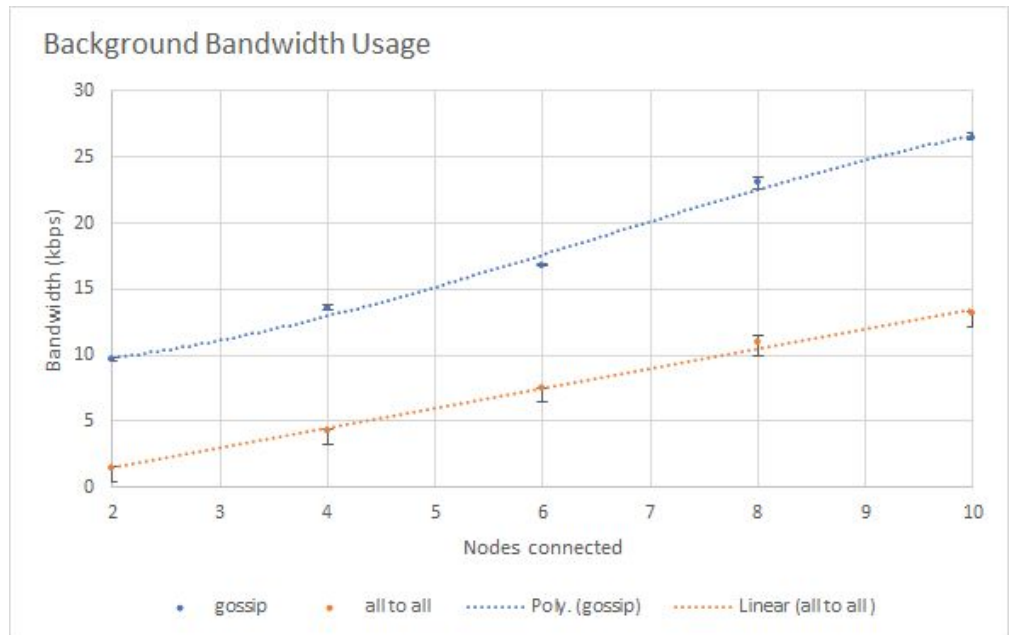
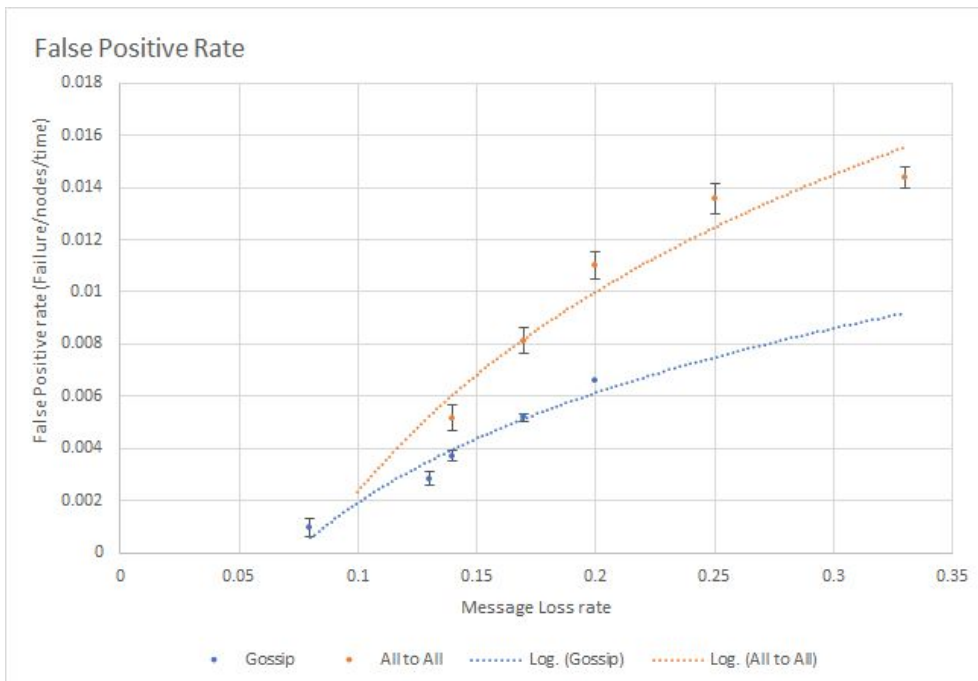


**CS 425 Mp1 report (Group 10)****1. Background Bandwidth Usage vs Number of nodes**

We see that the bandwidth linearly increases for all to all failure detection. This is expected because the average messages sent/received proportionally increases in all to all with each node. However for gossip, we see that the rate at which bandwidth is increasing, reduces as more nodes are added to the system. This could be because the total members we are gossiping to remains the same even when the number of nodes increases. Nevertheless as the total message size is greater for gossip because we are sending the entire membership list.

**2. False Positive Rate vs Message Loss Rate**

As expected, we see that as the Message Loss Rate increases, the false positive rate increases logarithmically. In All to All, if the number of nodes increases, then each node has to successfully receive all other  $N-1$  node tables so that there won't be a failure, yet as long as one heartbeat is lost a false positive should occur. In gossip, the table is shared in  $O(\log(N))$  time, and even if a few messages are lost by one node, other nodes that just merged their table could randomly select that node to send to their table. Hence, the false positive rate is lower on average for gossip.