# Management and content delivery for smart networks: algorithms and modelling

# Lab. 1: Performance of single queues

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The objective of this lab is to practice with the simulator in two ways.
First, starting from the simulator of the M/M/1 queue, simulators of other types of queue will be derived; hence, the student will get familiar with the main elements of the simulator.
Second, by plotting the results the student will have a first experience of queue performance evaluation through simulation, including setting the simulation length, choosing the interesting working points and parameter setting.

## Task 1: The M/G/1 queue

Consider an M/M/1 queue.
Plot the performance of the queue versus load in terms of:

- Average queuing delay
- Probability that the server is idle (i.e., fraction of time that the server is idle)

Choose another distribution for the service time and consider the corresponding M/G/1 queue:

- Compare the performance of the M/G/1 queue with the M/M/1 queue, for the same values of load
- Verify the Pollaczeck-Khinchine formula

## Task 2: The M/G/k/B queue

Modify the simulator of the single server queue to study the performance of an M/G/k/B queue.
Plot the performance of the queue versus load computing also

- the average number of busy servers
- the customer loss probability.