

Design Document

This Project simulates Random MAC Protocol (Wireless).

The configuration for the simulation are:

- 100 source nodes, one sink node
- Terrain Dimension: 50m x 50m
- Simulation Time: 100 s
- Packet size: 128 bits (including a header)
- Packet generation interval (T): 0.02

Each node will generate X number of packets in the stipulated time period. X varies from 1 to 10. It needs to be given in command line argument to the tcl file.

My command line execution for executing tcl file is as follows, I have added some extra parameters that you can set from outside.

\$ ns proj3_shivangs.tcl <X> <Nodes>

- X = number of Copies you want to create for a node during the time period
- Nodes = number of source nodes you want active

For the project, 3 main existing files were edited.

- mac-simple.cc
- mac-simple.h
- wireless-simple-mac.tcl (i.e. proj3_shivangs.tcl)

The main changes in mac-simple.cc :

- Editing the send function.
 - Create random packets of X numbers with X random intervals for the stipulated interval.
- Create a num_packet bind (num_packet) in constructor of mac-simple class to num_packet variable in .tcl file. This required because value of X is mapped on num_packet which is the user input.

The main changes in mac-simple.h :

- Create a num_packet variable for it to be accessed in .cc file.

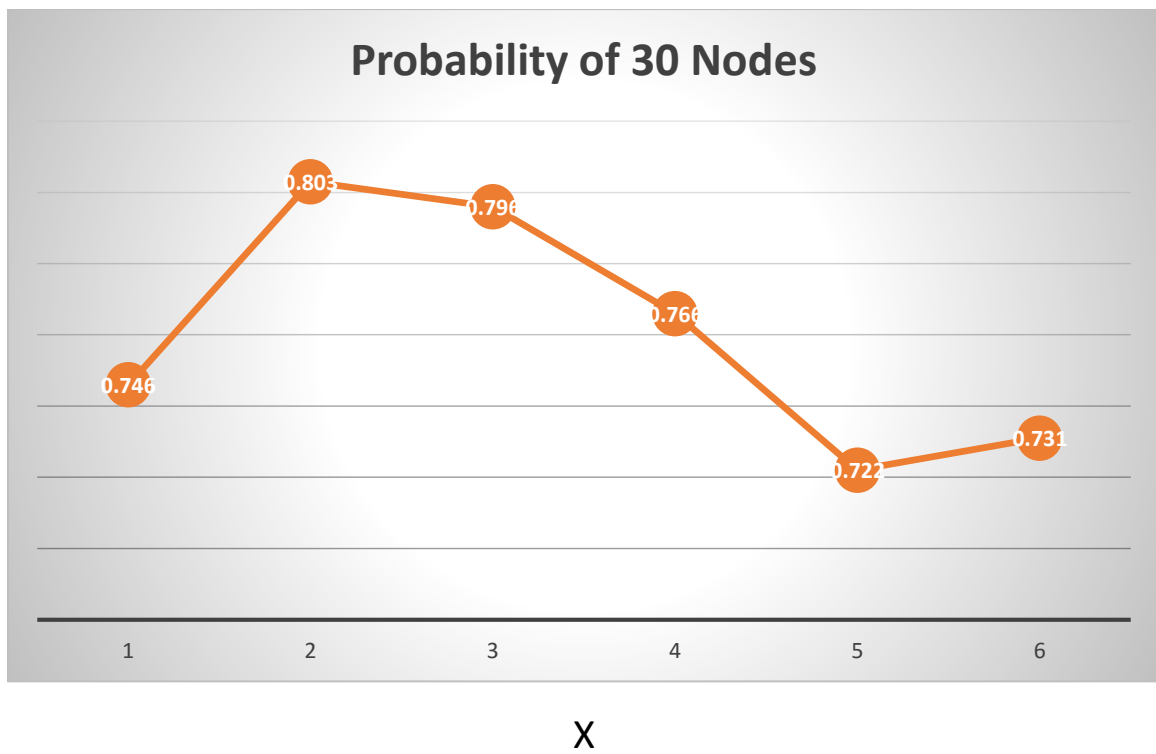
