Project 2 – Cloud RAN-based cellular system

A Cloud RAN-based cellular system is composed of a central processing unit (BBU), N remote radios (RRH) and N cells. Each RRH serves one and only one cell. An Application Server (AS) generates data packets having one of the *cells* as destination. The target cell is uniformly taken from the available ones. Each data packet has size S and a new one is generated every T seconds, where S and T are IID RVs (to be described later). The BBU has one interface towards the RRHs and communicates with only one of them at a time, at a speed of M bytes/s. The BBU receives data packets from the AS and forwards them to the proper RRH. If the BBU interface with the RRHs is busy, data packets are queued and served using a FIFO policy.

When the BBU receives data packets from the AS, the communication between BBU and RRHs can happen in one of the following two modes:

a) The BBU forwards the packet to the proper RRH, which in turn forwards it to the cell.

b) The BBU performs a compression on the data packet, reducing its size by X%; it then forwards the compressed packet to the proper RRH. Packets are then decompressed as soon as they reach the RRH. Such operation takes D seconds, where D is given by $D = X \times 50ms$. Only one packet can be decompressed at a time. If the decompressing process is busy, incoming data packets are queued and served using a FIFO policy.

la compressione non occupa tempo??

Measure at least the end-to-end delay of data packets for various values of X for both methods, and compare the results.

At least the following two scenarios have to be evaluated:

- Exponential distribution of T and S;
- Lognormal distribution of S, exponential distribution of T.

fattori che vanno fatti variare:
M
X

i parametri delle distribuzioni come si scelgono? ovvero la media della distribuzione exp T e S.

In all cases, it is up to the team to calibrate the scenarios so that meaningful results are obtained.

Project deliverables:

a) Documentation (according to the standards set during the lectures and up to 10 pages)
b) Simulator code
c) Presentation (up to 10 slides)