Project Report

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Implementation Details:

In our implementation, we stop the transmission of the message from a particular node when it has received the message for 10 times. The criteria of convergence for both the Gossip and Push-Sum algorithm is when the spread is 100%. Spread refers to the percentage of the nodes that have received the message.

For Push-Sum algorithm, the actor terminates if an actor's ratio s/w did not change more than 10^{-10} in 3 consecutive rounds.

Graphs plotting convergence time vs size of the network for different topologies and algorithms

1. **Gossip Algorithm**

Gossip (Log)

2. Push-Sum Algorithm:

Push-Sum

Push-Sum (Log)
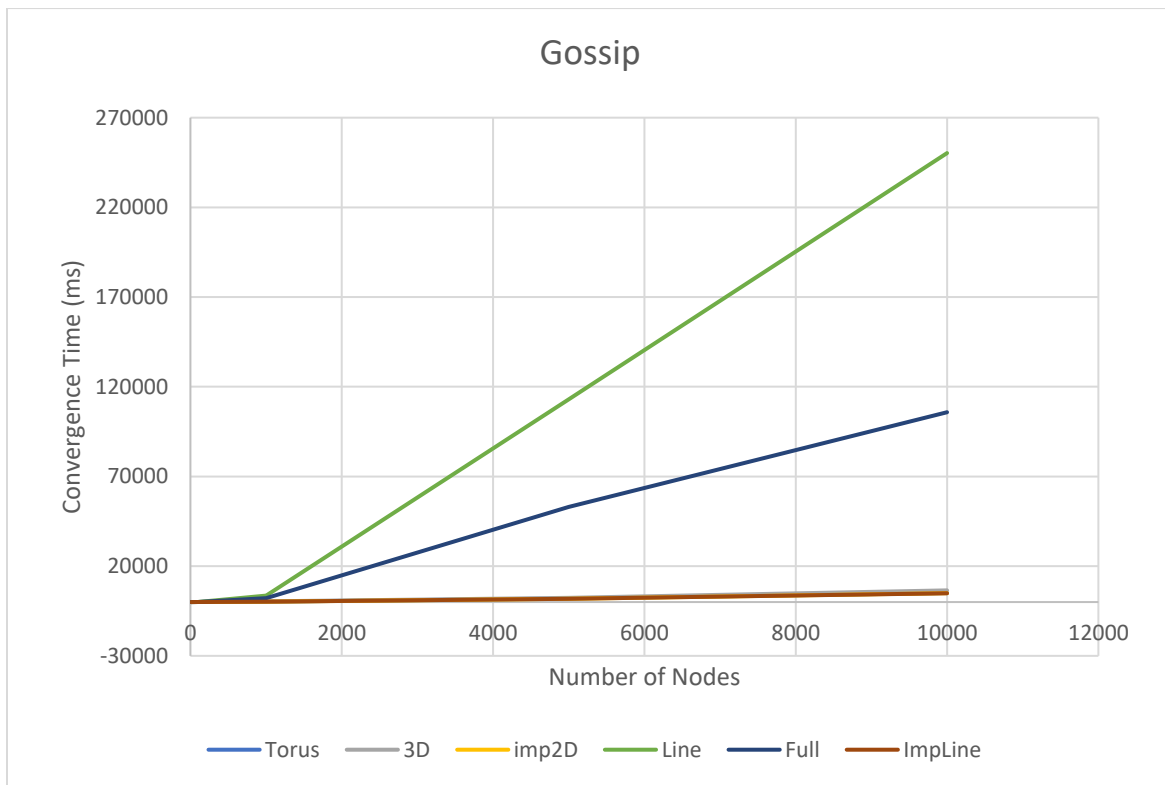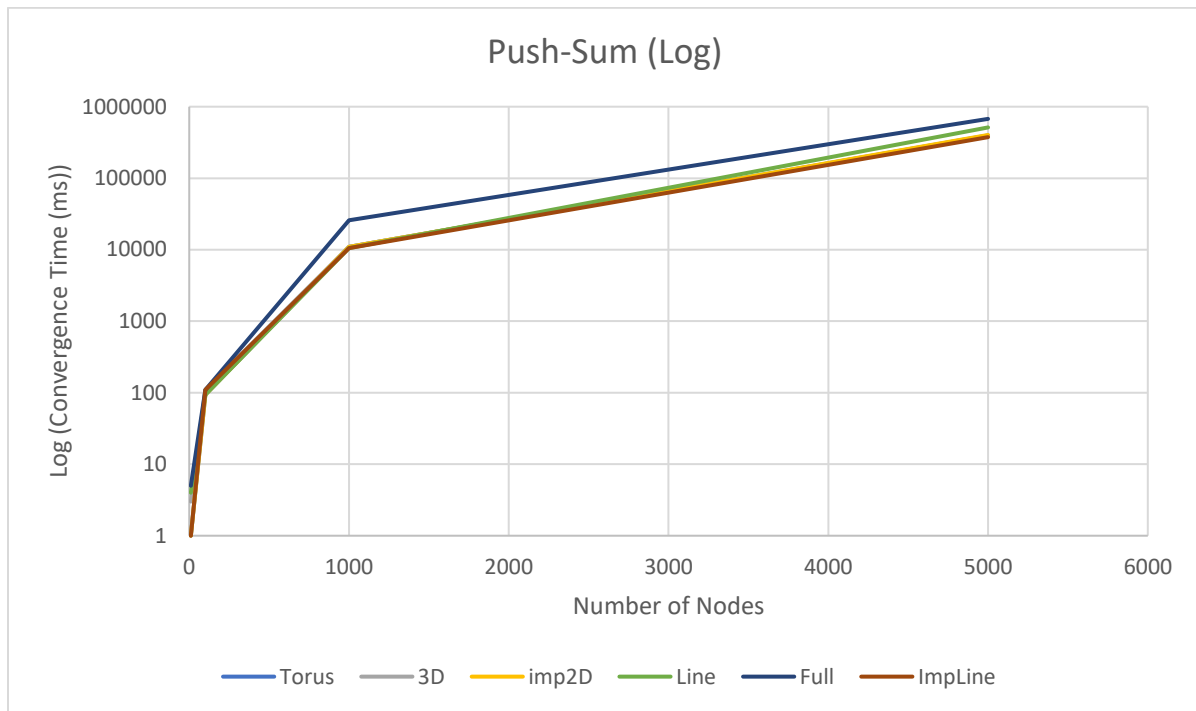
Observation:

1. Line topology has the worst convergence time for all the number of nodes tested. This can be attributed to the fact that the number of neighbors is limited and thus reduces the coverage for the topology.
2. The main idea of the full topology is that every node is connected to each other node, this gives rise to a. number of redundant links in the network. As the number of nodes increases the performance of this topology decreases as expected.
3. When we compare line with imperfect line topology, the main advantage is the strategy of adding random neighbors and thus improving the coverage and also propagation of messages.
4. Imperfect line has better convergence time compared to full topology for all the variable number of nodes.
5. In some of the cases we observe that imperfect line topology fares better than 3D for push-sum algorithm.