Network Engineering - Lab Exercises

Project - To be delivered the day of the exam (to be announced)

Details

1. It can be done in groups of 1 to 3 persons.

2. Deliver a report + Matlab codes. The report must include all required plots and texts, and explain how the Matlab code can be executed.

3. Deadline: Deliver it by the new date of the final exam (to be announced).

4. How: by mail to konstantinos.dovelos@upf.edu and boris.bellalta@upf.edu

The problem

Consider a WLAN with $N = 4$ active stations. Each active station i receives a downlink (AP→station) traffic flow i. Each traffic flow i is characterized by an arrival rate λ_i, the average packet size $E[L_i]$, and a coefficient of variation $\text{CV}[L_i]$ of the packet size. The transmission rate of the packets of flow i depends on the distance between the AP and station i. Packets are received with errors with probability $p_e = 0.15$, and the maximum number of retransmissions is $R_{\max}$ (the same for all traffic flows).

Considering that the AP has a single buffer (shared by all traffic flows, no traffic differentiation):

- Choose the position of the N stations, as well as the parameters of the N traffic flows.

- Investigate what is the effect on the packet delay ($E[D_i]$) and throughput (Th_i) of each flow of the $R_{\max}$ parameter.

Consider that traffic differentiation is applied:

- Investigate what is the effect on the packet delay ($E[D_i]$) and throughput (Th_i) of each flow when flow priority is assigned in different ways, i.e., considering the traffic load, flow bandwidth, packet size, distance between the AP and the station, etc.

Note: *It is suggested to reuse part of the code of Lab exercise 4, although using different values for the position of the stations, and parameters of the traffic flows.*