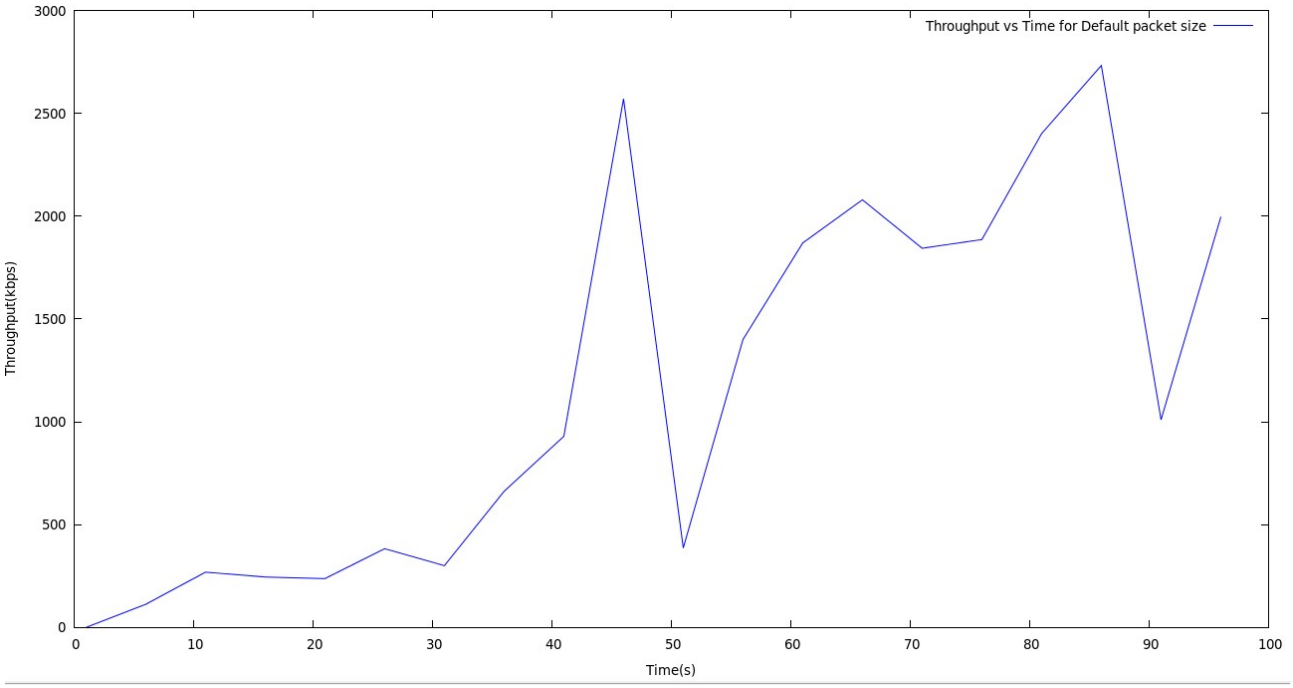
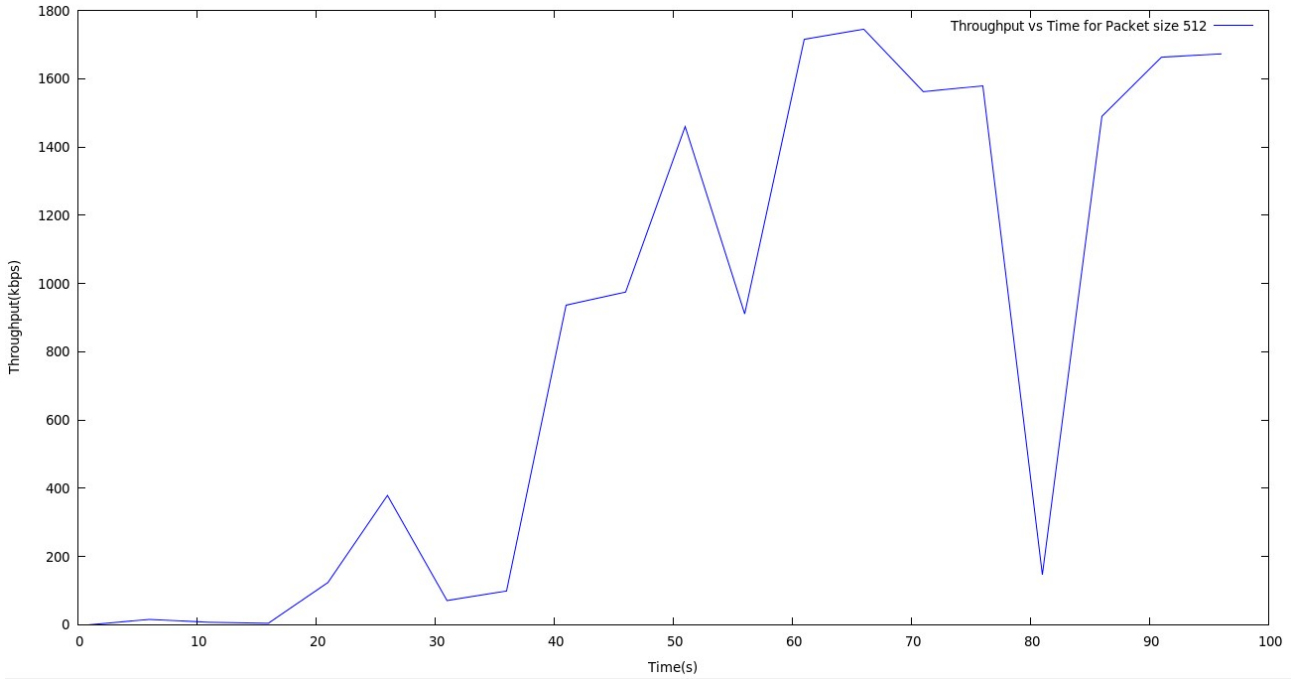
