

REPORT-BONUS

Failure Node Implementation

Before calling any of the algorithm (either Gossip or PushSum) a random node is chosen and it is made to stop from transmitting messages. In this case if that node is chosen in between the message propagation phase it would not be sending that message sent to it, instead it remains silent.

Experiments Performed:

Both Gossip and PushSum algorithm are implemented with a failure node.

Observation:

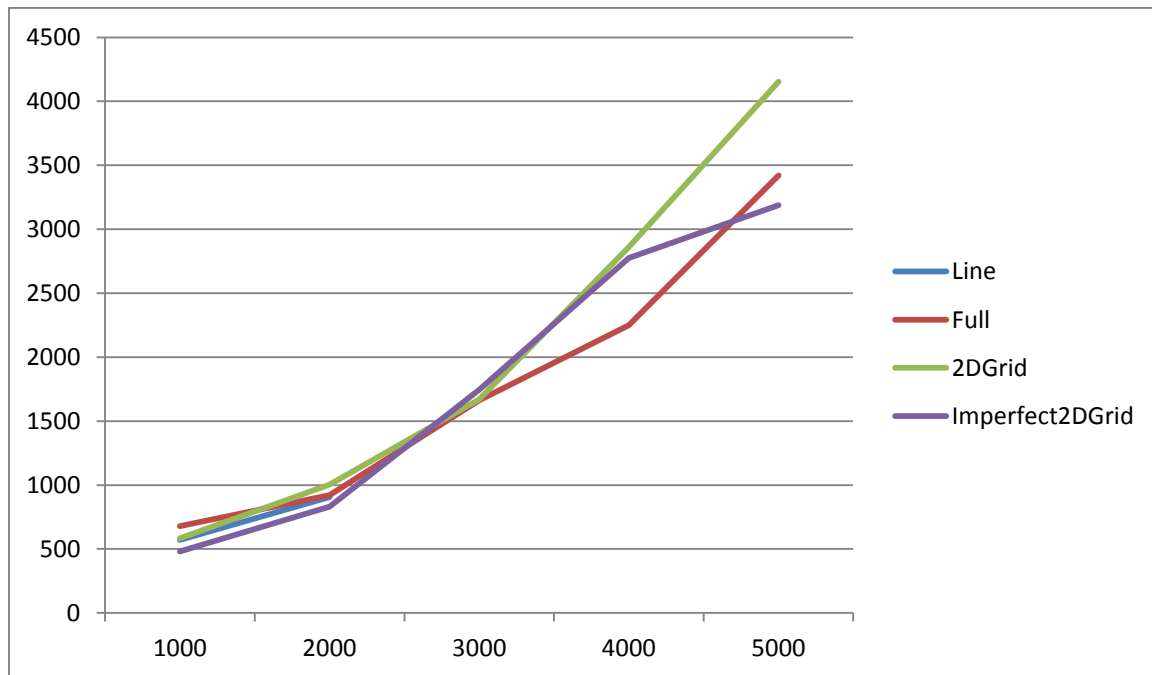
The performance of the Gossip Algorithm with a failure node is shown below.

Below is the graph plotted against

X-axis : Number of Nodes

Y-axis : Convergence Time

For the algorithm **GOSSIP**



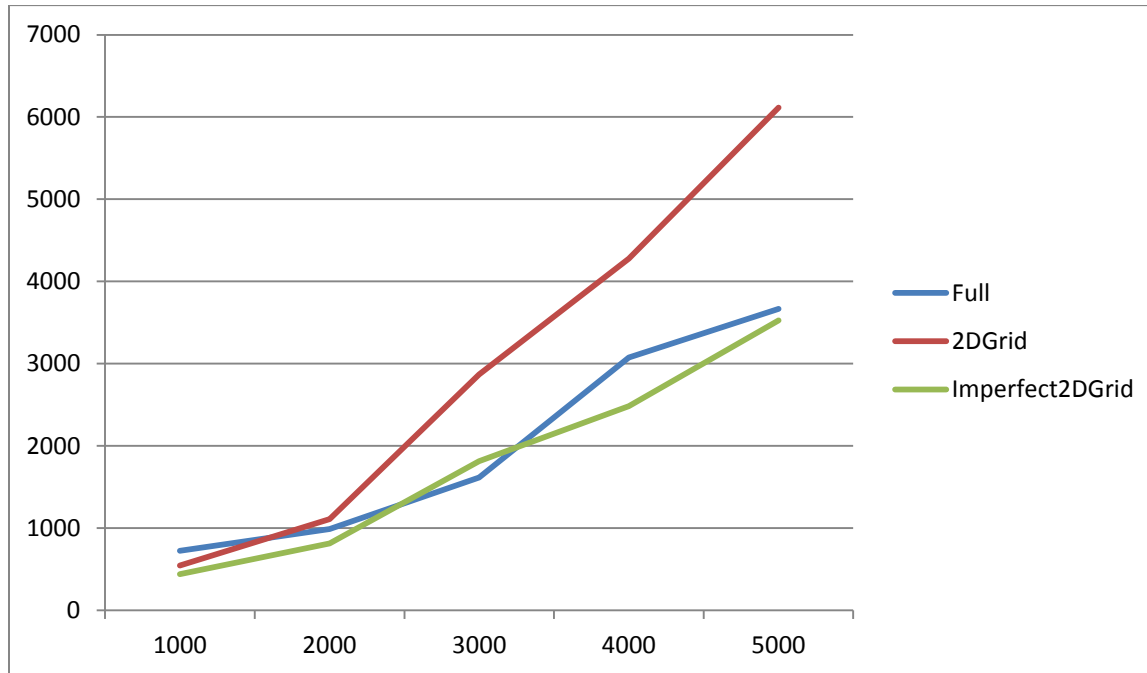
The performance of the PushSum Algorithm with a failure node is shown below.

Below is the graph plotted against

X-axis : Number of Nodes

Y-axis : Convergence Time

For the algorithm **PUSHSUM**



- The convergence time taken for the implementation of a failure node is greater than when all the nodes are active. As the number of active nodes is less, the step towards the convergence decreases which in turn increases the convergence time.
- It is difficult to converge the message for less number of nodes. In this case, as there is possibility of selecting the failed node during the transmission of messages, the time that all nodes receive the message at least once increases.
- For Line topology, convergence of the message occurs rarely because there are only two neighbors available for each node except the first and last ones. If the failure node is either first node or the last node then the chance of converging message is more where as if the failure node is somewhere in the middle of the network the chance of converging the message is even less as it loses the connection with two of the neighbors.
- For Line topology, if the failed node is the 1st one in the line arrangement of nodes and the random node which got selected in the beginning of the algorithm are same, then the system would never converge.
- If the threshold value (number of messages received) set on a node is increased (more than 10) then the chance of converging increases, as the node has more chances to transmit the message further and the node being isolated will have a chance to receive it so that the system converges