PERFORMANCE EVALUATION

HOMEWORK 1

Jean-Yves Le Boudec
Eleni Stai

DUE DATE: Monday, March 4th 2019 at 11:55 PM

1 ASSIGNMENT

Customers in Joe's shop are not satisfied because the downloading time is very large. Joe has hired you as performance analyst to understand the problem and propose some solutions.

To this end, you have implemented a simulator of Joe's system. It simulates a number of customers present in the system; the inputs to the simulator are:

- number of requests per second C;
- number of wireless LAN access points AP;
- number of servers S.

In addition to the above inputs you will need to insert the minimum value of the sciper IDs of your group. Every simulation run provides the following performance metrics; they are all average values for one run:

- θ: number of download requests that completed successfully (per second);
- pps: number of packets per second transmitted on LAN;
- cps: collision probability on LAN;
- d: delay for serving a request at the server farm.

The simulator is implemented; for any value of the input variables, you obtain the result of one simulation run by filling in the form available at `http://tcpip.epfl.ch/input.php`

1. Try various values of the input variables. If you submit twice the same values, do you always get the same response ?
2. Analyze the performance with $AP = S = 1$ by plotting the various performance metrics versus C. What can you conclude from there ?
3. Someone suggests to you that a solution is to double the number of access points. Pose this conclusion as a hypothesis and verify it by running other simulations.
4. Now propose an engineering rule for the choice of parameters in Joe's shop and verify it by running additional simulations. Namely, try to identify as a function of the number of requests per second, C, what should be the number of servers, S, and access points, AP, such that there is a linear growth in the throughput. What is your proposed solution ?

You have to return a document explaining your solution, including all the plots.