

Exercise 1: BE, RED, ECN

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18th September 2002

Abstract

Your task is to simulate (using pre-provided source code) a simple network (which will be used in later exercises also) for best effort, best effort with RED, and ECN-capable network and analyse results. After simulations you analyse results and write a short report (max 5 pages) of your findings.

1 Getting source material

At first, you have to retrieve scripts for this work. The package, which contains needed files can be found from course home pages ¹. You can use `wget` command to retrieve it. Extract files with `tar xf ex1.tar`. It is recommended that you use different directory for each work.

After completing simulation session, clean up your files if you used `/tmp` file system.

1.1 Files included in package

ecnnnet.tcl The main simulation file, which calls for other *.tcl files.

***.tcl** Simulation scripts

***.scr** Files used to process output files

***.awk** Files used to process output files

compare A perl script to run basic simulations

usens2.* A script to set up environment

2 Running simulations

At first, you must set up environment for ns2. You do this by giving command "`source usens2.csh`".² This will set up file paths.

Then you can run first round of simulation by command "`./compare`". At a result, there should be output files in three different directories `{be,red,ecn}` and overall summary file "`results.txt`".

Each directory contains output files and results "`statistics.txt`".

2.1 Further studies

Initially, the simulated time is 120 seconds. You should increase simulation time to 300 seconds for final simulations by changing `testTime` variable at `ecnnnet.tcl`.

Also you need to activate bottleneck tracing to provide enough results. See comments at beginning of `ecnnnet.tcl`. You can also do full tracing, it will consume a large disk space but will enable you to look for network visualisation with "`nam tr_diffnet.nam`".

¹<http://www.tct.hut.fi/opetus/s38180/s02/exercises/ex1.tar>, also from `/p/gen/courses/S38/S38.180/Exercise1/ex1.tar`

²If you use some bourne shell variant such as bash, replace extension `.csh` with `.sh`

If you want to run only one case, define `netType` in `conf/netType.tcl` one of BE, ECN, or RED. The file `conf/sources.tcl` is only for diagnostic messages.

2.2 If there is some problem

If you exceed your file quota, you can try to use `/tmp` file system for (`mkdir /tmp/yourname-ex1`; `cd /tmp/yourname-ex1` before down-loading). Note that files at `/tmp` can be deleted at any time, so copy result files and possible changed `*.tcl` files to home directory.

3 Results to include into documents

Your document should answer for following questions:

- How fairness changes in different cases
- How packet loss changes in different cases
- How throughput changes in different cases
- What is utilisation of bottleneck link, how much of buffer is used
- Determine network goodput ratio in each of cases.

Include relevant results and graphs to your document. Note that summary file “`results.txt`” and result files “`statistics.txt`” give only overall summary. To do in-depth analysis, you need to analyse also monitoring files.