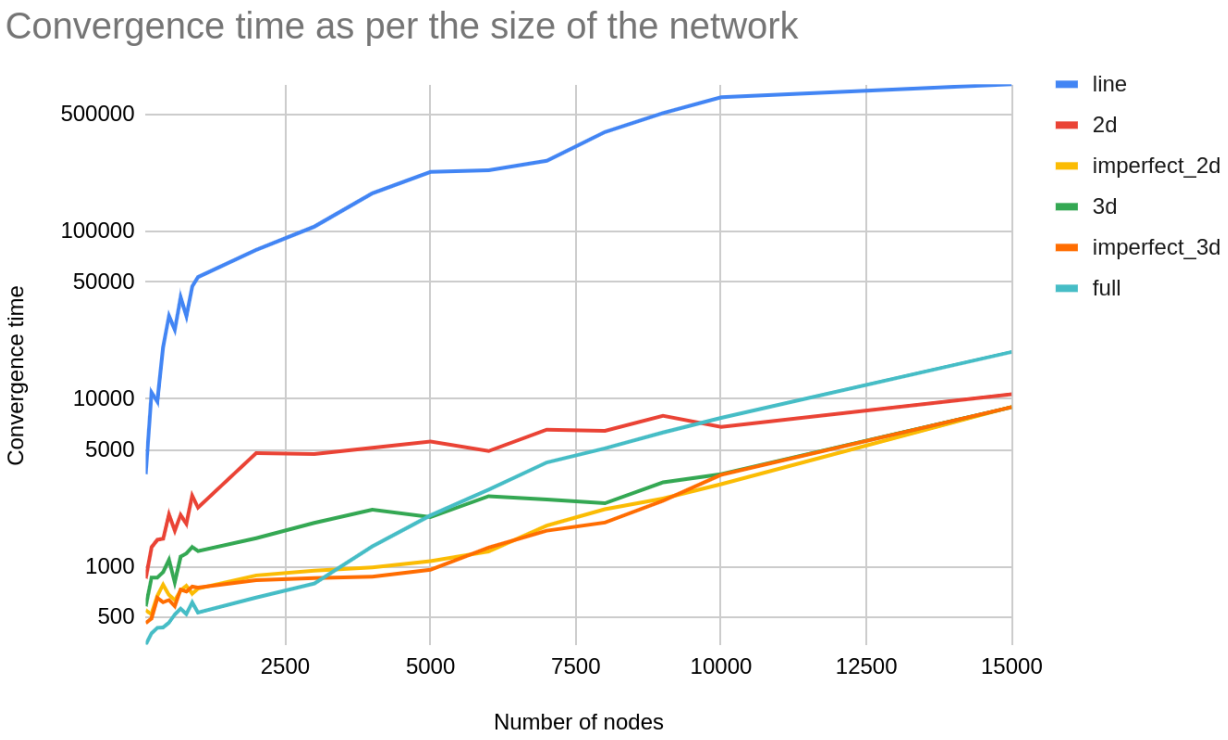
Analysis 1:

Gossip Protocol

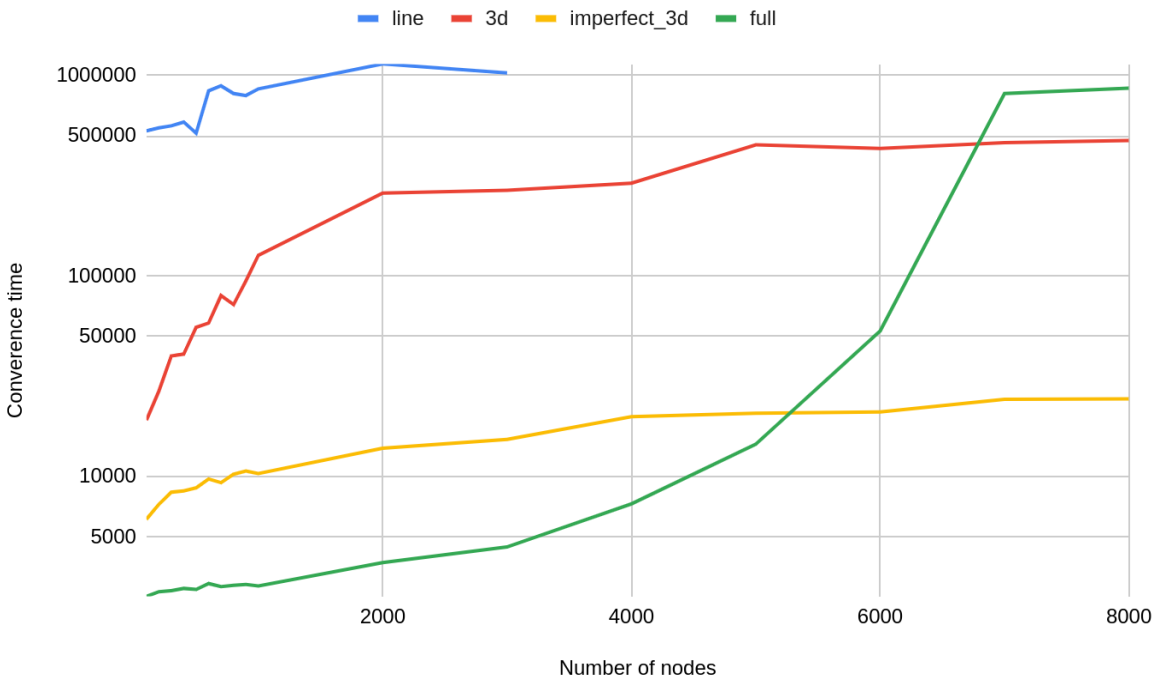
The following chart compares various topologies on the basis of their convergence time as per the size of the network (Number of nodes).



