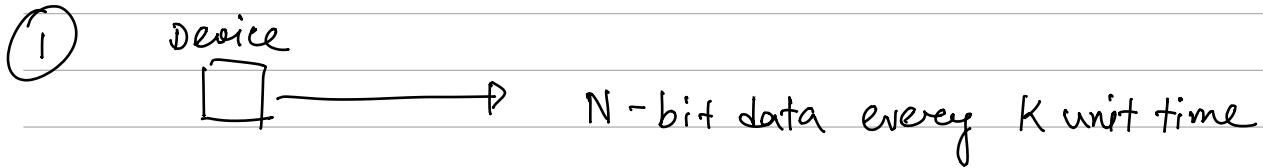


Theory Assignment 1

SWARNARUP
B21140

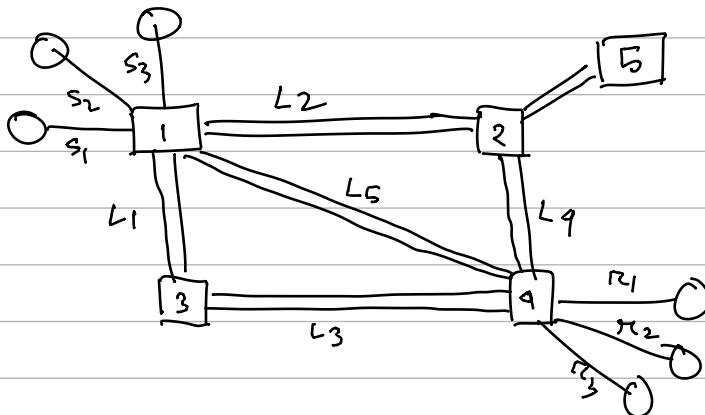


Example of a system can be a device sending its location to a place continuously. In every K sec the location data is sent. K is small and fixed.

- a) Ideally a circuit switched network should be used for reliability and speed of transmission purpose.

But since a device is transmitting its location, it's not inappropriate to assume it's going to be sending data across a wide range. In that case packet switched network system would be a better option.

- b) If packet switched network is used, two types of cores can arrive. Let's see with an example network system.



s_i : Rate of users connected to Router 1

r_i : Rate of users connected to Router 2

Case 1 : if $\sum s_i + \sum r_i < L_i$ then there would be no requirement for congestion control but Routing the Data through shortest path would make a difference in end-to-end experience.

case 2 : if $\sum s_i < L_i$ and $\sum r_i < L_i$ but $\sum s_i + \sum r_i > L_i$ then there is need for congestion control. Because at an intermediate Router incoming rate can be $\sum s_i + \sum r_i$ and it can only send to its capacity L_i . there it has to drop packets and require congestion control .

(2)

For a protocol to be universally acceptable standards are important , because depending on the scenario and prerequisites a system may be unable to produce the protocol or without using the standard measures of the protocol different systems may produce different outcomes.

example of lack of standard protocols :

Lack of standard protocols for Registrations of Courses . Sometimes it's OAS , LMS sometimes Samarth or Google form . And since things are First Come First Serve , students need to be alert about the mode of registration in the beginning of every semester .

(3)

Analogy of network protocol stack and Airline functionality

- ① Physical layer: Aircraft, runways and airport infrastructure
- ② Link layer: Air traffic control and ground handling .
- ③ Network layer: Route planning, Flight connection.
- ④ Transport layer: Seating of Passenger, baggage handling
- ⑤ Application layer: Passenger experience and customer services .

End to end argument in Airline System:

The passenger has two jobs

- (1) Selecting Source & destination Airports
- (2) Selecting seat and leaving the baggage.

The Transport layer in the system takes care of Assigning a Plane then seat the passenger, installing the baggage.

Physical, Link and Network layer takes care of assigning a route to the destination airport securely and efficiently.

When Plane reaches the destination airport. The transport layer extracts the baggages and with the help of tag returns the baggage to respective passenger.

①

3 tools to measure distance between 2 end points of new road

- ① Sattelite image and opsiometer
- ② CrPS
- ③ Odometer.

① Sattelite image and opsiometer

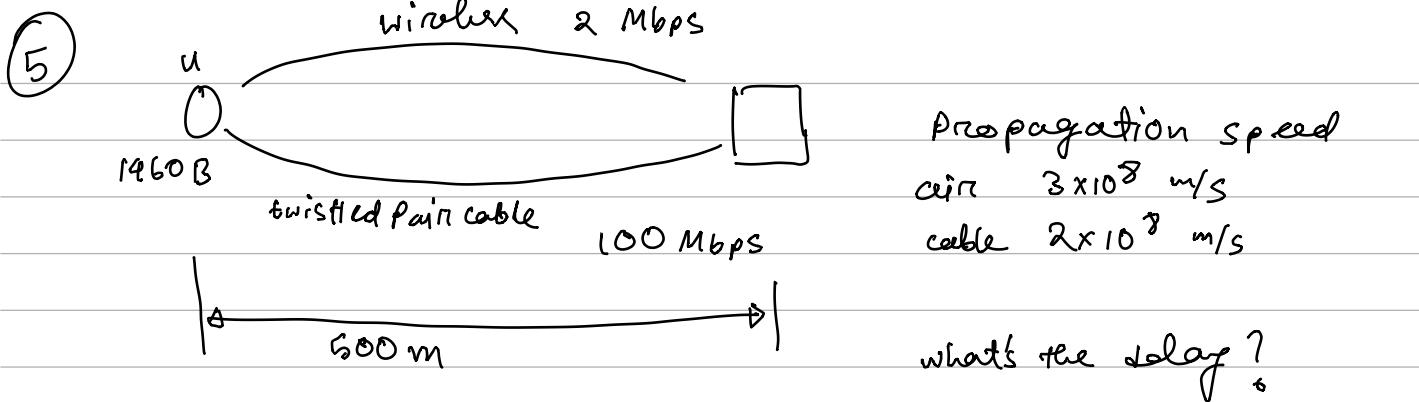
accuracy = ± 50 m/km (Reason for low accuracy is human error)
precision = ± 10 m/km

② CrPS accuracy: ± 5 m/km precision: ± 10 m/km

③ Odometer accuracy: ± 20 m/km precision: ± 50 m/km

④ increasing Order of accuracy: CrPS > Odometer > Sattelite image and Opziometer.

⑤ increasing Order of Precision: CrPS > Sattelite image > Odometer.



i) Wireless Technology:

$$\text{transmission delay} = \frac{1460 \times 8}{2 \times 2^{20}} = 5890 \times 2^{-20}$$

$$\approx 5890 \times 10^{-6} \text{ sec}$$

$$\text{Propagation delay} = \frac{500}{3 \times 10^8} = 1.67 \times 10^{-6} \text{ sec.}$$

$$\begin{aligned}\text{total delay} &= \text{transmission delay} + \text{Propagation delay} \\ &\approx (5890 + 1.67) \times 10^{-6} \text{ sec} \\ &= 5891.67 \times 10^{-6} \text{ sec.} \\ &\approx 5.89167 \times 10^{-3} \text{ sec}\end{aligned}$$

ii) Twisted Cable Technology:

$$\text{transmission delay} = \frac{1460 \times 8}{100 \times 2^{20}} = 0.11 \times 10^{-3} \text{ sec}$$

$$\text{Propagation delay} = \frac{500}{2 \times 10^8} = 250 \times 10^{-8} \text{ sec}$$

$$\begin{aligned}\text{total delay} &= \text{transmission delay} + \text{Propagation delay} \\ &\approx 0.11 \times 10^{-3} \text{ sec.}\end{aligned}$$

(6)

