

Advanced Computer Network

Minor Project I

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1 Question

Suppose a computer in an army headquarters is transferring a file of 10 Megabits to a computer placed in a check post situated at the distance of 2000 KM. Assuming that sender and receiver computers are connected through a point to point link of 1 Gigabit and propagation speed as 2.4×10^8 meters per seconds, you are required to calculate the following:

1. Propagation Time
2. Transmission Time

2 Solution

2.1 Propagation Time

$$\begin{aligned}\text{Distance} &= 2000 \text{ km} \\ \text{Propagation speed} &= 2.4 \times 10^8 \text{ m/s} \\ &= 240000000 \text{ ms}^{-1}\end{aligned}$$

$$\begin{aligned}\text{For conversion of meter to kilometer,} \\ \text{Propagation speed} &= 240000000/1000 \\ &= 240000 \text{ kms}^{-1}\end{aligned}$$

$$\begin{aligned}\text{Propagation time} &= \frac{\text{Distance}}{\text{Propagation Speed}} \\ &= \frac{2000}{240000} \text{ s} \\ &= 0.008333 \text{ s} \\ &= 8.333 \text{ ms} \\ &= \underline{8333.33 \text{ } \mu\text{s}}\end{aligned}$$

2.2 Transmission Time

Message size = 10 Megabits
Bandwidth = 1 Gigabit/sec
 = 1000 Megabits/sec

We know,

$$\begin{aligned}\text{Transmission time} &= \frac{\text{Message Size}}{\text{Bandwidth}} \\ &= \frac{10}{1000} \text{ s} \\ &= 0.01 \text{ sec} \\ &= 10 \text{ ms} \\ &= \underline{10000 \mu\text{s}}\end{aligned}$$

2.3 Result

Therefore, the **propagation time** is 8333.33 μs and the **transmission time** is 10000 μs .