Project 3 Design Document

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To evaluate a wireless MAC (Medium Access Control) protocol for sensor networks:

For this project we have implemented our own protocol for sensor networks. We started with simple MAC as a reference and built up on that. We modified the send() method to send the file multiple times. We then ran a make on the ns-2.35 folder. We have done the following

1. A data packet is generated every T seconds and was delivered to the sink before the next packet was generated.
2. The source nodes are equipped with only an RF transmitter.
3. In order to increase the chance of successful transmission, each node transmitted X copies of each packet at random instants before the next packet was generated.
4. The source node picked X random instants of time within the interval [0, T], and transmitted the data packet at each of the X instants of time.

Writing a new MAC protocol:

To start with we used mac-simple.cc and mac-simple.h as templates. We then modified the send() method to generate a number of random delays, and then schedule a copy of the generated packet to be sent at these delays. The number of delays generated are X.

Writing a simulation:

We wrote a new .TCL file and set the default values according to the values in the project description. We referred to the 'wireless-simple-mac.tcl' file in the /tcl/ex/

folder in the ns-2.35 directory. We initialized the number of nodes as 11 including source node initially and set the other default values too. We first tried with 100 nodes, but the trace files were over 2.4 GB. Analyzing these files was a bit tough, so we tried different number of nodes and felt 10 was best. We set node 0 as sink node and the remaining nodes as transmitters. We then placed them randomly inside the 50x50m area by creating a random number generator. We used UDP since we did not need a connection or acknowledgements. We wrote it to a trace file and then analyzed it. The data was then documented in our project report.

Conclusion:

We implemented our custom protocol MAC/ESMAC and ran a simulation on it. We learnt how to use Network Simulator for running simulations of a wireless environment for sensors.