

COMP1047 – Computer Networks – Lab 2

Lab 2: Running Simulations

The objective of this practical lab activity is to become familiar with a network system via simulations. In this Lab and next Lab, you will compare the results obtained by simulations with those obtained by analytical modeling.

You will be provided with the following files

- i. [lab1.tcl](#)
- ii. [lab1cbr.tcl](#)
- iii. [lab1onoff.tcl](#)
- iv. trace file.pdf
- v. Network Components.pdf (Additional study and reference)

In the next Lab, you will run the simulation scripts and understand how to analyse the results.

Poisson/UDP traffic through two links

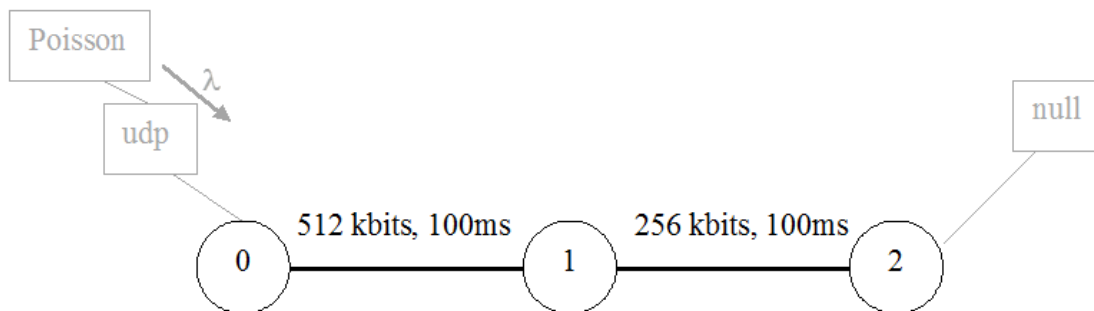


Figure 1: Simple network with two links

Copy the simulation script file [lab1.tcl](#). This tcl script creates the network of Figure 1 for [ns2](#) with the following properties:

- Simulation parameters:
 - a. It creates the trace file /tmp/out.tr in order to save in the local disk all the events simulated by ns2.
 - b. Simulation time equals 10000 seconds.
- Traffic parameters:
 - a. It creates the Poisson traffic generator (see the figure) of parameter λ .
 - b. The transport protocol is UDP.
 - c. The size of the packets is 1024 bytes.

- Links parameters:
 - a. Link 0-1: 512 kbits, propagation delay: 100ms, queue scheduling: FIFO, queue size: 100 packets
 - b. Link 1-2: 256 kbits, propagation delay: 100ms, queue scheduling: FIFO, queue size: 100 packets
- The random generator takes the initial value from the seed variable given as an input.

(You can take a look at the tcl source code of lab1.tcl but right now do not modify it, please.)

In order that the [ns2](#) program can be executed from any terminal, include in your environment PATH variable the full path to the directory where the program is installed or copy it in /usr/bin (if not done in the previous lab).

To run a simulation, use the following command from a terminal window:

```
username$ ns lab1.tcl a_lambda_value a_seed_value
```

λ is an input parameter and it is the input rate of the Poisson traffic in UDP packets per second that you can vary in each simulation run. **The seed must be set as your student id.**

0) Get familiar with the ns command, the analyzer and their outputs:

>> Test briefly the script by running the following simulation:

```
ns lab1.tcl 30 iiiiii     Replace iiiiii by your student id.
```

Then check if the trace file **out.tr** is created and that the content corresponds well to the parameters of the simulation, i.e. the packet size, the traffic type, the total number of packets generated and the simulation time (last line of out.tr).

>> Now, type the following [nam](#) command to see the simulation animation:

```
username$ nam animation.nam
```

Increase the window size to the maximum and press the play button. Then see packets traveling through the links and observe the packets stored in the link queues. You can accelerate the animation speed, or slow it down, move forward, etc.

Answer the following questions:

Q1. There is a delay between packets sent over the first link 0-1, why?

Q2. Why are these delays different?

To be continued