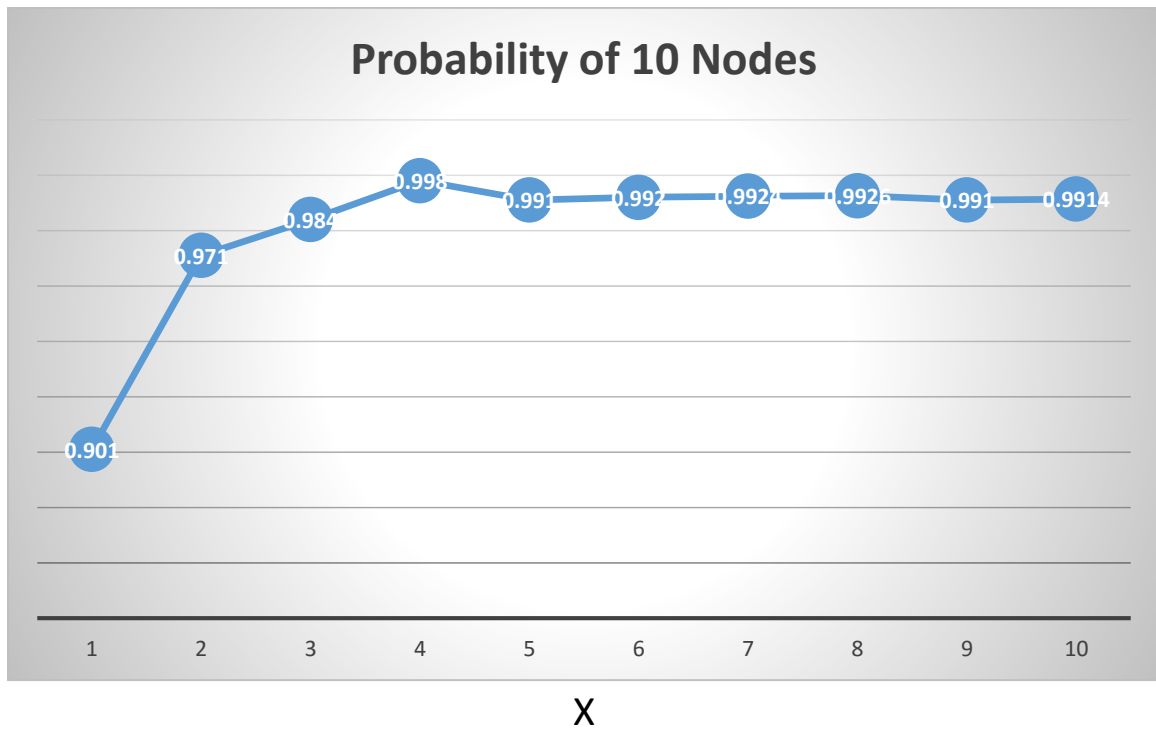
The main changes in wireless-simple-mac.tcl :

- 100 nodes creation (node_(\$i) ; i= 0-100)
- 1 sink node (node_(\$val(nn)) ; val(nn)=sink node id)
- Udp nodes assignment to each mobile node.
- Sink assignment for sink node.
- CBR (constant bitrate) for each udp.
- Attach cbr to Sink.
- Packet size =16 bytes = 128 bits
- Interval = 0.02 seconds
- Simulation execution for <Time> seconds

The simulations for the above experiment have been carried out using 10 nodes and 30 nodes.

10 node simulations has been exclusively carried to get faster output than 30 nodes.

Simulation Results



Result Analysis

There are mainly two main observations from the above data tested:

- One keep the Number of nodes constant and increase the copy packets, we get more collisions for higher value of X. This is because the rate of sending packets increases, collisions are to increase
- Keeping the number of X constant if we increase the number of nodes, collisions increase and so the probability decreases as seen from the graph.

This project specifies the working of a simple MAC protocol in NS2 with the above results and Analysis.

One major point here to mention is that the topology here also is very important. Distance from Node to Sink also plays an important role because attenuation takes place if we increase the distance and chances are there that the packets are dropped.