Report Bonus

Gossip Protocol and Push Sum Algorithm Failure Models

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Various topologies implemented are:

- Line Topology
- Full topology
- 2D Topology
- Imperfect 2D Topology

Algorithms Implemented are:

- Push-Sum Algorithm.
- Gossip Protocol

Failure Model for our Algorithm

We have introduced a fourth parameter namely

```
./project2_bonus num_nodes topology algorithm failure_nodes
```

The failure_nodes denote the number of nodes to kill permanently after a certain time period. The number of failure nodes should always be lesser than the number of total nodes.

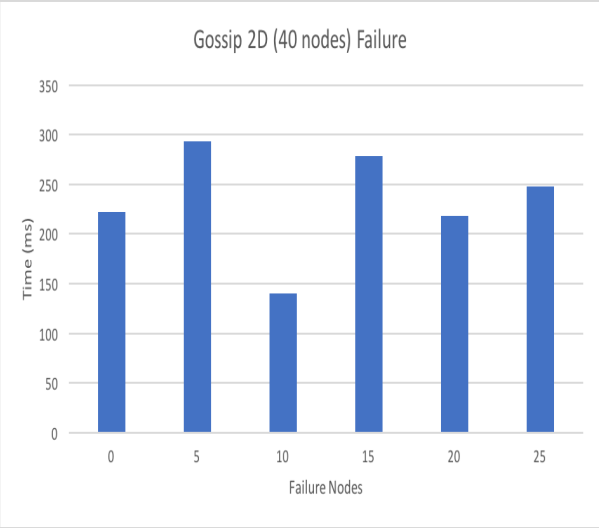
Experiments performed:

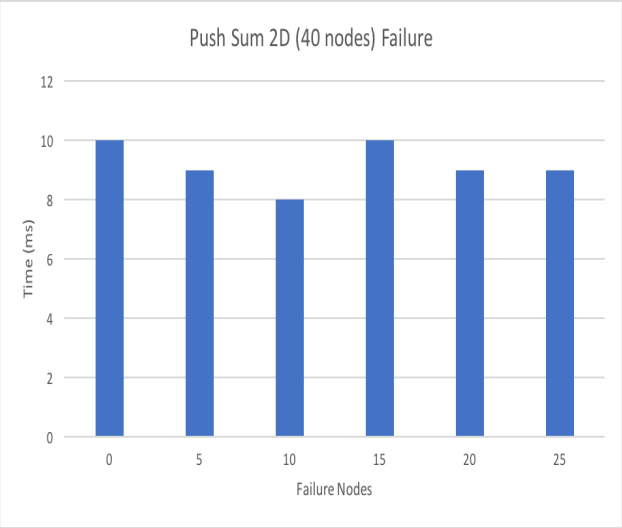
We have varied the failure nodes and fixed the number of nodes depending on the topology and the algorithm, and plotted graphs for each of the 4 topologies for both Gossip and Push-Sum algorithms.

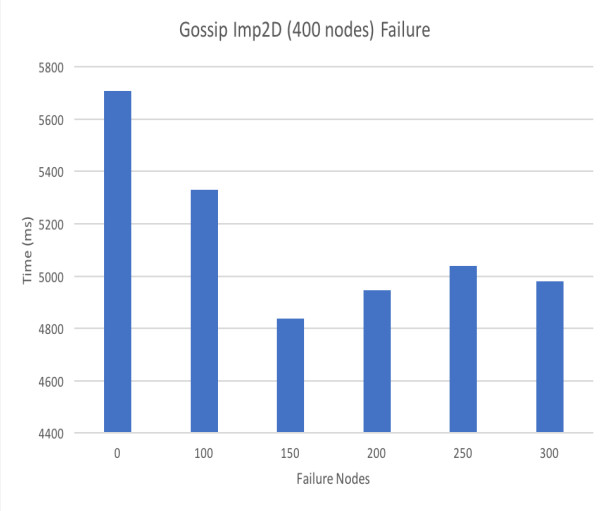
Observations:

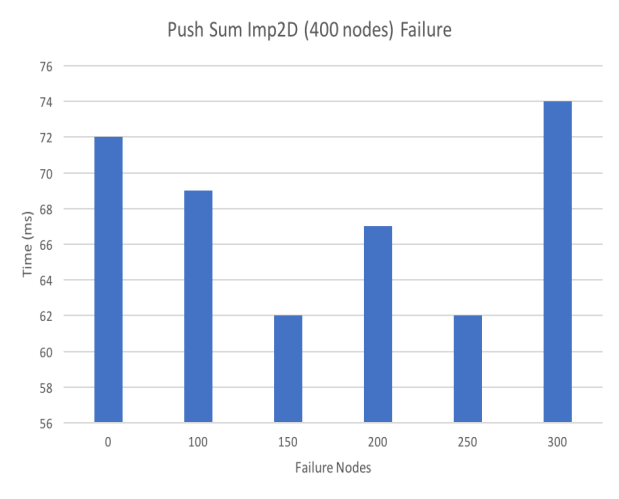
As the number of failure nodes are increased, the system time required in milliseconds for full topology decreases while for some topologies like line, imp2D and 2D, there are variations.

