

Report

Gossip Protocol and Push Sum Algorithm Implementation

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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

Convergence Model for our Algorithm:

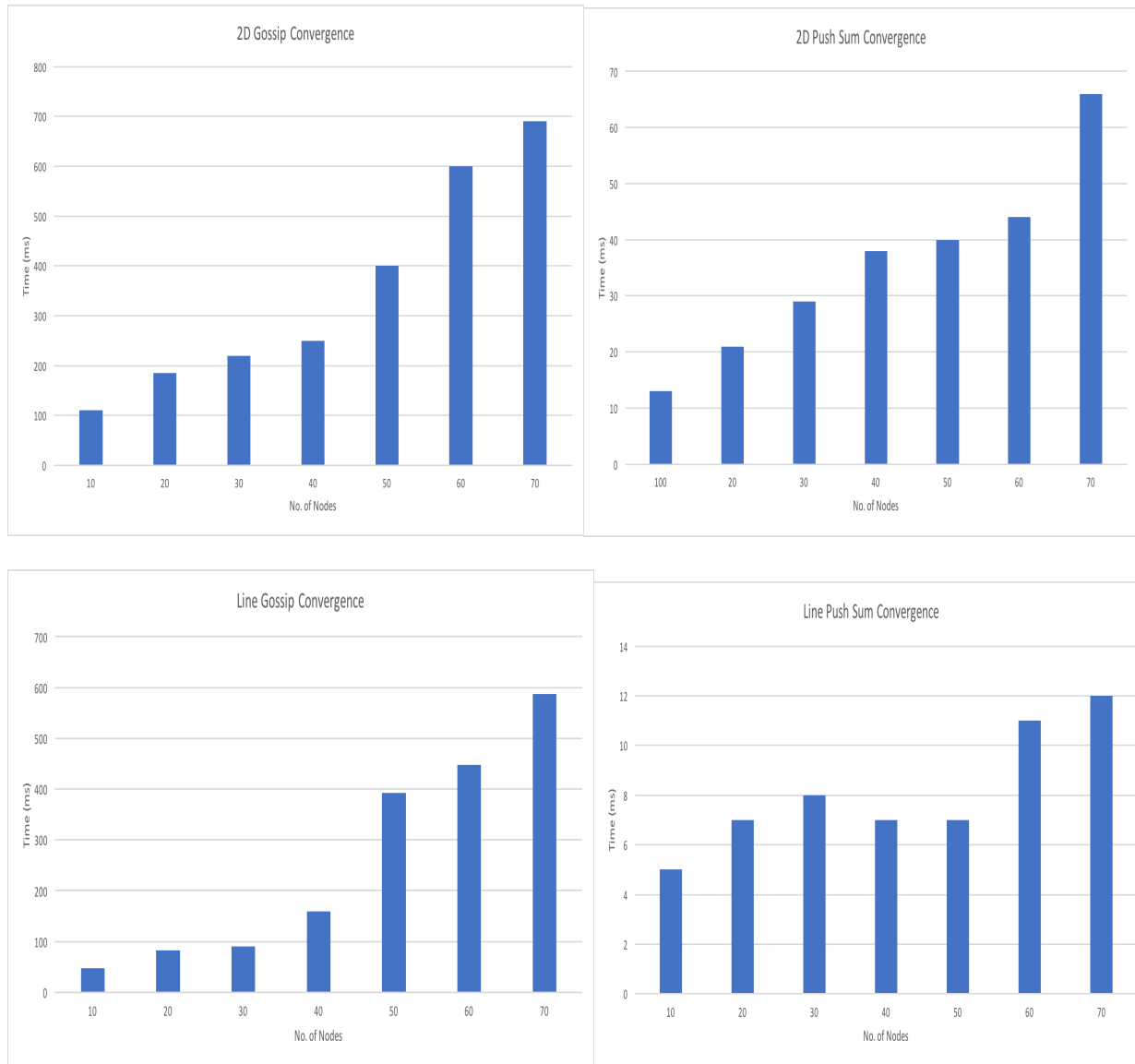
1. Gossip Protocol:

