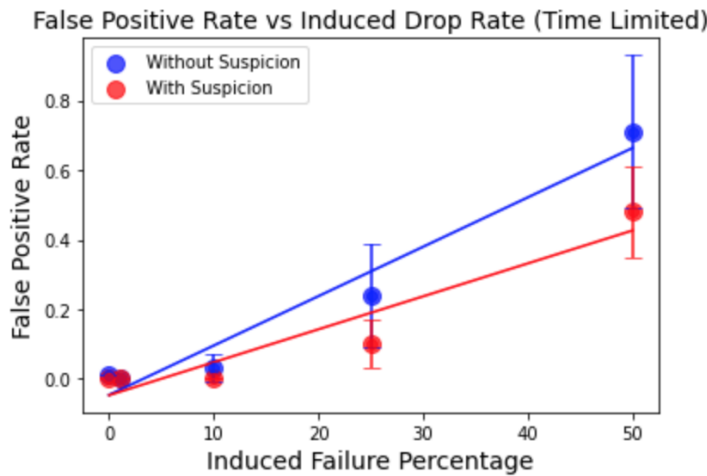
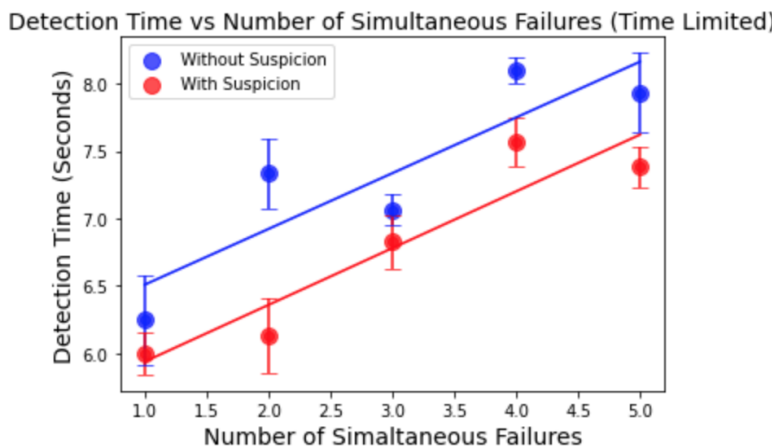


**1a)** When time is the limiting factor, there is a positive correlation between bandwidth and number of machines, but no significant difference between gossip and gossip+S. This similarity makes sense because our implementation still sent dead/failed entries over the network but did not parse them on receipt. Both seem to be growing roughly linearly, maxing out at around 8 KB/s. We measured incoming bandwidth using a bash script and the iptables package in Linux.

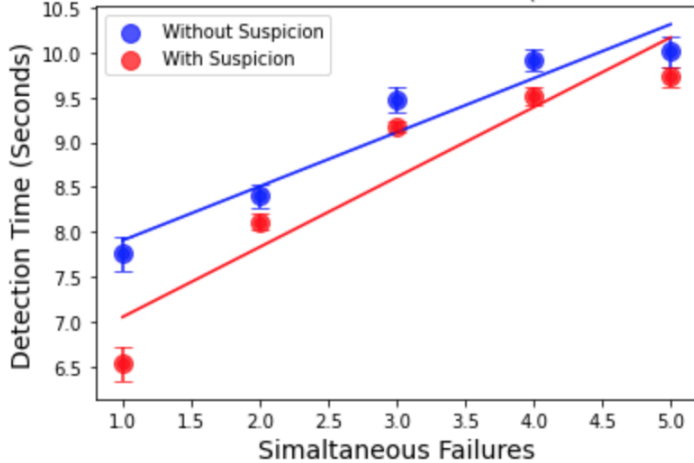


**1b)** When time is the limiting factor, the false positive rate is positively correlated with the induced message drop percentage (we tested 0%, 1%, 10%, 25%, and 50%). Additionally, the false positive rate was higher for gossip than gossip+S, and this gap seemed to widen as the message drop percentage was increased. This makes sense because a node cannot recover from failure in normal gossip in our code, but it can recover from suspicion in gossip+S, giving it more time to convince others it is alive.



