

5. Tutorial 4

Monday, March 1, 2021

12:56 PM

① a. $B = 10 \text{ Mbps}$

$L = 5000 \text{ bits}$

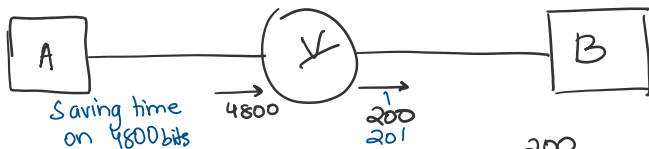
$T_{P_{A-R}} = T_{P_{R-B}} = 10 \mu s$

$$\begin{aligned} T_{\text{total}} &= T_{t_A} + T_{P_{A-R}} + T_{t_R} + T_{P_{R-B}} \\ &= \frac{5000}{10^7} + 10 \mu s + \frac{5000}{10^7} + 10 \mu s \\ &= 1.02 \times 10^{-3} s = 1020 \mu s \end{aligned}$$

b. $4T_t + 4T_p$ 

c. **Cutthrough Switching**

-capable of transmitting the packet before receiving the entire packet.



Transmission delay for 200 bits: $T_{t_{A_{200}}} = \frac{200}{10^7} = 20 \mu s$

$T_{P_{A-R}} = 10 \mu s$ after 30 μs , retransmission begins

$$\begin{aligned} T_{\text{total}} &= T_{t_{A_{200}}} + T_{P_{A-R}} + T_{t_{R_{5000}}} + T_{P_{R-B}} \\ &= 20 \mu s + 10 \mu s + 500 \mu s + 10 \mu s \\ &= 540 \mu s \end{aligned}$$

②

End to end delay =

Setup + $T_{t_A} + 4 \cdot T_p$

$0.2 + 3200/9600 + 4 \cdot 0.001 = 0.5373$

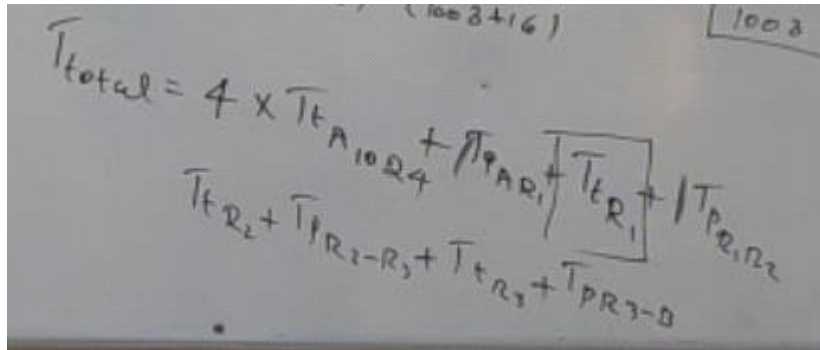
3200 bits divided into packets of size 1024 [including header]

16 bit header + 1008 bit data

Number of packets: $3200/1008 = 3.1746$

Rounded to 4 packets (minimum)

176bit data + 832 bit padding + 16 bit header = 4th packets contents



The image shows a handwritten formula for the total time T_{total} . The formula is written as:
$$T_{total} = 4 \times T_{A_{1024}} + T_{P_{AR_1}} + T_{R_1} + T_{P_{R_1, R_2}} + T_{R_2} + T_{P_{R_2, R_3}} + T_{R_3} + T_{P_{R_3, D}}$$
 There are some additional markings: "(1024+16)" above the first term, and "1003" in a box to the right.

$$= 4 \times (1024/9600) + 4 \times 0.001 + 3 \times (1024/9600) = 0.7507 \text{ s}$$

3.

0	101	000	111	Frame 1
1	111	001	100	Frame 2

4 frames