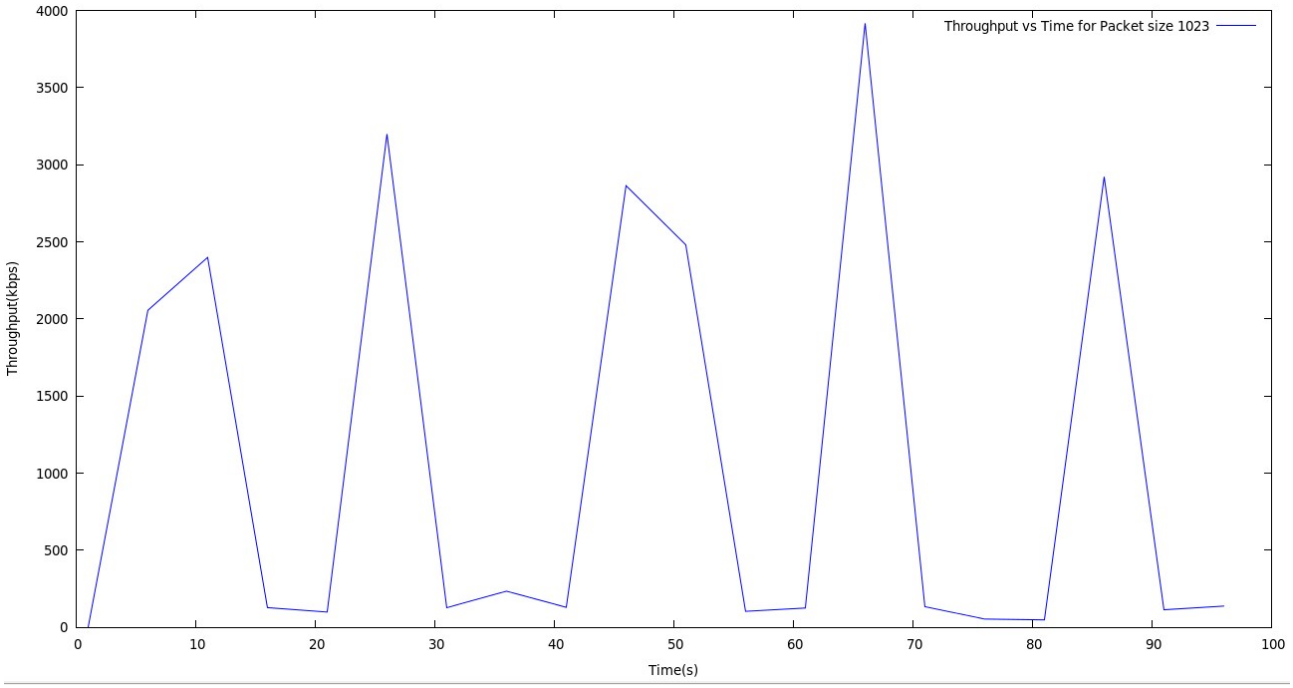
Assignment 2: Analyzing MAC Layer Misbehavior using ns-2

