CSE 566: Wireless Networks Security (Spring 2015)
Project 1a

Date: 02/19/2015 **Due Date: 03/03/2015**

This is the first part of a simulation project. The second part will be assigned later in the semester. This part is to familiarize you with the ns2-network simulator that will be used later for security simulation.

For all projects, work in groups of 2-3.Once you form a group, try to stay together until the end of the semester.

Specifications of the Project:

Problem:

Throughput and Delay are two important metrics for the evaluation of a network. In this project, we will use ns2 to evaluate these metrics for the 802.11 MAC protocol in a multihop environment.

Simulation Setup:

Topology: Construct a simple grid topology with 21 nodes in a multihop environment. The dimension of the terrain is 490 meters x 210 meters. Place the nodes at coordinates which are 70 meters apart, i.e., the grid should have 3 rows and each row should have 7 nodes.

Network Details: Use a CBR source connected to a UDP transport layer. Use AODV as the routing protocol. Use 802.11 as the MAC protocol. The physical channel rate should be 2 Mbps. You can use default link layer protocol for the simulations.

CBR Source Details: Set the bit rate to 50 kbps and packet size to 200 bytes. You will need to calculate the source interval to get the desired bit rate.

Network Sources: You will need to attach the CBR sources and sinks to get the following 6 source-sink pairs:

Pair No.	Source (Node ID)	Sink (Node ID)
1	1	3
2	2	16
3	4	6
4	10	12
5	7	21
6	18	20

Simulation Specifics: Use length of simulation as 30 seconds.

Pair No.	Transmission Start Time (secs)	Transmission Stop Time (secs)
1	5	25
2	7	15
3	5	25
4	6	10
5	5	25
6	1	29

Definition of the Metrics: Throughput is defined as the total number of bits received at the application layer. End-to-end delay is defined as the difference between the time the source application layer transmits a packet and the time the destination application layer receives the same packet.

You need to evaluate the Throughput and the End-to-End delay for the following:

1) Network with the above specifications.
2) Network with the above specifications but with RTS/CTS disabled.
3) Repeat 1 for different CBR packet sizes - 100 and 500 bytes.
4) Repeat 3 with RTS/CTS disabled.

What you are expected to learn:

You are expected to learn

i. The basics of setting up a topology in ns2.
ii. How to specify the different OSI layers in ns2.
iii. Creating and running a simulation set up.
iv. Interpreting a trace file, parsing it using scripting languages like perl/awk and calculating metrics from parsed data.

Deliverables:

(i) A project report (single report per group with names of all members – Last name, First name) containing the plots of the various throughputs and delays you obtain from your simulation and your observations and analysis, if any. This report must be submitted in hardcopy form in class on the due date. No early or late submissions will be accepted.

(ii) Zip of your simulation source files (only *.tcl) should be emailed to hayreddi@buffalo.edu. List the group members in the mail. The subject of your email **should** be "CSE566:Project 1 Source."

For better understanding of networks you can try to change the MAC protocols and try to see how they vary in terms of throughput and delay. However you will NOT be given extra credit for this.