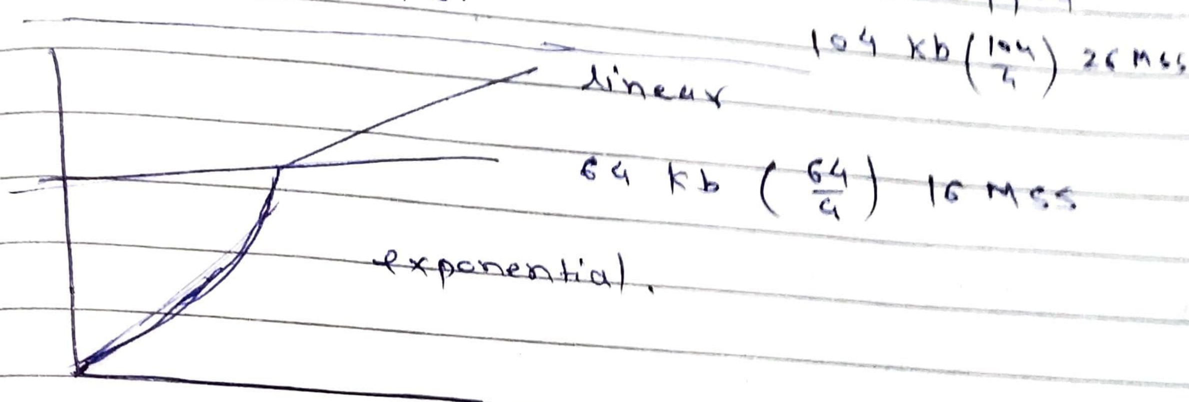
Kanchanka

Sol Timeout occurs in a TCP session so now we set the threshold to half of the window size where time out occurred.

∴ threshold $= \frac{128 \text{ kb}}{2} = 64$ kb.

so from 64 kb linear increase in congestion window size will occur.

from timeout window size is dropped to 1 MSS = 4 kb.



Now for each increment 1 RTT required.

∴ 1 → 2   1 RTT

2 → 4   2 RTT

8   3 RTT

(MSS) 16   4 RTT

~~32   5 RTT~~

~~64   6 RTT~~ → 4 RTT required to achieve threshold.

Now, From 16 to 26 more (26 - 16) i.e 10 RTT are required.

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∴ total RTT req = 10 + 4 (lin) (exp)
= 14 RTT

RTT = 2 × propogation delay
= 2 × 100 msec
= 200 msec.

∴ Time required = 14 × 200 ms
= 2800 ms
= 2.8 sec.

Q.2. TCP slow-start.

Transmission 6th we have time out.

4 MSS	→	8 MSS	1 RTT	1
8 MSS	→	15 MSS	2 RTT	2
15 MSS	→	16 MSS	3 RTT	3
		17		4
		18		5
		19 MSS	⟷	6

timeout.

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So now threshold value $= \frac{20}{2} = \underline{\underline{10 \text{ MSS}}}$

Now we jump back to initial i.e
$\underline{\underline{4 \text{ MSS}}}$

4 →	8 MSS	→	7th
8 →	9 MSS	→	8th
	10	→	9th
	11	→	10th
	12	→	11th
	13	→	12th
	14 MSS	→	13th

at end of 13th transmission
i.e 14 MSS
$= 14 \times 4$ kb
size of window $= \underline{\underline{56 \text{ kb}}}$

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Q-3) P of ~~corrupted~~ corrupted packet = 0.25

If we assume 100% rate i.e probality 1 of transmission

so 150 transmission will pass 150 packets.

But prob. is $\frac{3}{4}$ for succes $(1-0.25) = 0.75$.

∴ We require more ~~packets~~ transmission

$= \frac{150 \times 4}{3} = 50 \times 4$

$= 200$ transmission.

∴ retransmissions $= 200 - 150$

$= \underline{\underline{50}}$

50 retransmissions needed.

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Q.4 Total segment size = 340 B.
header overhead = 72 bytes

∴ payload in each = 340 − 72
= 268 bytes.

Total seq no. possible = 2^{32}
(32 bit field)

∴ Total packet (seq) without wrap
= 2^{32}

∴ Total pyload size

= $2^{32}(268)$ bytes

∴ $x = 268 \times 2^{32}$ bytes.