Constructed a simple topology with 50 nodes deployed in a random manner. Each nodes communicate over a multi-hop network and that they hear each other. Used a CBR source connected to a UDP transport layer, AODV as the routing protocol and 802.11 as the MAC protocol.

Calculated Throughput for default and varying packet sizes.



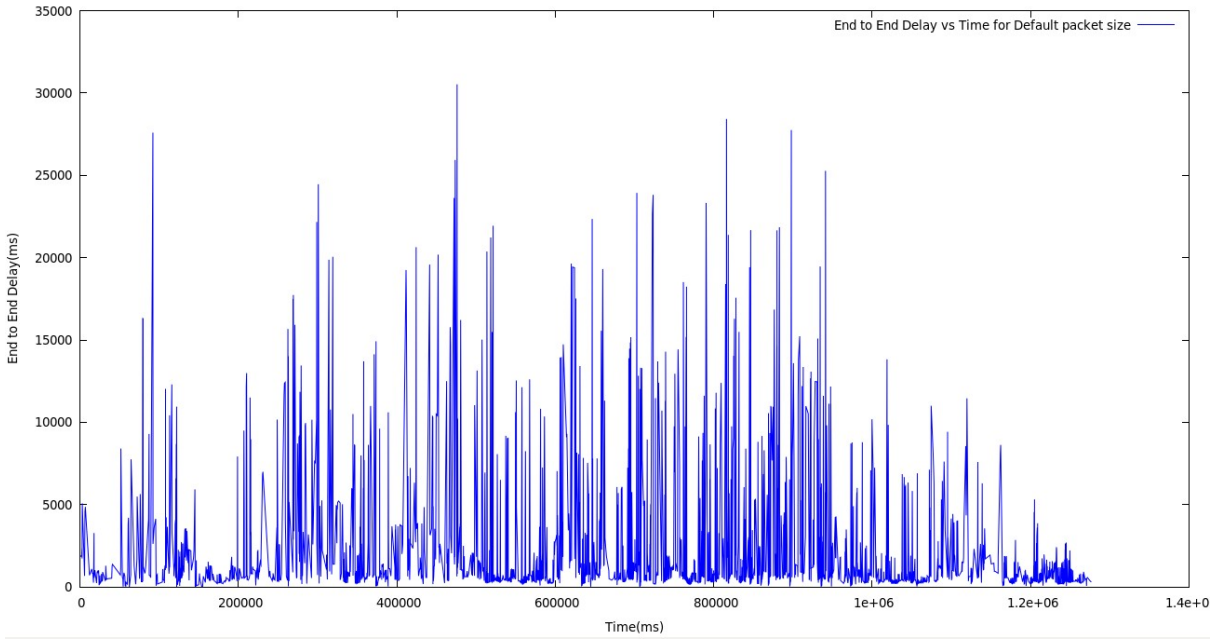


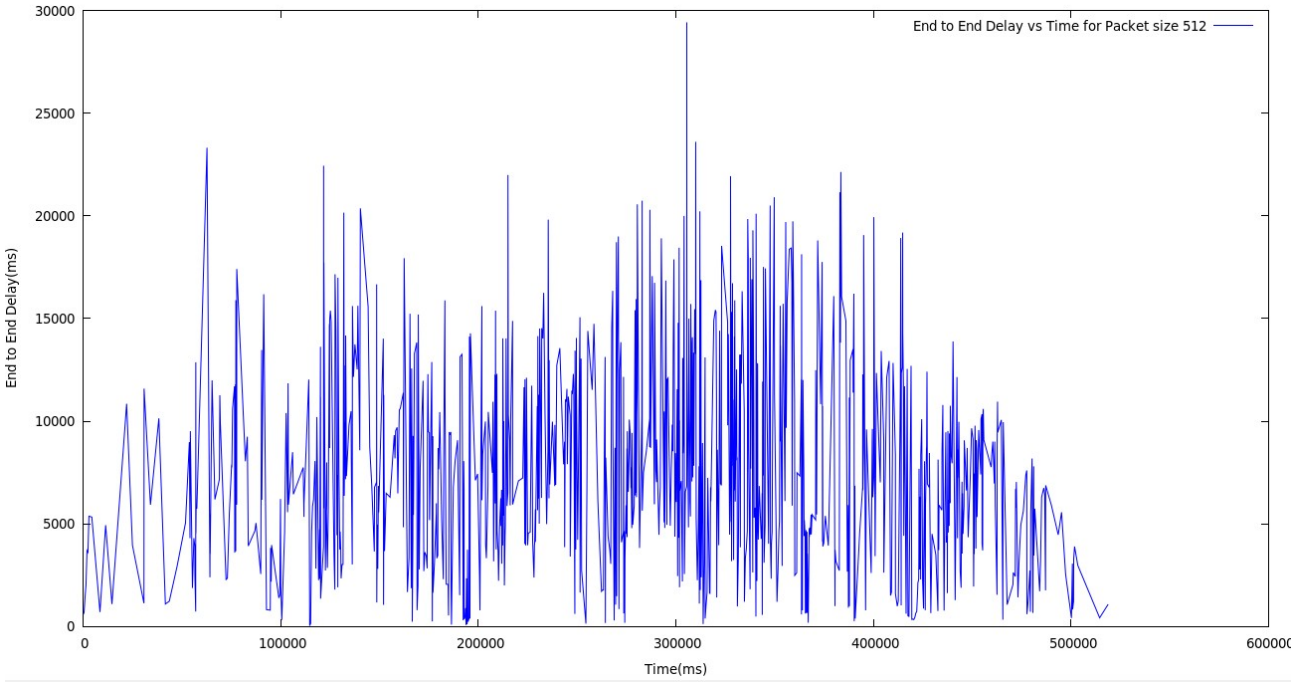


