

POLITECNICO DI MILANO
V FACOLTA' DI INGEGNERIA DI MILANO LEONARDO
MULTIMEDIA INTERNET (part 1)
PROF. PAOLO GIACOMAZZI
September 25, 2013

COGNOME (family name)	
NOME (name)	
MATRICOLA	

Exercise 1.

Consider a sequence of two schedulers. Scheduler 1 is GPS and scheduler 2 is Strict Priority. Scheduler 1 receives the traffic flow $X_1(t)$ in service class 1 and the traffic flow $X_2(t)$ in service class 2. Let us denote the traffic flow $X_2(t)$ at the output of scheduler 1 as $Y_2(t)$. The flow $Y_2(t)$ is served by scheduler 2, in priority 2. Scheduler 2 also serves the traffic flow $Y_1(t)$ (a fresh traffic flow) in priority 1. The output line capacity of scheduler 2 is C and the weights of the service classes 1 and 2 in scheduler 1 are w_1 and w_2 , respectively. Calculate the probability that the delay of the traffic flow $Y_2(t)$ is larger than d in scheduler 2.

$$X_1(t): r_1, b_1, H_1$$

$$X_2(t): r_2, b_2, H_2$$

$$Y_1(t): r_3, b_3, H_3$$

$$r_1 = 1 \times 10^6 \text{ (bit/s)}$$

$$b_1 = 0.6 \times 10^6 \text{ (bit)}$$

$$H_1 = 0.8$$

$$r_2 = 1.2 \times 10^6 \text{ (bit/s)}$$

$$b_2 = 0.75 \times 10^6 \text{ (bit)}$$

$$H_2 = 0.9$$

$$r_3 = 0.9 \times 10^6 \text{ (bit/s)}$$

$$b_3 = 0.45 \times 10^6 \text{ (bit)}$$

$$H_3 = 0.75$$

$$w_1 = 0.5$$

$$w_2 = 0.5$$

$$C = 7 \times 10^6 \text{ (bit/s)}$$

$$d = 0.03 \text{ (s)}$$

Exercise 2.

Consider a radio channel with multi-path fading, in which the channel capacity is a random process $C(t)$. For $C(t)$, we have $E(C(t)) = mt$ and $Var(C(t)) = mat$, where t is the time free variable and m and a are positive real constants. The transmission on this channel is managed by a FIFO scheduler, which is fed with a long-range dependent traffic flow $X(t)$, with $E(X(t)) = rt$ and $Var(X(t)) = rbt^{2H}$.

Write the $\alpha(t)$ function required to calculate the probability that the delay in the scheduler's buffer is larger than d .

Exercise 3.

Explain the relation between scheduling and admission control.

POLITECNICO DI MILANO
V FACOLTA' DI INGEGNERIA DI MILANO LEONARDO
MULTIMEDIA INTERNET (part 2)
PROF. PAOLO GIACOMAZZI
July 15, 2013

COGNOME (family name)	
NOME (name)	
MATRICOLA	

Exercise 1.

Describe the setup process of a call between two H.323 terminals, in a H.323 network in which each terminal is managed by a different gatekeeper and the signaling model is Gatekeeper-routed.

Exercise 2.

What are the advantages and disadvantages of the usage of the interleaving technique to reduce the impact of packet loss in VoIP services?

Exercise 3.

Show an example of how a two-media connection (audio + video) can be described in the SDP body of a signaling message.

Exercise 4.

In the interconnection between a SIP network and a PSTN network, the correct management of SCTP streams and SS7 signaling links is a critical issue. Explain why it is important and how it can be managed.