broblem kya hai, ki thure is no way to differentiate between new frame and duiplicate frame.

Nayî frame aarahaî haî kî dulşticatı franc aa Hahaî haî, is k siye kohî diffountiation hi pahî Konşaktor isko Hecievor diffountiatı nahî kanpakta.

Joh aab Kya Karu, ?? to aab Kya Karu iske lige hamne Kya Schemu inproduced Ki, Ki assign a number to each frame

Joh numburing kaise kare aaise kare kya 1,2,3,4.5 aaise numburing kare kya, yeh numbur kaha store hoga. hogy obviously frame k header min fare hoga.

Agan Kohê bhê information agan protocol ada



Karter har toh kaha karter har uske header mein Joh yet number Kaha add hongry frame k header Agan headen mun kohi bhi chij add kanna hai, top us chij ki lingth top fix kanni hi pandi. 7 tak k number 3 bils mein Hefresent hojayegey. 32 tak k number 5 bil mein Hefresent hojayegey. E Aaise Kara matlab har frame ko alag humbh de fessible nahi hai. Suppose humbring 30 bit Ki tay the cusul time to kya humber assign us +, how sever k baad wafas numboung Ken Se Stood hog! U Se. hore hai, ki jitana jada hamara headur ho. Uma better true: Agar hum agar I bit Ka frame number Hakhe top bhi chalega. Jaise babale fer ome Ka O dusti ka one --- like this. Agan dance bho kinga toh kohi problem rahi

acriedi .