Bonus

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We have implemented node and failure model for gossip algorithm and push – sum algorithm. We have calculated the percentage spread i.e.,

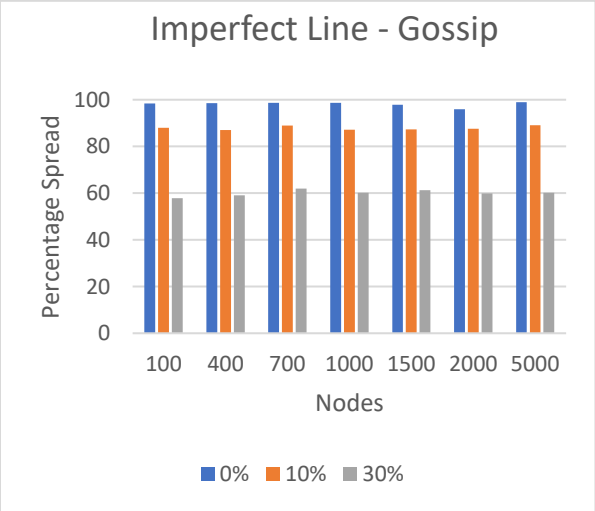
% Spread = Spread by number of nodes * 100

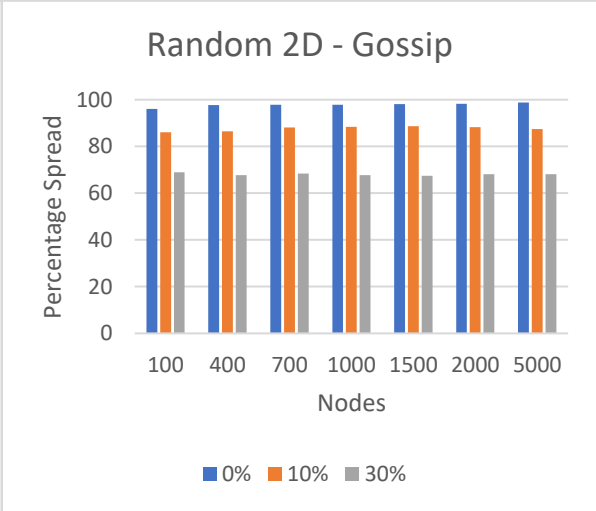
For the results included in this report, we considered 3 cases of failure nodes.

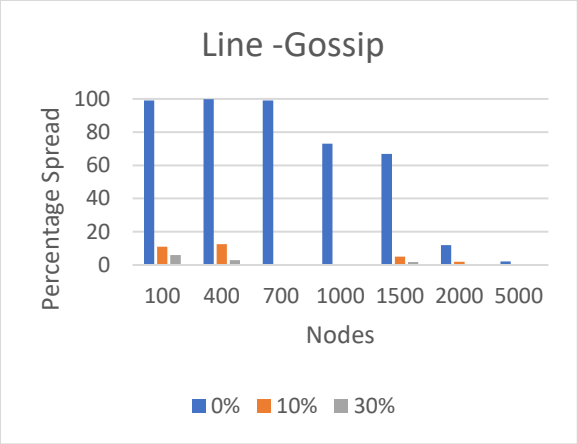
1. No failure.
2. 10% failed nodes.
3. 30% failed nodes.

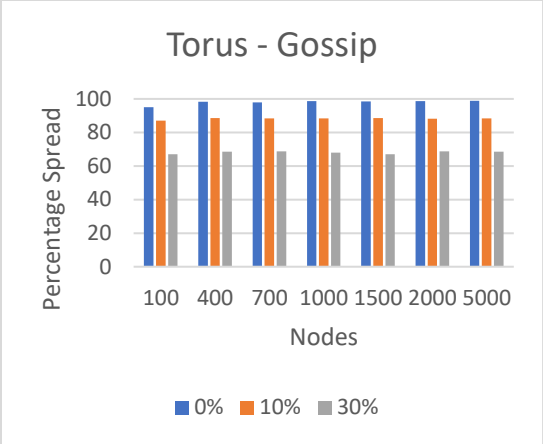
Graphs of Gossip and Push–Sum algorithms for various topologies.
The graph plots the %spread for the topology and algorithm vs the number of nodes.

