Bonus Project Report

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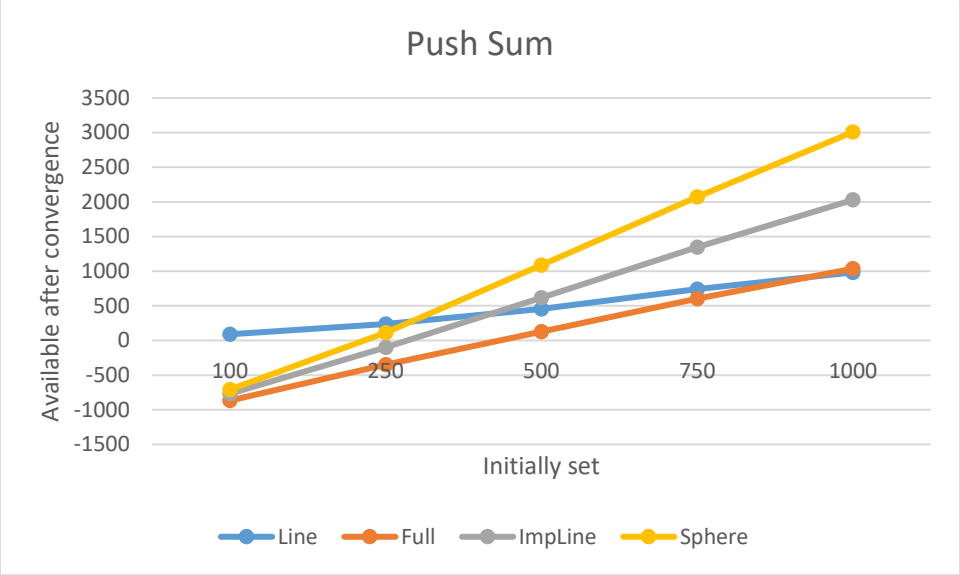
For Failure analysis, we tested all topologies with both the algorithms. We incrementally increased the number of available failure nodes and tested converge. We removed the node from the topology once it reaches its message count 10 in case of gossip and s/w ratio does not change for 3 consecutive time in case of push-sum, thereby the topology grows smaller every time a node hits it desired value. We handled the failure node (times when selected neighbour was not found, since it was removed from the topology) by checking whether the selected neighbour is present/active or not. If the node is inactive, then it again obtains a new random neighbour and continues the process.

X axis denotes the total failure nodes given initially, Y axis denotes the number of failures available after convergence (i.e –> initially given – available after convergence = number of failures). Following is for total 100 nodes.

Gossip algorithm for failed nodes with 100 Nodes

From the graph we see that in Full network the available nodes after convergence are negative, that means there were many failures, we believe this is because as the network grows smaller and smaller the chances of getting a random number from 1 to 100 which is present/active gets lesser and lesser, that's why it has to make plenty of attempts before it finds a neighbour who is present and it can send a message to.(To check the number of failures which occurred – uncomment line 17 in failure.ex)

In case of line, the failure are less because we propagate to the immediate neighbours in-order to optimize the working, i.e – actor 4 has neighbour 3 and 5, if they are not present, we go for 2 and 6 and so on.



Push-sum algorithm for failed nodes with 100 nodes

In Push-sum, the observation was different, since it will take a long time for every node to converge, sometimes there are less failures, and other times there are more.