Soluzione Esame 10-07-2020

lunedì 13 luglio 2020 16:14

```
matricola =  879236
variabili =  ['8', '7', '9', '2', '3', '6']
x       y       z       u       v       w
8       7       9       2       3       6
```

DATI:

$R1 = 2.0\ \frac{\text{Mbit}}{\text{s}} = 2.00 \times 10^{6}\ \frac{\text{bit}}{\text{s}}$

$R2 = 30.0\ \frac{\text{Mbit}}{\text{s}} = 3.00 \times 10^{7}\ \frac{\text{bit}}{\text{s}}$

$R3 = 6.0\ \frac{\text{Mbit}}{\text{s}} = 6.00 \times 10^{6}\ \frac{\text{bit}}{\text{s}}$

$D1 = 800\ \text{m} = 8.00 \times 10^{2}\ \text{m}$

$D2 = 70\ \text{km} = 7.00 \times 10^{4}\ \text{m}$

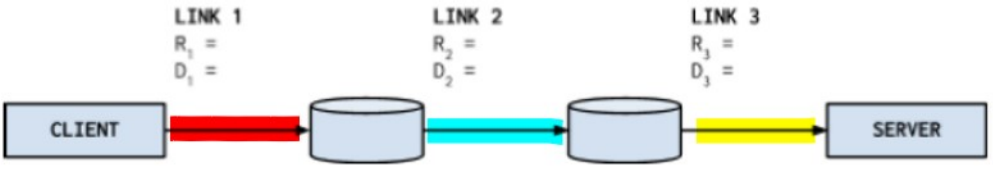
$D3 = 900\ \text{m} = 9.00 \times 10^{2}\ \text{m}$

$L = 1.8\ \text{kB} = 1.44 \times 10^{4}\ \text{bit}$

$Q = 6$

$d_{elab} = 3\ \text{ms} = 3.00 \times 10^{-3}\ \text{s}$

$vel = 2.50 \times 10^{8}\ \frac{\text{m}}{\text{s}}$



---LINK 1

$d_{prop} = \frac{D_1}{vel} = \frac{8.00 \times 10^{2}\ \text{m}}{2.50 \times 10^{8}\ \frac{\text{m}}{\text{s}}} = 3.20 \times 10^{-6}\ \text{s}$

$d_{trasm} == \frac{L}{R_1} = \frac{1.44 \times 10^{4}\ \text{bit}}{2.00 \times 10^{6}\ \frac{\text{bit}}{\text{s}}} = 7.20 \times 10^{-3}\ \text{s}$

$d_{acc} = Q \cdot d_{trasm} = 6.00 \times 10^{0} \cdot 7.20 \times 10^{-3}\ \text{s} = 4.32 \times 10^{-2}\ \text{s}$

$d_{link1} = d_{prop} + d_{trasm} + d_{elab} + d_{acc} = 3.20 \times 10^{-6}\ \text{s} + 7.20 \times 10^{-3}\ \text{s} + 3.00 \times 10^{-3}\ \text{s} + 4.32 \times 10^{-2}\ \text{s} = 5.3403 \times 10^{-2}\ \text{s}$

---LINK 2

$d_{prop} = \frac{D_2}{vel} = \frac{7.00 \times 10^{4}\ \text{m}}{2.50 \times 10^{8}\ \frac{\text{m}}{\text{s}}} = 2.80 \times 10^{-4}\ \text{s}$

$d_{trasm} == \frac{L}{R_2} = \frac{1.44 \times 10^{4}\ \text{bit}}{3.00 \times 10^{7}\ \frac{\text{bit}}{\text{s}}} = 4.80 \times 10^{-4}\ \text{s}$

$d_{acc} = Q \cdot d_{trasm} = 6.00 \times 10^{0} \cdot 4.80 \times 10^{-4}\ \text{s} = 2.88 \times 10^{-3}\ \text{s}$

$d_{link2} = d_{prop} + d_{trasm} + d_{elab} + d_{acc} = 2.80 \times 10^{-4}\ \text{s} + 4.80 \times 10^{-4}\ \text{s} + 3.00 \times 10^{-3}\ \text{s} + 2.88 \times 10^{-3}\ \text{s} = 6.6400 \times 10^{-3}\ \text{s}$

---LINK 3

$$d_{prop} = \frac{D_3}{vel} = \frac{9.00 \times 10^2 \text{ m}}{2.50 \times 10^8 \frac{\text{m}}{\text{s}}} = 3.60 \times 10^{-6} \text{ s}$$

$$d_{trasm} == \frac{L}{R_3} = \frac{1.44 \times 10^4 \text{ bit}}{6.00 \times 10^6 \frac{\text{bit}}{\text{s}}} = 2.40 \times 10^{-3} \text{ s}$$

$$d_{acc} = Q \cdot d_{trasm} = 6.00 \times 10^0 \cdot 2.40 \times 10^{-3} \text{ s} = 1.44 \times 10^{-2} \text{ s}$$

$$d_{link3} = d_{prop} + d_{trasm} + d_{elab} + d_{acc} = 3.60 \times 10^{-6} \text{ s} + 2.40 \times 10^{-3} \text{ s} + 3.00 \times 10^{-3} \text{ s} + 1.44 \times 10^{-2} \text{ s} = 1.9804 \times 10^{-2} \text{ s}$$

---DELAY E2E

$$d_{e2e} = d_{link1} + d_{link2} + d_{link3} = 5.34 \times 10^{-2} \text{ s} + 6.64 \times 10^{-3} \text{ s} + 1.98 \times 10^{-2} \text{ s} = 7.9847 \times 10^{-2} \text{ s}$$

---FILE

$$T = \frac{F}{R_{min}} = \frac{1.60 \times 10^{10} \text{ bit}}{2.00 \times 10^6 \frac{\text{bit}}{\text{s}}} = 8.0000 \times 10^3 \text{ s}$$

$$THR_{medio} = R_{min} = 2.00 \times 10^6 \frac{\text{bit}}{\text{s}}$$

nel caso di collegamenti multipli il collegamento con la banda minore fa da collo di bottiglia e viene usato per determinare, semplificando, il tempo di scaricamento e il throughput