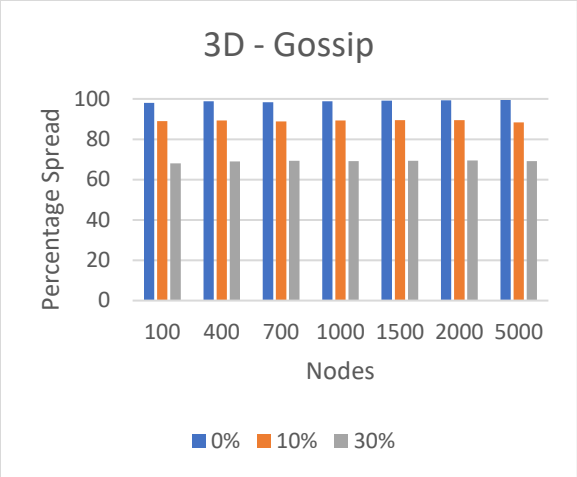
Gossip Algorithm:

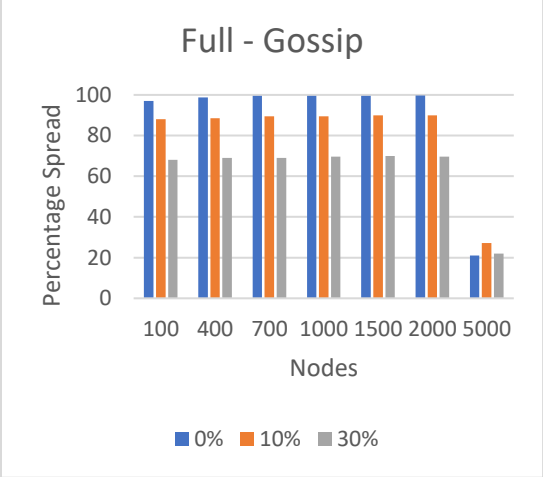




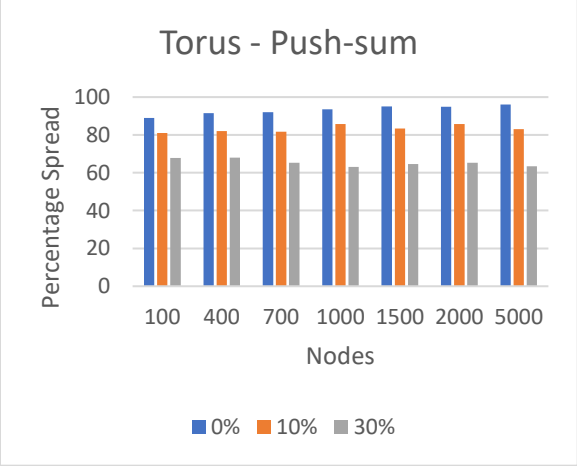


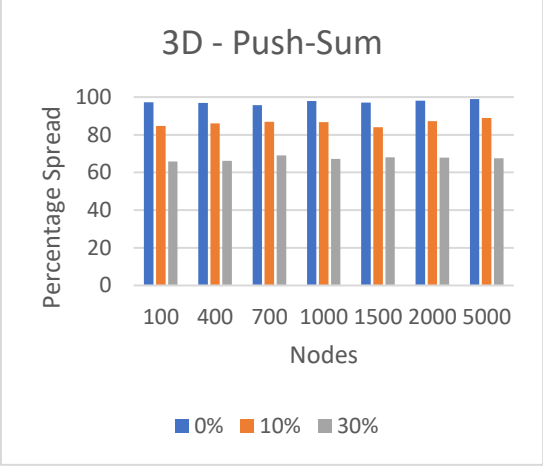


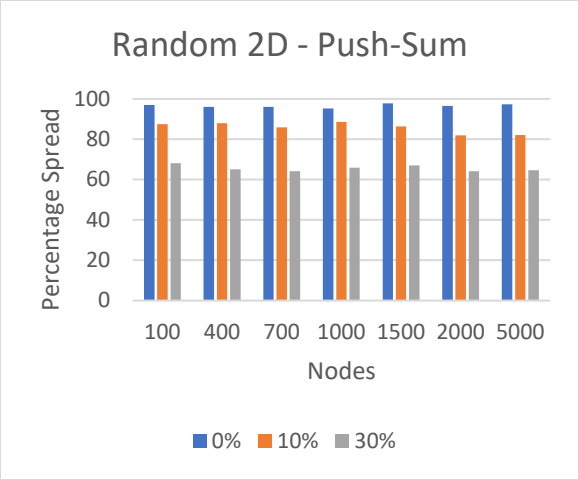


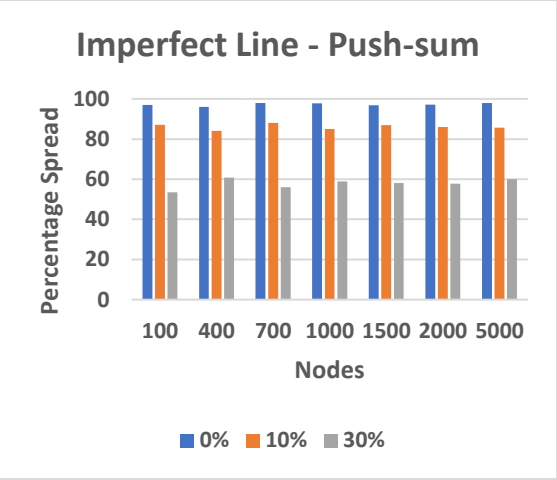


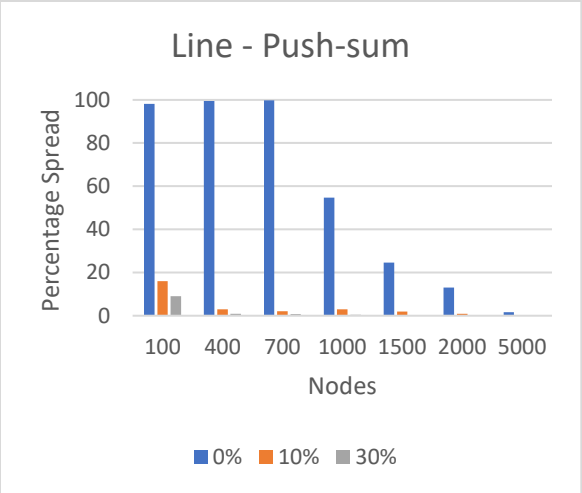
Push Sum Algorithm

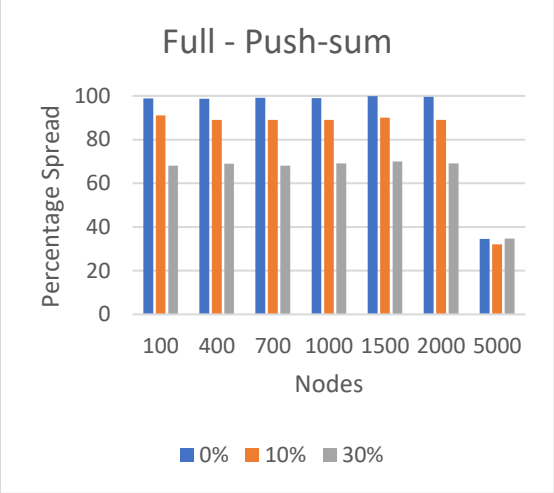












Interesting observations

1. Failure of nodes impact the line topology the most as it has the least number of neighbors.
2. Torus and 3D topologies are the most failure-tolerant.
3. As the number of failure nodes increase, the spread becomes lesser for every topology. It can be seen from the above graphs.
4. Random 2D is also fault-tolerant as this tolerance is comparable to that of 3D topology.