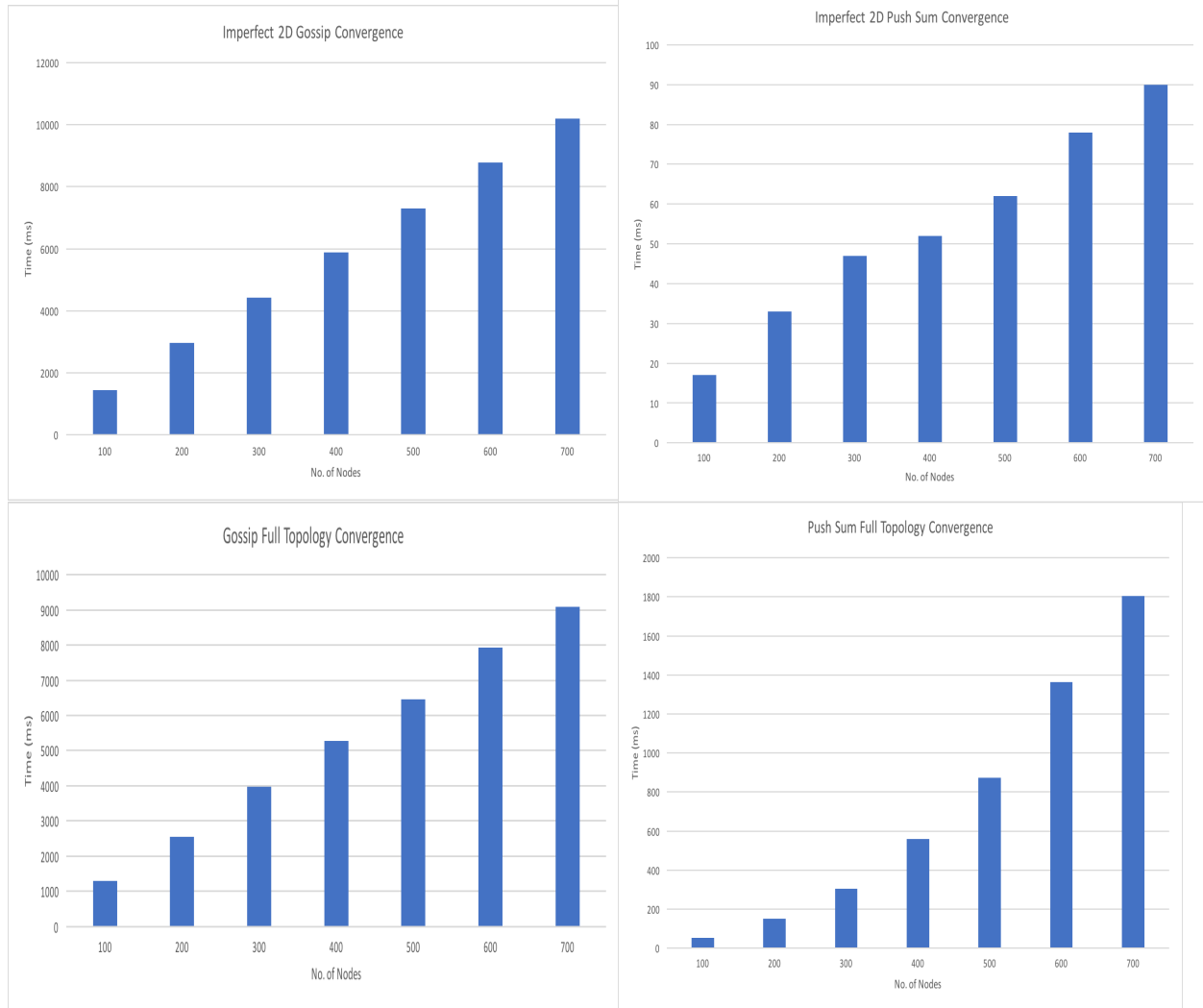
We have decided to maintain a blacklist of nodes which have received a message 10 time. Every node which reaches that limit is blacklisted by a Master Node. A blacklisted node cannot send any messages and participate in the gossip. If 25% of the nodes out of the total number of nodes are blacklisted for Full topology and Imperfect 2D or 10% of the nodes out of the total number of nodes are blacklisted for Line topology and 2D, the algorithm converges and the main process is killed.

2. Push Sum Algorithm:

A similar convergence model was followed. If the ratio of s/w for a node did not change more than 10^{-10} times for 3 consecutive rounds, the node was blacklisted by the Master Node. A blacklisted node cannot send any messages. If 25% of the nodes out of the total number of nodes are blacklisted for Full topology and Imperfect 2D or 10% of the nodes out of the total number of nodes are blacklisted for Line topology and 2D, the algorithm converges and the main process is killed.

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





Interesting Findings:

From the graphs, it is seen that imperfect 2D and full topology have the highest probability of converging. 2D converges at an average rate while line has the lowest probability of converging. This is because in line and 2D, there is a higher chance that the neighbors of a particular node are all blacklisted. In such a case, the algorithm cannot converge. Hence, our ideal topologies are imperfect 2D and full topology.

For a small network, one should select full topology and for a large network, one should select imperfect 2D for the best performance.