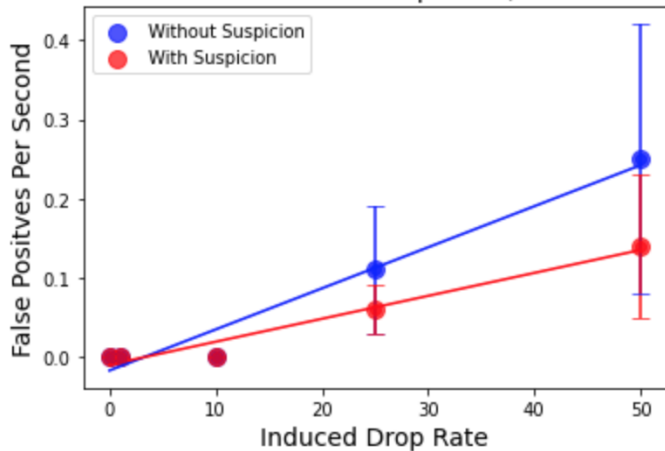
**1c)** When time is the limiting factor, the detection time seems to be positively correlated with the number of simultaneous machine failures. Our measurements included  $T_{\text{cleanup}}$  in the times recorded, so the graph shows times taken for failed machines to leave the membership list. Our data was very variable, but gossip+S outperformed gossip across all numbers of machines failed, which makes sense given that nodes in normal gossip have to time others out individually.

Detection Time vs Simultaneous Failures(Bandwidth Limited)



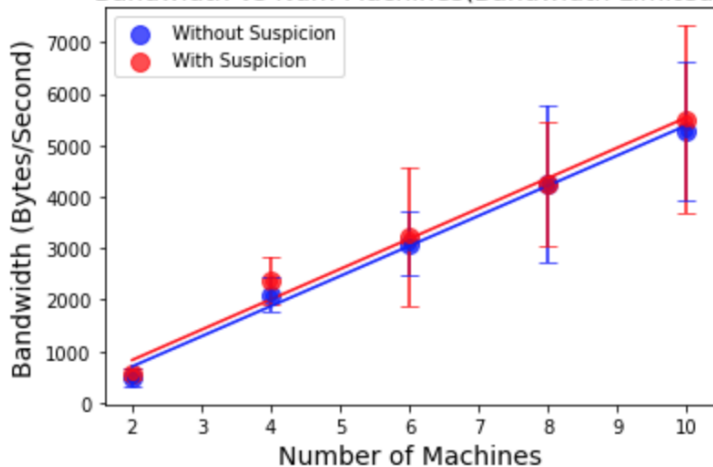
**2a)** When bandwidth is the limiting factor, the detection time is still positively correlated with the number of simultaneous failures, but the differences between the two protocols is much smaller (with gossip+S still winning). This makes sense because the advantage that suspicion has over normal gossip is being able to communicate suspicion with other nodes, and this ability is drastically reduced when bandwidth is limited.

False Positive Rate vs Induced Drop Rate (Bandwidth Limited)



**2b)** When bandwidth is the limiting factor, the false positive rates decrease across the board (when compared to time being the limiting factor) but are still positively correlated with the induced drop rate. Interestingly, looser time constraints led to no false positives for 0%, 1%, and even 10% message drop rates for both protocols, even when timed for many minutes. This may be because the relaxation of the time constraint more more eventual completeness but higher accuracy.

Bandwidth vs Num Machines(Bandwidth Limited)



**2c)** When bandwidth is limited, the bandwidth used by both gossip and gossip+S is still positively correlated, and it is lower across the board when compared to the time limited trials. The tightening of the gap between the protocols can be explained by the bandwidth cap, as this limits the extra messages that can be sent by gossip+S, bringing it down to the levels of normal gossip. Like before, gossip+S still uses slightly more bandwidth.