DISTRIBUTED OPERATING SYSTEMS
COP5615
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PROJECT-2

GROUP MEMBERS

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HOW TO RUN

Directory structure to run command:

Project folder/
|
|---project2.scala
|
|---SCALA-2.11.2/
| ---------bin/
| -------application.conf
| ---------lib/
|---AKKA/
| ---------*.jars(akka jars)

Compile command:

./scalac -cp "../../akka/*:../../scala-library-2.11.2.jar:." ../../project2.scala

Run command:

./scala -cp "../../akka/*:../../scala-library-2.11.2.jar:." project2 [numberofactors] [topology] [algorithm]

Example:

./scala -cp "../../akka/*:../../scala-library-2.11.2.jar:." project2 8000 full gossip
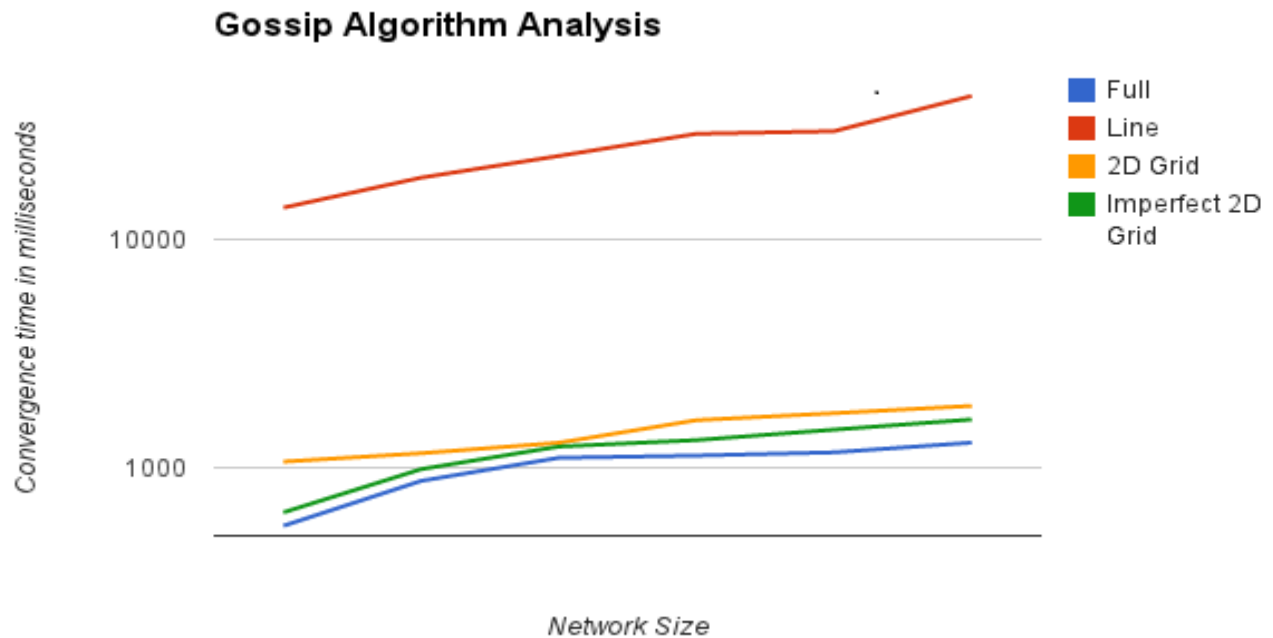
Analysis of the Gossip Algorithm simulation:

From the results obtained with running gossip algorithm on different topologies we could make the following inferences with regards to the gossip algorithm.

- With all topologies, we could conclude that time taken for convergence increases with the increasing number of nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs BEST for the Full topology with the least time taken to converge the gossip message to all the nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs WORST for the Line topology with the most time taken to converge the gossip message to all the nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs almost equally for the 2D and imperfect 2D grid topologies with the time taken to converge the gossip message to all the nodes in the network is only behind the full topology but much better than line topology.
- The imperfect 2D Grid topology performs slightly better than 2D grid topology in most networks sizes.

In terms of Best performance:

Full > Imperfect 2D Grid > 2D Grid >> Line

GOSSIP ALGORITHM				
Network Size	**Full**	**Line**	**2D**	**Imperfect2D**
8000	554.2	13719.4	1058.6	634.6
10000	871.8	18566.6	1152.2	981.4
12000	1100.4	23107.4	1280.4	1232.4
14000	1125.4	28896.8	1608	1315.4
16000	1162.6	29654.6	1725.6	1461.6
20000	1282.4	42312.2	1857.6	1619.6

Gossip Algorithm Analysis

Analysis of the Push-sum Algorithm simulation:

From the results obtained with running pushsum algorithm on different topologies we could make the following inferences with regards to the gossip algorithm.

- With all topologies, we could conclude that time taken for convergence using push sum algorithm increases with the increasing number of nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs BEST for the Line topology with the least time taken to converge the gossip message to all the nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs WORST for the Full topology with the most time taken to converge the gossip message to all the nodes in the network.
- For any N- number of nodes in network, the gossip algorithm performs almost equally for the 2D and imperfect 2D grid topologies with the time taken to converge the gossip message to all the nodes in the network is only behind the line topology but much better than full topology.
- The imperfect 2D Grid topology performs slightly better than 2D grid topology in most networks sizes.

In terms of Best performance:

Line > Imperfect 2D Grid > 2D Grid >> Full

PUSHSUM ALGORITHM				
Network Size	**Full**	**Line**	**2D**	**Imperfect2D**
8000	3569.8	114.8	415	385.6
10000	3961.8	138.6	439.2	436.2
12000	6373.6	159.4	494.4	491.2
14000	8238.4	177.8	564.6	566.4
16000	9144	194.4	589.2	588.4
20000	10602.4	253.4	661	637.8

PushSum Algorithm