Project 2 – Active Queue Management

Due: October 6, 2017

For this project, we will use the *ns-3* simulator to conduct a set of simulation experiments to compare the performance of Random Early Detection (RED) queuing method to the more traditional DropTail queuing. Specifically, we will be implementing the experiments performed in Floyd's "Random Early Detection Gateways for Congestion Avoidance" paper in ns-3 to examine how the results differ when using a more modern variant of TCP.

1) READ THE PAPER
2) For this assignment, make three separate ns-3 scripts (p2a.cc p2b.cc p2c.cc or equivalent python name)
   a. p2a
      i. Create the topology shown in Figure 4 of the paper.
      ii. Use the paper as a guide to run the appropriate experiments to produce a graph similar to figure 3. Your exact results will differ but this is the information you should be producing.
   b. p2b
      i. Create the topology shown in Figure 6 of the paper
      ii. Use the paper as a guide to run the appropriate experiments to produce a graph similar to figure 5.
   c. p2c
      i. Create the topology shown in Figure 10 of the paper
      ii. Use the paper as a guide to run the appropriate experiments to produce a graph similar to figure 9.
   d. You don't have to run the experiments using the topology in Figure 11 but you should still read that section.

Notes:
1) Be sure to look through the ns-3 documentation on TCP to see what options are available to you. The TCP model has a large number of attributes which can be set to model specific environments. The variant you should use is TCP NewReno which is the default.
2) For traffic generation, examine the different options available in the ns-3 Application module and pick the model and parameters that match the descriptions given in the paper
3) When you need to perform multiple runs with the same parameters to get an average, use RngSeedManager::SetRun(x).
   https://www.nsnam.org/doxygen/classns3_1_1_rng_seed_manager.html#a14c9a839f8141b0e9ec2af0e96d68263
4) ns-3.26/src/traffic-control/examples contains scripts that will probably be useful to look at when setting up your experiments.

Submission:

Submit p2a, p2b, p2c and the graphs created for each. You can use whatever program you want to create the graphs. Name them after the program that created them (p2a.cc is used to create p2aGraph.png etc)