

Project2 - Gossip Simulator

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A. Implementation:

The network forms to be simulated are “Full, Line, 2D Grid and Imperfect 2D Grid”. We have chosen the worker actor names invoked by the master actor by the position of the grid.

For example:

1. Line and Full

If there are 6 nodes, the nodes are named as “1.0, 2.0, 3.0, 4.0, and 5.0”

2. Grid and Imperfect 2D Grid

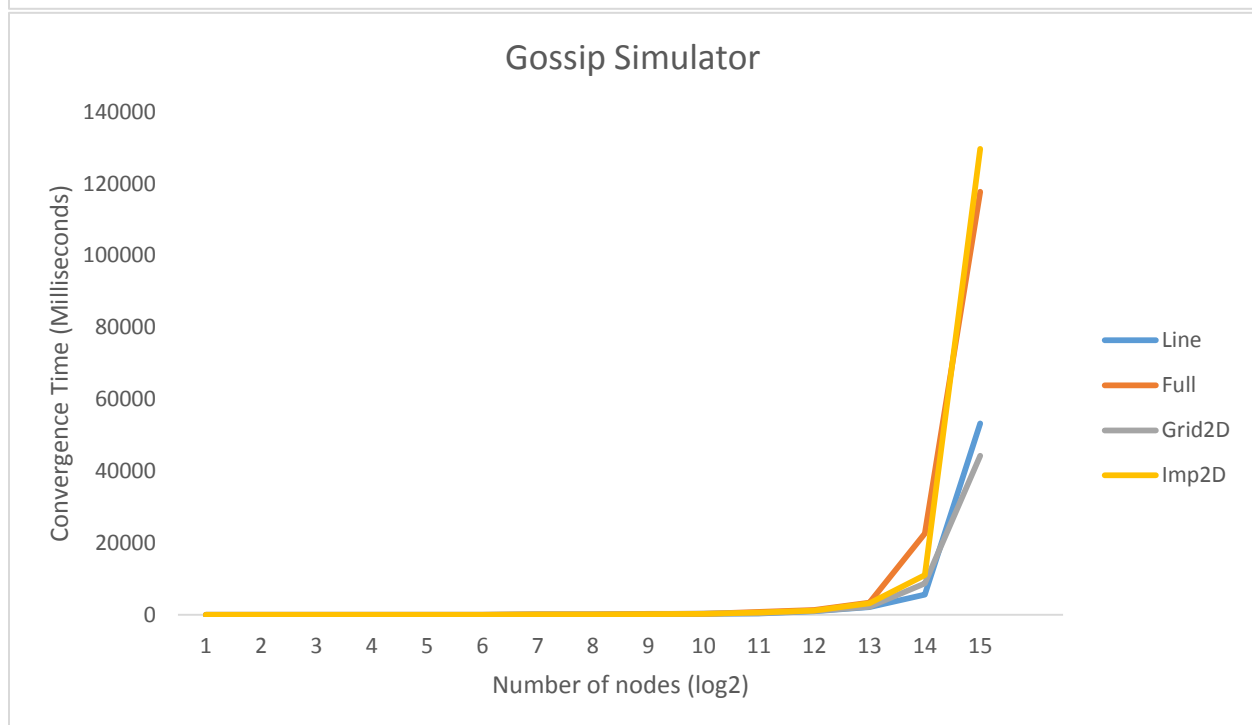
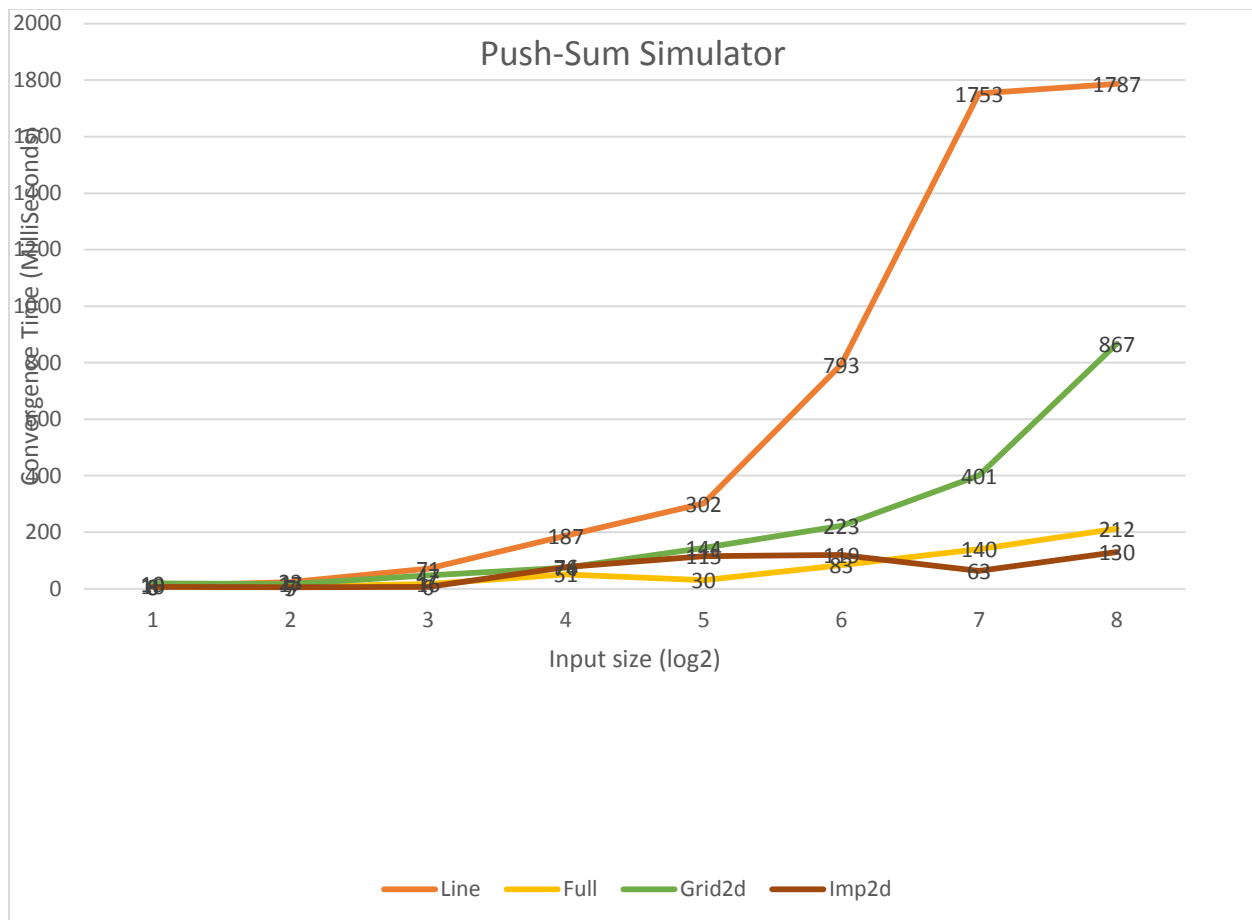
If there are 6 nodes, the nodes are rounded off to the nearest square to maintain grid property and named as “0.0, 1.0, 2.0, 0.1, 1.1, 2.1, 0.2, 1.2 and 2.2”.

The message (message on case of gossip and s and w in case of push-sum) are sent to the next actor based on the neighbor principle where for full neighbors are selected as random and for others according to their grid property.

“s” is the node number and we have chosen a 1x1 naming and hence we use (a,b) and $s = \text{dim} * b + a$ for computing s as advised in the project proposal. dim is the dimension which is square root of the number of nodes rounded.

B. Observations:

The following are the graphs plotted for the input size and time for convergence. Input size is chosen in powers of 2 so that a logarithmic scale is ensured.



1. Push-sum is observed to take more time for convergence as the number of input nodes or the size of network increased.

2. Line is the slowest in terms of convergence irrespective of the number of messages that a worker can send at once. Imp2d network is the fastest when the worker can send more than 2 messages in case of push-sum algorithm.

3. The order of the convergence time as the input goes high (asymptotic) for Push sum algorithm is as below:

Line > Grid2d > Full > Imp2d

4. The order of the convergence time as the input goes high (asymptotic) for Gossip algorithm is as below:

Imp2d > Full > Line > Grid 2d

5. The maximum size of the network that we could handle is of 131072 nodes.