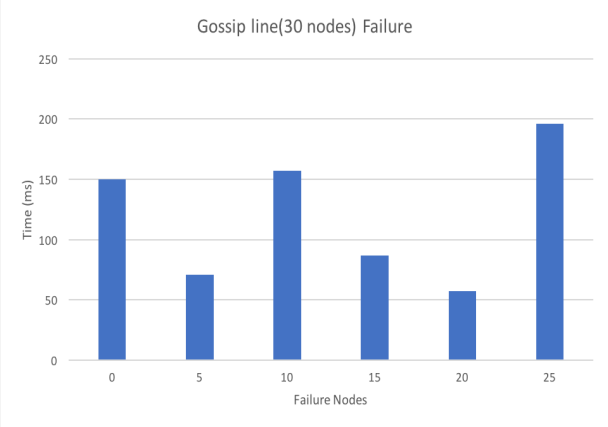
Graphs for No. of Failure Nodes vs Time required to converge in milliseconds:

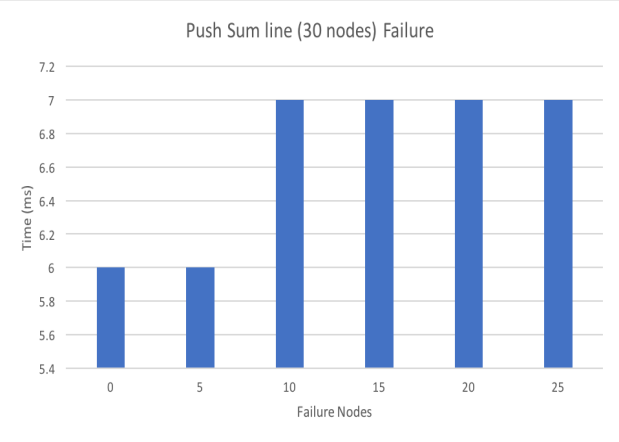


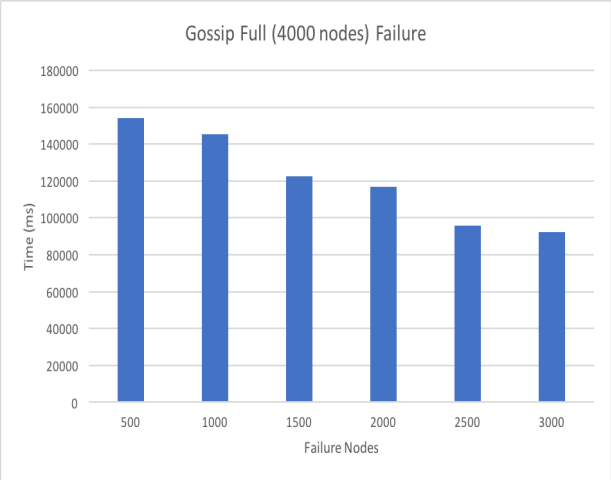


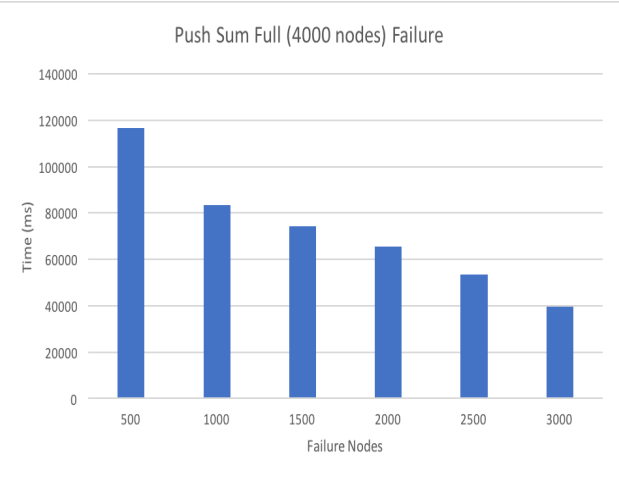












Interesting Findings:

If the percentage of failure nodes gets above 60%, then the probability of convergence decreases. In a large network, one should select the imperfect 2D network, while on a small network, it should be full topology.