Interesting observations:

- For smaller number of nodes, convergence time for various topologies are,
  T_line > T_2D > T_3D > T_imperfect2D > T_imperfect3D > Full
- The above trend remains the same as the number of nodes increases. However in case of full topology, convergence time is higher with respect to its counterparts. We attribute this to the increased network overhead due to the increased number of nodes

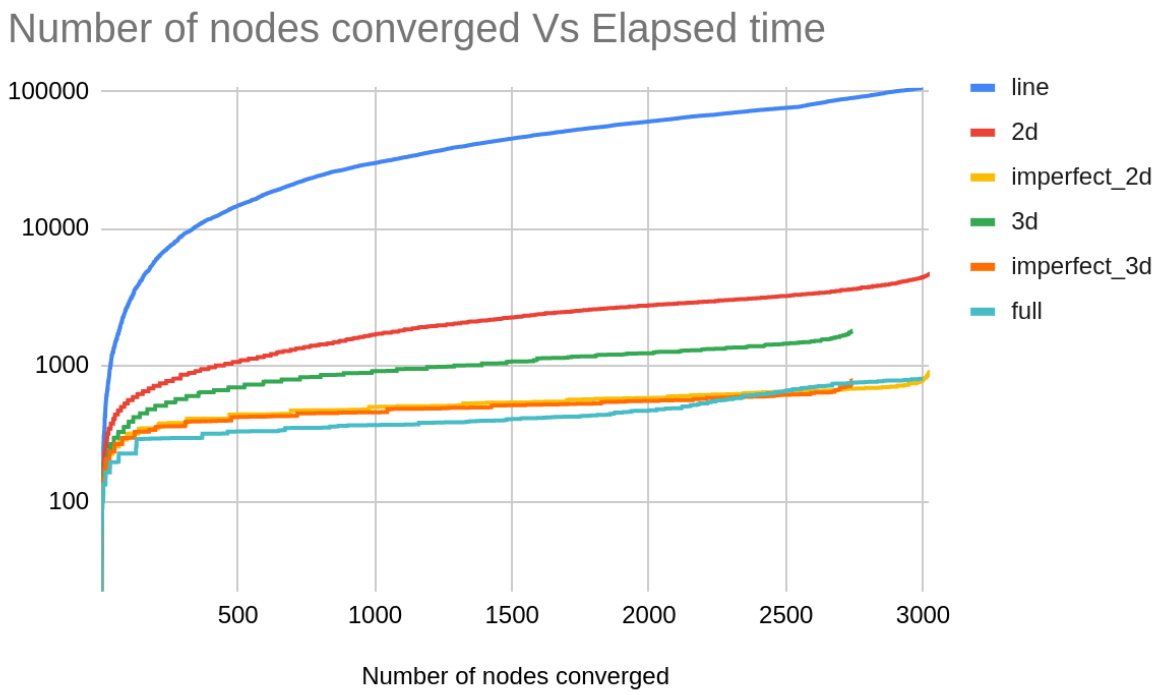
PushSum Protocol

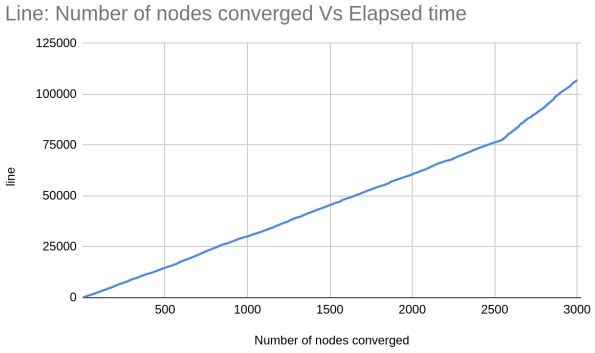


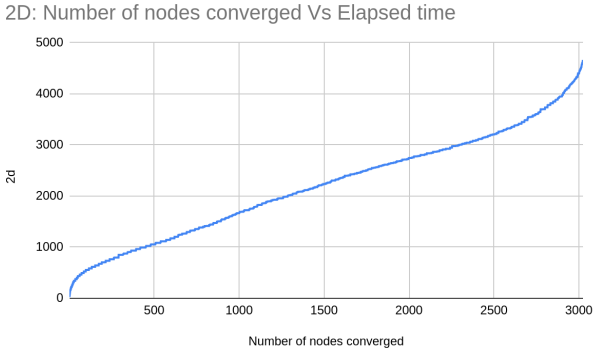
Trends similar to the gossip protocol have been observed in the PushSum protocol implementation.

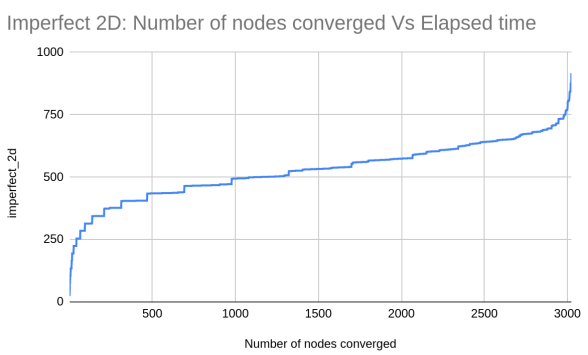
Analysis 2

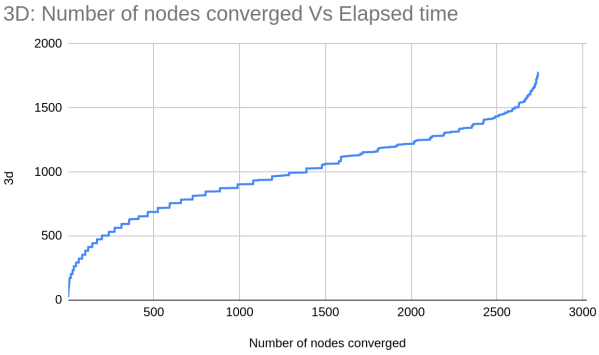
