MNC PROJECT 3 REPORT AND ANALYSIS

by

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Aim: Implement a simple wireless MAC protocol and analyse the packet flow using NS2 simulator.

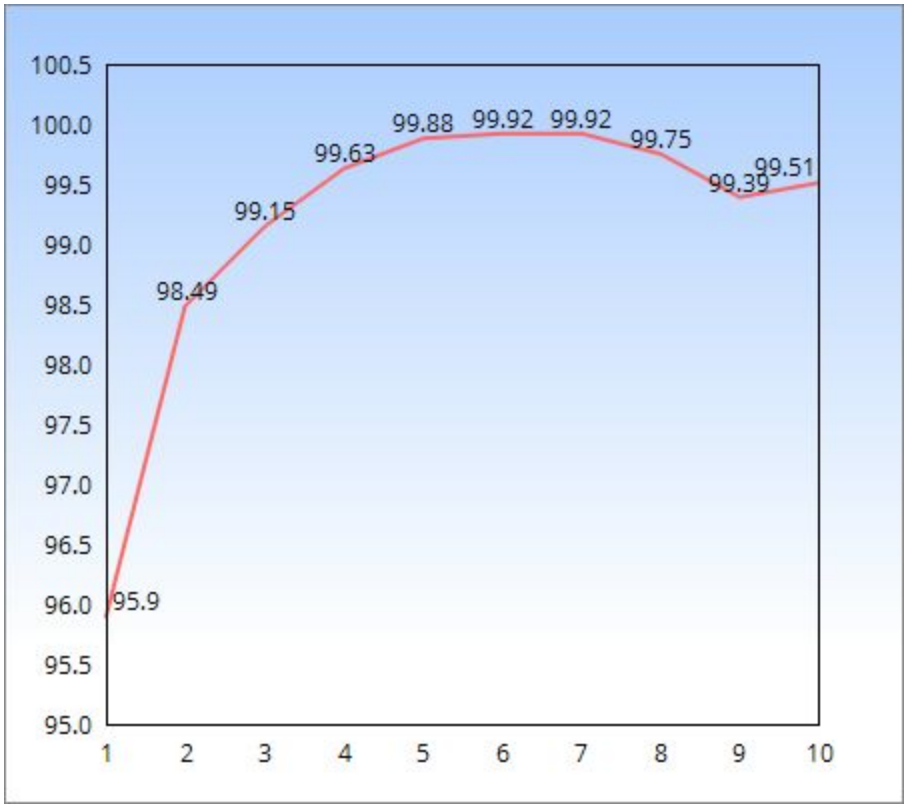
Configuration:
We have used NS2 to simulate our network configuration. The configuration of our TCL file was as follows:

1. Source nodes:10
2. Sink node:1
3. Packet size:16 Bytes
4. Terrain Dimension:50m*50m
5. Simulation time:10s
6. Packet generation interval:0.02s

Running our protocol for 100 nodes and a total duration of 100 seconds was taking much more time than what we had expected. Moreover, the generated trace file was too big for our analysis. Hence we decided to scale it down to a total of 11 nodes. Our scaled duration is 10s.

Analysis:
The average probability(P) is defined as the ratio of total number of successfully delivered packets to the total number of packets generated by the source nodes for the 10s duration. Here we have to vary the number of packets generated per interval in every scenario of our simulation(X). We have started with X=1 ranging to X=10. We then plot a P vs X graph.

At X=1, our delivered packets are very few. This is because only 1 packet is sent every interval. No extra packets are sent, thereby decreasing our chances of the packet reaching the sink node. If a collision happens, no other packet is sent in that interval, thereby dropping that packet for good. When, however, 2 packets are sent in the interval, there is a standby packet in case a packet collides. So, our probability increases. In this way, the probability steadily increases with an increase in the number of packets generated as the copied packets are sent for every packet.



P vs. X plot

However, we reach a point after which the P decreases (X=6). This is bound to happen, as, with an increase in X, there are many packets in our network leading to an increase in the number of collisions. So, an increase in X does not directly translate into an increase in the number of received packets as the channel gets more crowded. Hence, we have to find a tradeoff between the optimal number of generated packets(X) in an interval and the number of packets that do not make the channel too crowded for good performance.