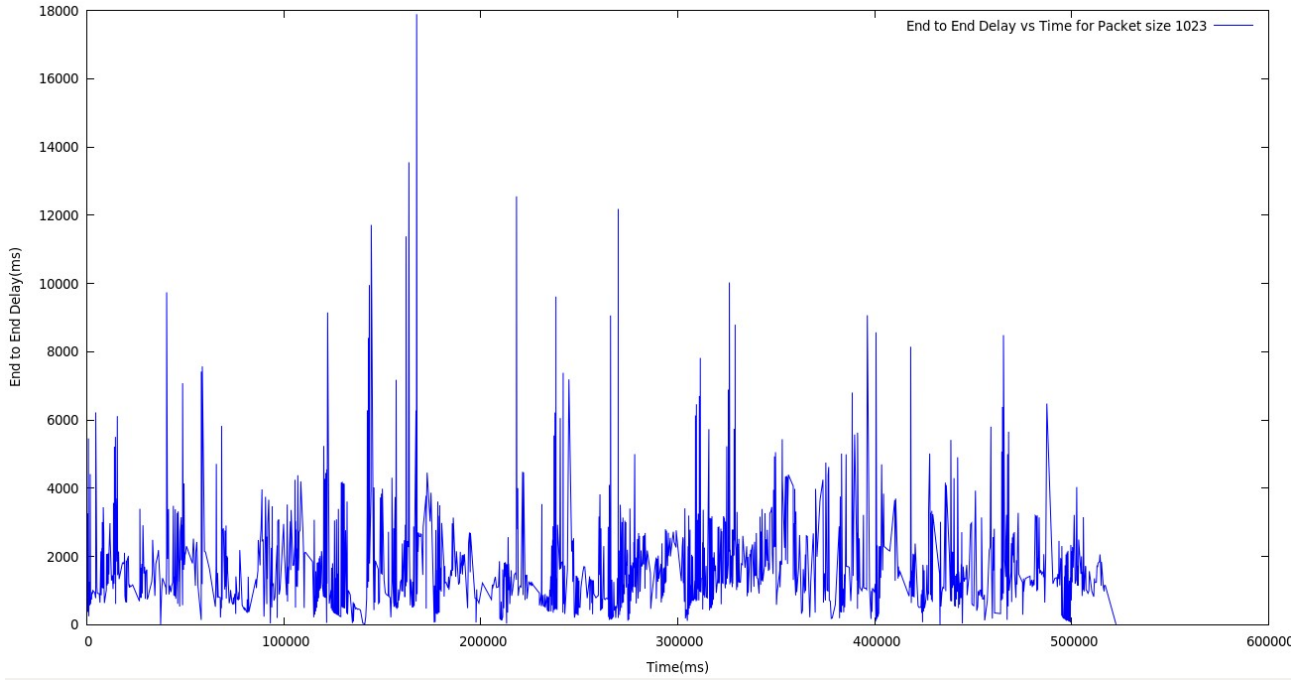
Above figures shows the throughput of the network (Kbps) over number of nodes for variable packet sizes. For each packet size, the throughput of network traffic decreases when the number of hops between the source and the destination increases. This is because increasing in the number of hops will increase the packet error probability, causing network throughput to decrease.