The following chart compares various topologies based on the number of nodes converging at a given time in a single run. Settings for the single run were as follows:
Number of nodes = 3000

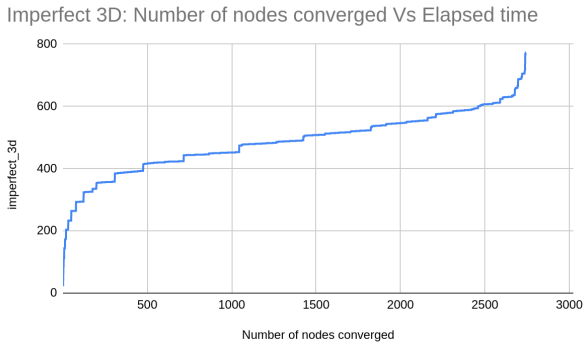


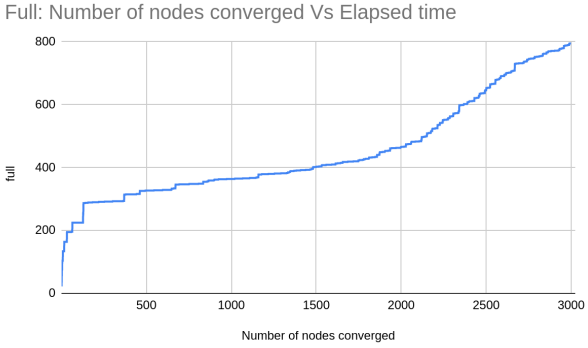












Interesting observations:

- In linear topology, nodes converge at a linear pace. As we increase the complexity of the network, nodes converge at a faster rate in the beginning. However, rates at which nodes converge slows down.
- As the network progresses towards convergence, it is apparent that the elapsed time steeply increases with respect to the number of nodes converged. This is because as the topology gets closer to its convergence, more number of nodes have already been converged. Hence, it reduces the probability of an unconverged node finding another unconverged node and sending a message to it.