Project 3 – Measuring Wireless Throughput Capacity

Assigned: March 13, 2015   *Due: April 3, 2015, 11:59pm*

For this project, we will use the *ns-3* simulator to measure the data throughput of a wireless ad–hoc network using a wireless routing protocol. The independent variables are the *node density* (average number of nodes per unit area), *transmission power* of each node, the routing protocol used (AODV or OLSR) and the *traffic intensity* (the total data demand on the network divided by the theoretical maximum possible data transmission rate).

Work in teams of 3 or 4 students per team.

1. Create a wireless LAN on a square area of moderate size, say for example 1000m by 1000m or 2000m by 2000m.

2. Randomly place nodes in the region, varying the number of nodes from a small number (say 20 to 100) up to a large number (say 1000 or so).

3. Vary the transmission power of each node from fairly small, (say 1mW) to fairly large (say 500mW). For a single simulation run, the transmission power of all nodes should be the same.

4. Each node should choose a randomly chosen peer (choose the peer only once per run) and generate UDP packets addressed to that peer at periodic intervals. The mean value of the "periodic interval" and the size of the UDP packet generated determines the *traffic intensity* for that run. The traffic intensity should vary from small (say 0.1) to large (say 0.9) for example.

5. Use the AODV and OLSR routing protocols (not both at the same time).

6. Measure *efficiency* of this network. This is defined as the total number of bytes received by receivers divided by the total demand (bytes generated at all sources). Clearly, the efficiency will be between zero (none of the data arrived at the destination) and one (every single byte generated was received correctly at the destination). The total bytes received should *NOT* include UDP packets received and forwarded by nodes along the path from a source to a destination, nor should it include any overhead associated with DSR.

7. Write a report detailing your findings, and draw some conclusions from the results of this study.

Use the same `riley-turnin` procedure we have used on prior assignments.