Furthermore, the decreasing level for smaller packet size is less than the decreasing level for a bigger one, because packet error probability increases as packet size increases due to the packet fragmentation, and this case makes the decrease in throughput.

Calulated End to End Delay For default and varying packet size

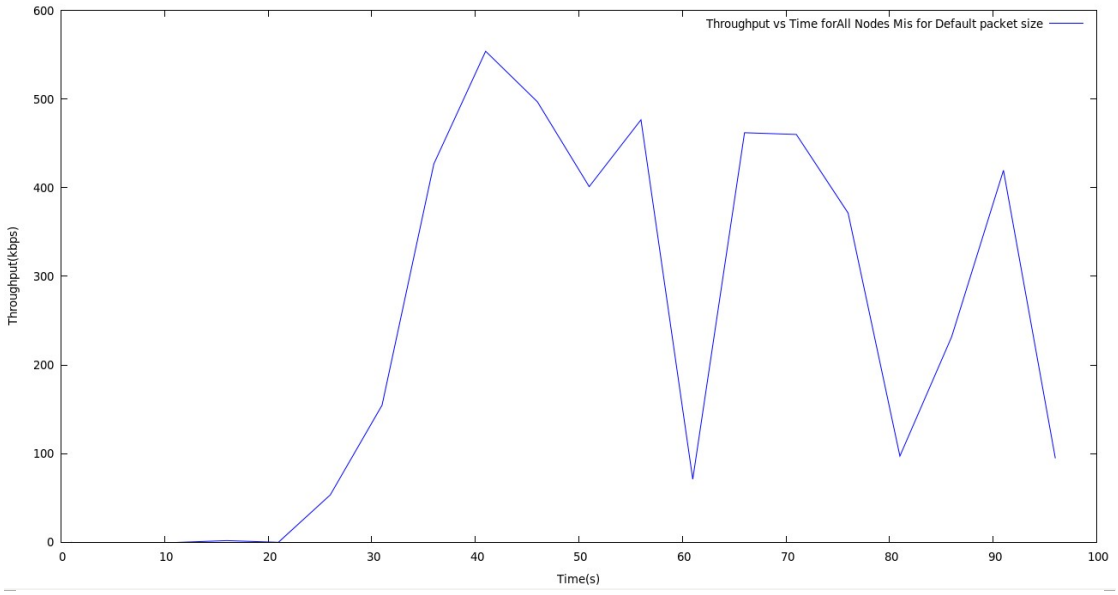


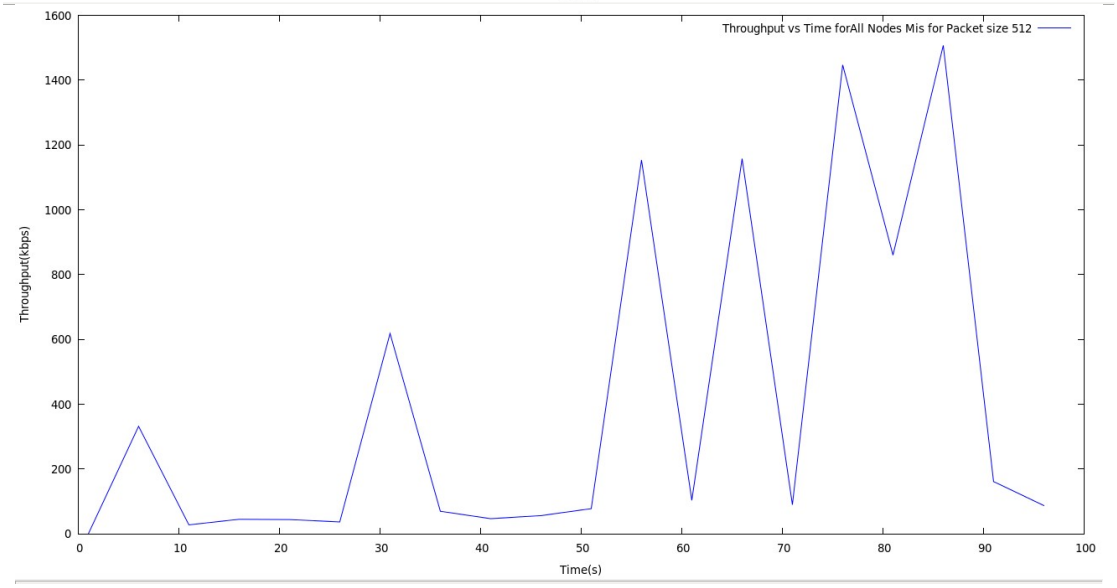


