

## Final Project

Assigned: Oct 31, 2011

Due: TBD

Choose one of the final projects listed below, or suggest a project of your choosing. Each group leader must schedule a meeting with the instructor no later than 4:30pm, Friday Nov 4 to discuss the proposed project and a plan for completion. Each group will present their project results to the class during the final exam period, or during the last week of classes. A final report is due at that time as well.

1. **Model Worm Propagation.** Create worm models in ns-3, similar to those discussed by Sharif in the worm modeling paper we discussed in class. Perform a simulation study of the rate of spread of worms as a function of some (not necessarily all) of the following:
  - (a) Scan Rate (number of infection packets per second) for UDP Worms
  - (b) Simultaneous Connection Attempts for TCP Worms
  - (c) ICMP “Unreachable” responses (enabled or disabled) for TCP Worms
  - (d) Fraction of total hosts that are *infectable* vs. those not infectable (ie. those not vulnerable to the attack).
2. **Comparison of Different Wireless Simulators.** Create an experiment similar to that by Cavin et. al that compares the results from *GTNetS*, *ns-2* and *ns-3*. Use a popular wireless multi-hop routing protocol (such as AODV) to determine packet deliver ratio as a function of the node density and transmission power range. For this project, it will be important to *explain* why differences are occurring, so it will require a detailed analysis of any different behavior noted.
3. **Tuning Red for Web Traffic.** Using *ns-3*, recreate exactly the Tuning Red experiment published by Jeffay et. al. See if the cumulative distributions measured by *ns-3* match closely those measured in the laboratory experiment. This project is somewhat similar to the earlier project comparing RED to DropTail. The difference is that the topology here is simpler (matching that used by Jeffay), there is no UDP competing traffic, and the number of experiments is considerably larger. You will also need to create the web browser and web server models. The probability distributions for the object sizes created by Bruce Mah are no longer available on Mah’s web page, they are implemented in GTNetS and freely available.

Explain any differences in the *ns-3* results and those measured and reported by Jeffay.
4. **Dynamic Source Routing for ns-3.** Create a model of the DSR protocol for ns-3. Using your experiments from lab 3, compare the performance of DSR to the other protocols used in that lab (OLSR and AODV).
5. **Comparing propagation loss models in ns-3.** Using the scenarios from lab 3, compare the measured performance of the wireless network using several different propagation loss models. See [http://http://www.nsnam.org/doxygen-release/group\\_propagation.html](http://http://www.nsnam.org/doxygen-release/group_propagation.html) for details about the various loss models available.