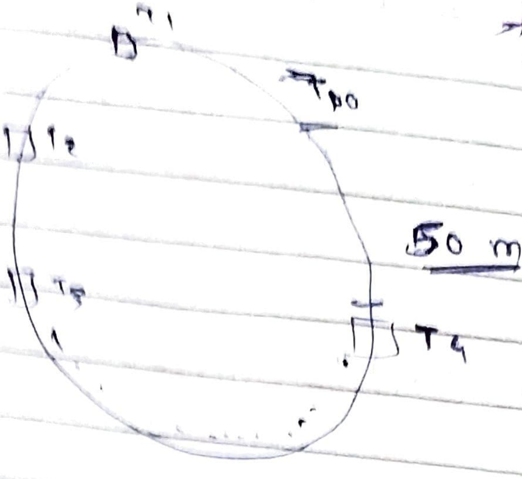
Total transmission time = $\frac{L}{R}$

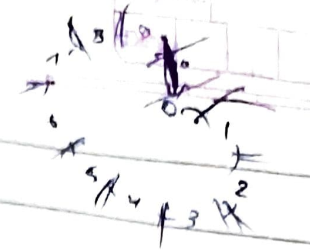
$= \frac{340 \times \cancel{2^{32}} \text{ bytes.}}{200 \times 2^{10} \times 2^{10} \text{ bytes per sec}}$

$= \frac{340}{200 \cancel{\times 2^{20}}} \times 2^{-20}$ sec

$= \frac{170}{100} \times 2^{-20}$ sec $= 1.7 \times 2^{-20}$ sec

~~= 1.34 × 2^12 Sec~~





Bandwidth = 8 Mbps
bit delay = 2 bits.

Token immediately released so THT (token holding time) = 0 sec.

Propagation delay $= \frac{d}{s} = \frac{50}{2\times10^{8}} = 25\times10^{-8}$ sec.

Transmission delay $= \frac{L}{B} = \frac{2000}{8\times10^{3}\times10^{3}} = \frac{1}{4}\times10^{-3}$ sec

Time when ring does work is for transmission:

∴ Total transmission time $= 10\times\left(\frac{1}{4}\times10^{-3}\right)$ sec

$= 2.5\times10^{-3}$ sec.

Total propagation delay $= 10\times25\times10^{-8}$
$= 25\times10^{-7}$ sec.

∴ ~~efficiency~~ $= \frac{\cancel{\text{transmission}}}{\text{trans + prop}} = \frac{2.25\times10^{-6}}{2.25\times10^{-6}+25\times10^{-7}}$

$= \cancel{2.25\times10^{-6}}$

Transmission time : 2.5×10^{-3} sec

prop time : 25×10^{-7} sec.

bit delay at each station : 2 bits

delay time : $\frac{2}{8 \times 10^{6}} = 0.25 \times 10^{-6}$ sec.

$\therefore$ Total delay time $= 0.25 \times 10^{-5}$ sec

Efficiency of ring

$$= \frac{\text{Trans time}}{\text{Prop. delay} + \text{trans time} + \text{bit delay}}$$

$$= \frac{2.5 \times 10^{-3}}{25 \times 10^{-7} + 2.5 \times 10^{-3} + 0.25 \times 10^{-5}}$$

$$= \frac{2.5 \cancel{\times 10^{-3}}}{25 \times 10^{-4} + 2.5 + 0.25 \times 10^{-2}}$$

$$= \frac{2.5}{0.5 \times 10^{-2} + 2.5}$$

$$= \frac{2.5}{2.5 + 0.005} = \frac{2.5}{2.505}$$

$$= 0.9980$$

$\therefore$ efficiency = 99.8 %

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[illegible]

(6) Two sockets x and y.
At time t, y received till 200 bytes
At time t+1, 2 back to back segments to y.

1st segment : 70 bytes header
2nd segment : 50 bytes header

In 1st segment, seq. no : 112
Source : 200
destination : 82

(A) In the 2nd segment from x to y
Seq. number : 112 + 70 = 182
Source port : 200
dest port : 82

(B) If first segment arrives before 2nd in acknowledgement of first arriving segment,

Acknowledment no : 182.
source port : 82
dest. port : 200

(C) If second segment arrives before first seg. In acknowledgement of first arriving segment, acknowldegment no = 201, It indicates that it is waiting for bytes 201 and onwards.

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Timeline