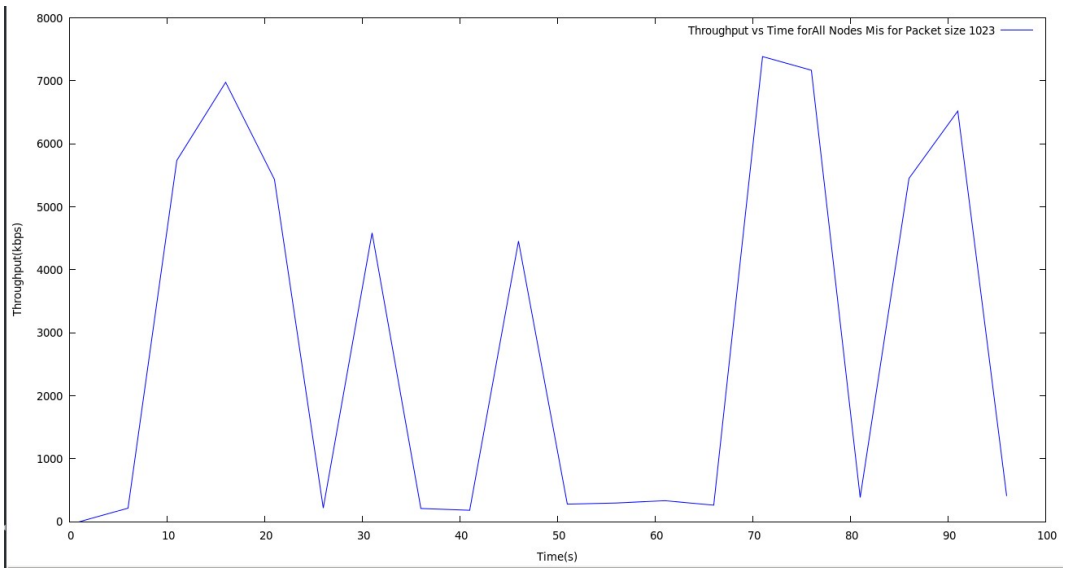


Varying packet size has a direct effect on End to End Delay. This is because larger the packet size longer is the packet transmission , propagation and processing times. With increase in packet size EED increases. For each hop the EED increases. Due randomization of nodes EED also varies.

Calculated Throughput with all nodes misbehaving for default and varying packet size.

