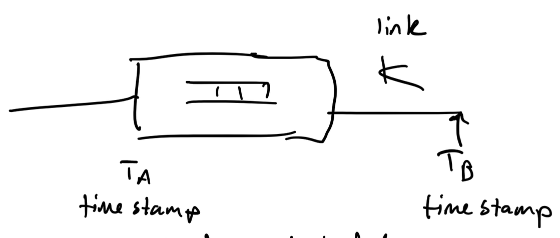
CS6014 Assignment 01 Packet Delay + Measurements

Thursday, January 16, 2025 10:45



$T_B - T_A$ (ms) = total delay

500 bytes	1000 bytes
10.0	11.0 - 2.8 = 8.2
2.8	10.0 - 2.8 = 7.2
* 2.4	* 2.8 - 2.8 = 0
4.0	3.0 - 2.8 = 0.2
5.5	5.5 - 2.8 = 2.7

$$\text{delay trans per byte} = \frac{2.8 - 2.4}{1000 - 500} = 0.0008 \text{ ms/byte}$$

$$T_{tx} = 1000 \times 0.0008 = \underline{0.8 \text{ ms}}$$

$\text{Delay}_{processing} = \emptyset$ T_{proc}

what is the queuing delay experienced by 1000 byte packets = 3.66 ms

Transmission delay (T_x): · time it takes to send packet over a link
· depends on packet size and link bandwidth

Propagation delay (T_{prop}): · also time it takes to send packet over link
· depends on physical medium and distance which is constant for all packets on the same link

Queuing delay (T_q): the time spent in the routers queue due to congestion
depends on traffic conditions

$$\text{delay} = \cancel{T_{prop}} + T_{tx} + \cancel{T_{proc}} + T_q$$

$$\text{delay} = T_{tx} + T_q$$

$$\text{delay} - T_{tx} = T_q$$

$$\text{delay} - \left(\frac{\text{size}}{R}\right) = T_{q_{1000}} \quad \left(\frac{(11+10+2.8+3+5.5)}{5} - 2.8\right) - \left(\frac{1000}{357.1}\right) = T_{q_{1000}}$$

if $T_q = 0$

$$\text{delay} = \frac{\text{size}}{R}$$

$$2.4 = \frac{500}{R}$$

$R = \frac{500}{2.4} = 208.3$ for 500 bytes

$R = \frac{1000}{2.8} = 357.1$ for 1000 bytes

$$6.46 - 2.80 = T_q$$

$$3.66 = T_q$$

For 600 bytes

$$T_{tx} = 600 \times .0008 = 0.48 \text{ ms}$$

$+$

$$T_{prop} = 2.8 - 0.8 = 2.0 \text{ ms}$$

Total transmission and propagation delay ~~for~~ 600 bytes is 2.48 ms