KN Gü 2

$\longleftarrow$ 600m $\longrightarrow$

A3.)

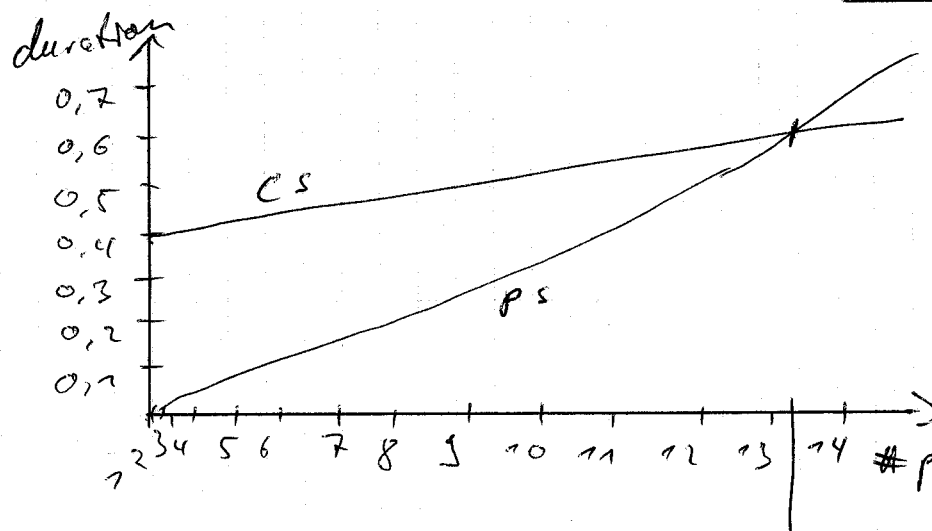t_{up} = set up time

$$t_{tr} = \frac{L}{R} \qquad t_{pr} = \frac{distance}{c}$$

Circuit switched

$$t_{cs} = t_{up} + t_{tr} + \frac{6 \cdot d}{c} = t_{up} + \frac{L}{R} + \frac{6 \cdot d}{c}$$
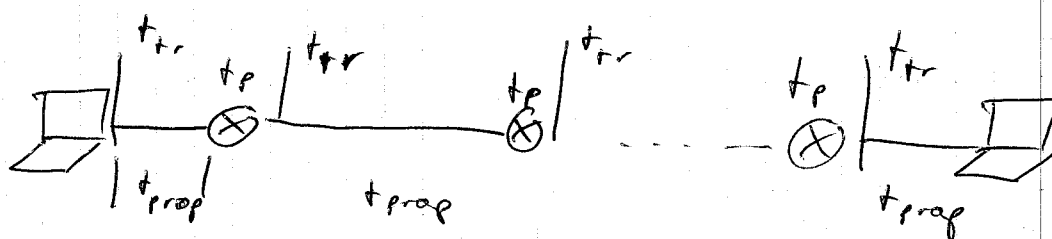
packet switched

$$t_{ps} = 6 \cdot t_{tr} + 6 \cdot t_{prop} + 5 \cdot t_p = 6\left(\frac{d}{c} + \frac{L}{R}\right) + 5 \cdot t_p$$

x packets
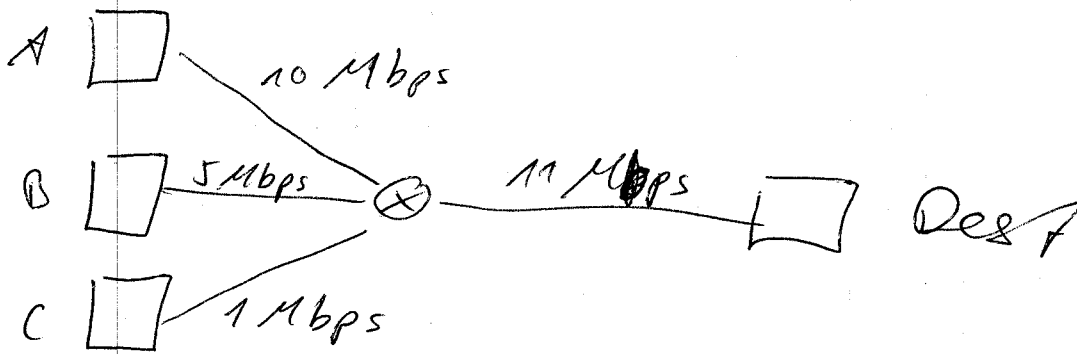
$$y = \left(\frac{L}{R} + \frac{d \cdot 6}{c}\right) x + t_{up}$$