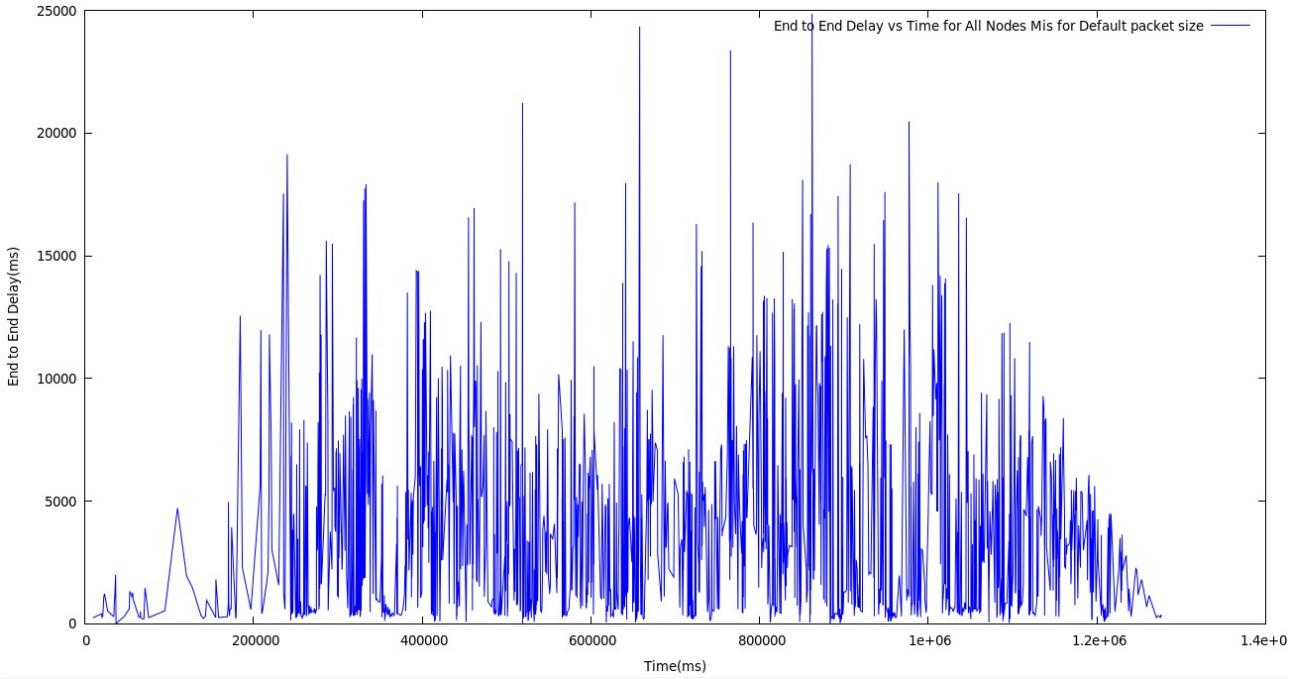


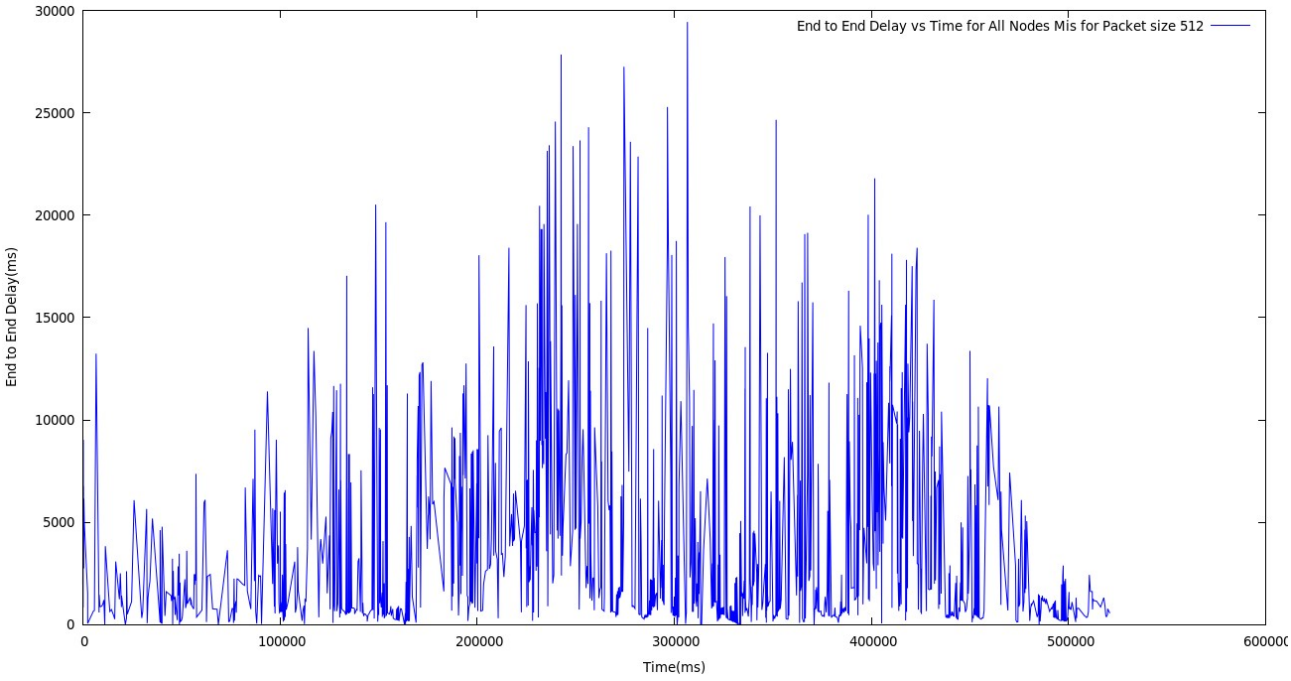


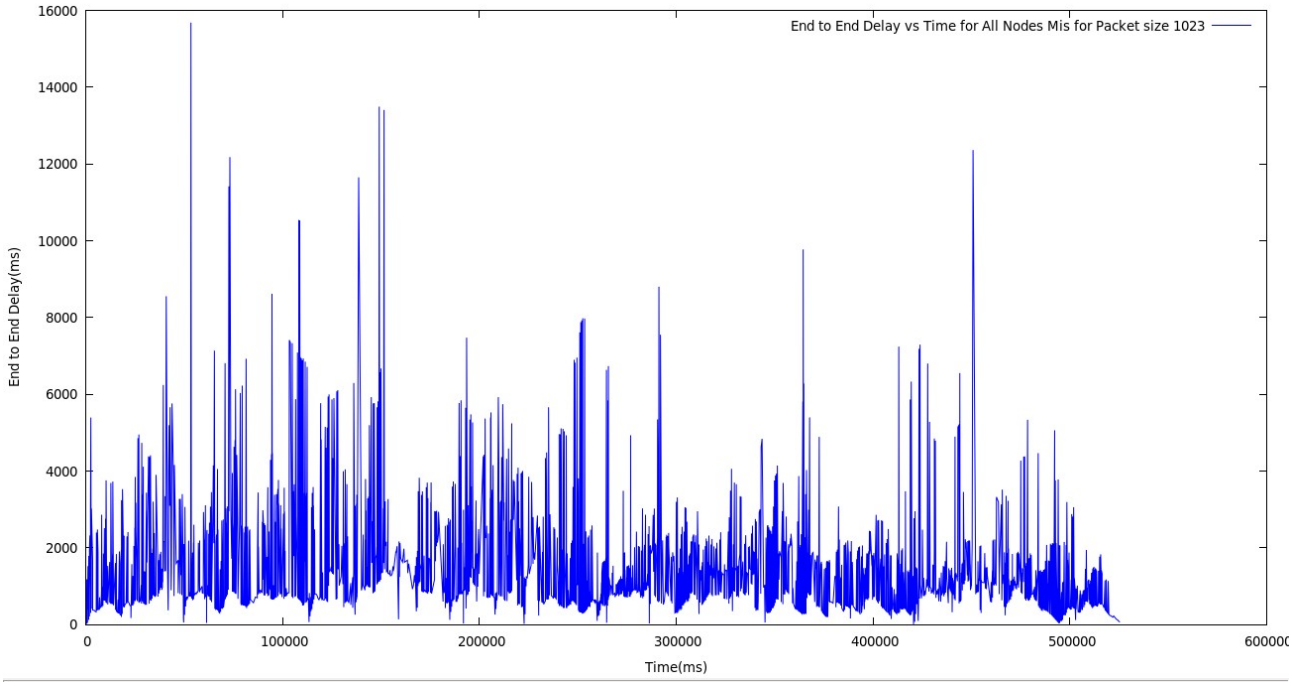


Here we can see that the nodes that are sending packets uses large share of channel. So their throughput is large. On the other hand throughput decreases. Also it depends on packet size, number of hops etc. The throughput of network traffic decreases when the number of hops between the source and the destination increases. Also randomization of node position plays a part in it too.

Calculated End to End Delay for all nodes misbehaving for different packet sizes.







When contention window increases, the nodes backoff timer increases . Therefore the nodes that are sending packets uses the large share of channel. While other nodes use very small channel. So these nodes takes large End to End Delay. When we increase Cwmin, End to End Delay increases.

But the Varying packet size has a direct effect on End to End Delay. This is because larger the packet size longer is the packet transmission , propagation and processing times.