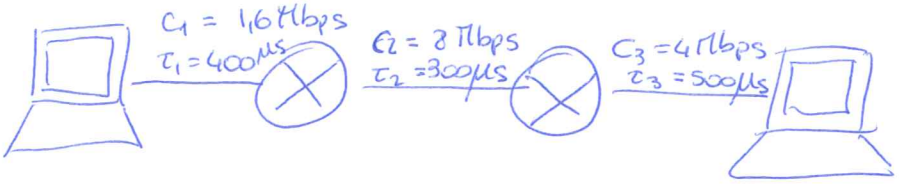
ESERCIZIO 2 – ESONERO 20/12/2019



SCWND = 16 MSS

RCWND = $\frac{2048}{128}$ = 16 MSS

MaxWin = min(SCWND, RCWND) = 16 MSS

$N_{SS} = \frac{66560}{\underbrace{128 \cdot 8}_{1024}} = 65$

$N_{RTT} = lg_2(16) = 4\ RTT$

$N_{MSS} = 2^{4+1} - 1 = 31$ MSS

$N_{MSS\ rimanenti} = 65 - 31 = 34$ MSS

$\lceil \frac{34}{16} \rceil = 3\ RTT$

$D = 4\ RTT + 3\ RTT = 7\ RTT$

$T_1 = \frac{\overbrace{(128+66)\cdot 8}^{1552}}{1600000} = 970\ \mu s$

$T_2 = \frac{1552}{8000000} = 194\ \mu s$

$T_3 = \frac{1552}{4000000} = 388\ \mu s$

$T_{A1} = \frac{\overbrace{66 \cdot 8}^{528}}{1600000} = 330\ \mu s$

$T_{A2} = \frac{528}{8000000} = 66\ \mu s$

$T_{A3} = \frac{528}{4000000} = 132\ \mu s$

$RTT = T_1 + \tau_1 + T_2 + \tau_2 + T_3 + \tau_3 + T_{A1} + \tau_1 + T_{A2} + \tau_2 + T_{A3} + \tau_3 =$

$= 970 + 400 + 194 + 300 + 388 + 500 + 330 + 400 + 66 + 300 + 132 + 500 = 4480\ \mu s = 4{,}48\ ms$

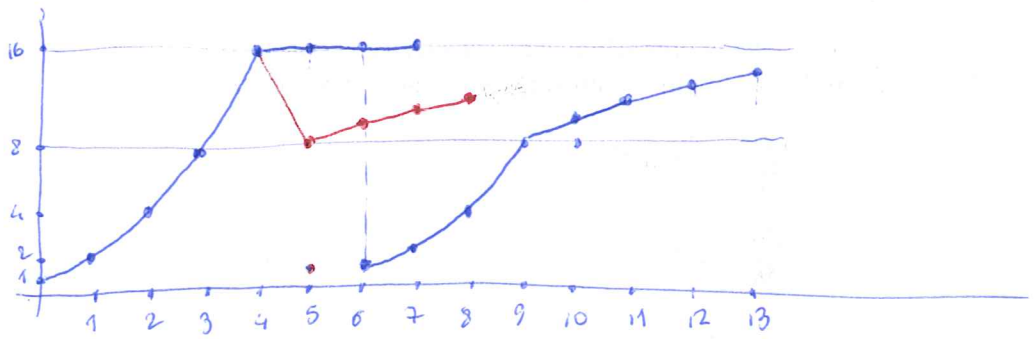
$RTT_2 = RTT_1 + 0{,}22 = 4{,}7\ ms$ (0,16 → 4,64)

$RTT_3 = RTT_2 - 0{,}38 = 4{,}32\ ms$ (0,26 → 4,38)

$RTT_4 = RTT_3 + 0{,}18 = 4{,}5\ ms$ (0,18 → 4,5)

$D = RTT_1 + RTT_2 + RTT_3 + RTT_4 + 3(RTT_4) = \overbrace{4{,}48 + 4{,}7 + 4{,}32 + 4{,}5}^{18} + 3 \cdot 4{,}5 = 31{,}58\ ms$

Al tempo $\overbrace{18\ ms}^{RTT_4}$ vengono persi tutti i segmenti $RTO = 2RTT_4 = 9\ ms$



1 | SS = 31 MSS
Reg. = 34 MSS

| SS_1 = 15 MSS
SS_2 = 15 MSS
CA = 35 MSS

| SS = 31 MSS
CA = 34 MSS

Al tempo 18 viene perso un solo segmento, fase di fast retransmit all'arrivo del terzo ack duplicato ri-invio il segmento perso (in questo caso il 10) e passo alla fase di fast recovery CWND = CWND/2 e SSTH = CWND/2, separato dalla fase di congestion avoidance.