Circuit-switched
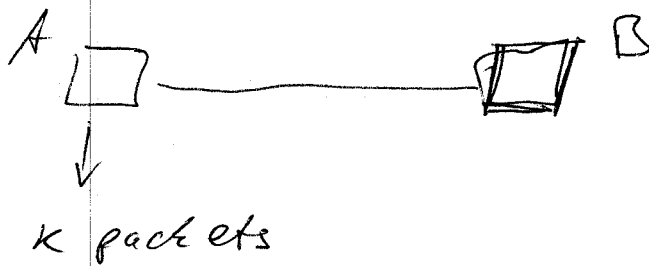
$$y = \left(\frac{d \cdot 6}{c} + \frac{6L}{R} + 5 t_p\right) \cdot x$$
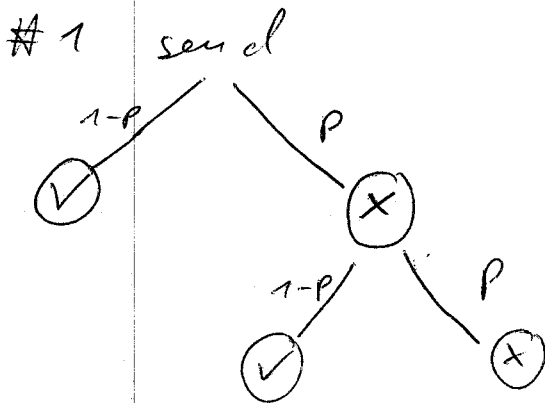
packet switched

13,13

A ⬜ ——— 10 Mbps

B ⬜ — 5 Mbps —⊗— 11 Mbps — ⬜ Dest

C ⬜ — 1 Mbps

Bandwidth-waste with circuit-switching

A ⬜ —————— ⬜ B

↓

k packets

$p \rightarrow$ failure

$(1-p) \rightarrow$ success

$$P_n = \binom{k}{n} (1-p)^n (p)^{k-n}$$

#1 send

1-p / \ p

(✓)   (X)

1-p / \ p

(✓)   (X)

	success after x sendings
$x = 1$	$1 - p$
$x = 2$	$p(1-p)$
$x = 3$	$p \cdot p (1-p) = p^2(1-p)$
⋮	⋮
$x = n$	$p^{n-1}(1-p)$

KN   Gü2

N   discrete r.v. (random var)

$$P(N = n) = p^{n-1}(1-p)$$

$\underbrace{\quad}$ pdf
(probability
density
function)

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r. v. X, pdf $P_x(x_i)$

$$E[X] = \sum_i x_i \, P(x_i)$$

$$E[N] = \sum_{n=1}^{\infty} n \cdot p^{n-1}(1-p) = \sum_{n=0}^{\infty} n \cdot p^{n-1}(1-p) \quad \text{①}$$
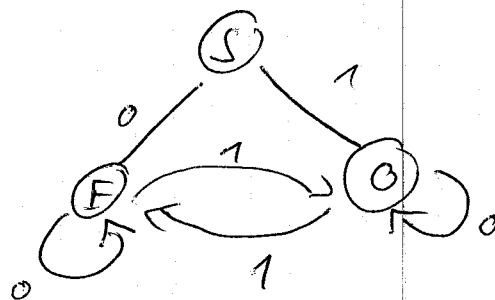
$$\left(\sum_{k=0}^{\infty} a \cdot r^k = \frac{a}{1-r} \right)' \Rightarrow \text{②} \quad \sum_{k=0}^{\infty} a \cdot k \cdot r^{k-1} = \frac{a}{(1-r)^2}$$

$$\left. \begin{array}{c} \text{①} \\ \text{②} \end{array} \right\} \Rightarrow \begin{array}{c} (1-p) \to a \\ n \to k \\ p \to r \end{array}$$

$$\text{①} \Rightarrow \frac{1-p}{(1-p)^2} = \frac{1}{1-p} = E(N)$$

FSM

$$I = \{0, 1\}$$

	A	B	C
	↓	↓	↓
p:	0,5	0,25	0,25
Code:	0	1 0	1 1
	1	0 0	0 1 ⟵