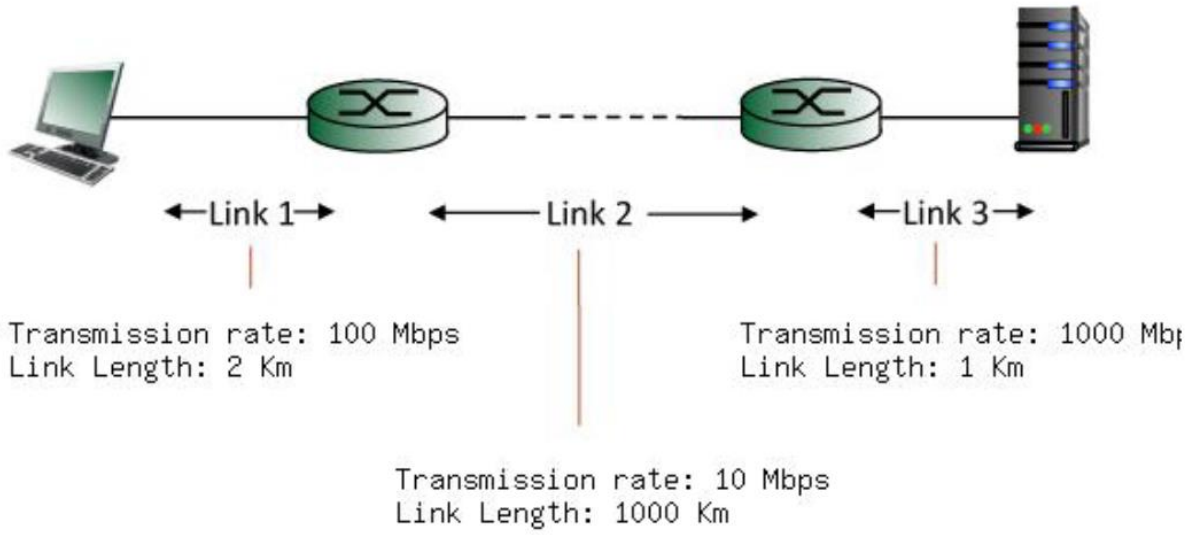
Assignment #001

Consider the figure below, with three links, each with the specified transmission rate and link length.



Find the end-to-end delay (including the transmission delays and propagation delays on each of the three links, but ignoring queuing delays and processing delays) from when the left host begins transmitting the first bit of a packet to the time when the last bit of that packet is received at the server at the right. The speed of light propagation delay on each link is $3x10^8$ m/sec. Assume a packet length of **4000** bits. Give your answer in milliseconds.

Answer:

$L = 4000\text{bits}, \quad R_1 = 100Mbps, \quad R_2 = 10Mbps, \quad R_3 = 1000Mbps$

$d_1 = 2km, \quad d_2 = 1000km, \quad d_3 = 1km, \quad v = 3 \times 10^8 m/s = 3 \times 10^5 km/s$

$TRANS_1 = L/R_1 = 40 \times 10^{-6} s,$

$TRANS_2 = L/R_2 = 400 \times 10^{-6} s,$

$TRANS_3 = L/R_3 = 4 \times 10^{-6} s$

$PROP_1 = d_1/v = 6.67 \times 10^{-6} s,$

$PROP_2 = d_2/v = 3333.34 \times 10^{-6} s,$

$PROP_3 = d_3/v = 3.34 \times 10^{-6} s$

总的端端时延latency为：

$$latency = TRANS_1 + TRANS_2 + TRANS_3 + PROP_1 + PROP_2 + PROP_3$$

$$\approx 3.79 \times 10^{-3} s$$

即3.79毫秒。

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2015年3月29日星期日