POLITECNICO DI MILANO
MULTIMEDIA INTERNET (part 1)
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Exercise 1.

Consider a network of three schedulers.
Scheduler 1 is a GPS scheduler, with three service categories, numbered 1, 2, and 3. The input traffic flows in categories 1, 2, and 3 are X1(t), X2(t), and X3(t), respectively. The weights of the service categories 1, 2, and 3 are w1, w2, and w3, respectively.
Scheduler 2 is a Strict Priority scheduler with three service priorities numbered 1, 2, and 3. The input traffic flows in categories 1, 2, and 3 are Y1(t), Y2(t), and Y3(t), respectively.
The flow X3(t), at the output of scheduler 1, is denoted as Z1(t).
The flow Y3(t), at the output of scheduler 2, is denoted as Z2(t).
The traffic flows Z1(t) and Z2(t) are offered to the third scheduler (scheduler 3).
Scheduler 3 is a Strict Priority scheduler with 2 service priorities, numbered 1 and 2. The traffic flow Z1(t) is served with priority 1, and the traffic flow Z2(t) is served with priority 2.
The capacity of scheduler 3 is C.

Calculate the probability that the delay of the traffic flow Z2(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
$X_3(t)$: r_3, b_3, H_3
$Y_1(t)$: r_4, b_4, H_4
$Y_2(t)$: r_5, b_5, H_5
$Y_3(t)$: r_6, b_6, H_6

r_1= 1.0x10^6 (bit/s)	b_1= 0.5x10^6 (bit)	H_1= 0.8
r_2= 0.8x10^6 (bit/s)	b_2= 0.5x10^6 (bit)	H_2=0.75
r_3= 1.3x10^6 (bit/s)	b_3= 1.0x10^6 (bit)	H_3=0.79
r_4= 1.0x10^6 (bit/s)	b_4= 0.5x10^6 (bit)	H_4=0.8
r_5= 1.0x10^6 (bit/s)	b_5= 0.5x10^6 (bit)	H_5=0.9
r_6= 1.3x10^6 (bit/s)	b_6= 0.5x10^6 (bit)	H_6=0.85

w1=0.3	w2=0.5	w3=0.2
C=8x10^6 (bit/s)	d=0.05 (s)	

Exercise 2.

A IPTV provider must transmit simultaneously to 100 customers the same content (a film). The provider does not use multicasting, meaning that it sends a separate copy of the film to each customer. Therefore, at the main video server, the network link must transport 100 traffic flows, one for each customer.

The characterization of the traffic flow associated to one customer is: $r=1x10^6$ (bit/s), $b=0.5x10^6$ (bit), H=0.85.

Calculate the capacity that must be allocated for the transport of the 100 flows, such that the probability that delay is larger than 0.05 (s) is about equal to $1x10^{-3}$.

Exercise 3.
With reference to the IP Diffserv architecture, suggest how could be a mapping between different types of applications and network Per Hop Behaviors.

POLITECNICO DI MILANO
MULTIMEDIA INTERNET (part 2)
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Exercise 1.

1. Explain the role of the three main types of signaling that occur in a H.323 network.
2. How do these different types of signaling interact?

Exercise 2.
Explain how the IETF P4P ALTO architecture can be used to improve the performance of P2P systems.

Exercise 3.

Assume that two H.323 networks communicate through a SIP network in an interworked architecture. Try hypotizing the possible exchange of messages to setup a call between two H.323 terminals, across the SIP network providing the interworking service.

Exercise 4.
Compare the procedures for the negotiation of media in SIP and H.323.