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All topologies for gossip as well as push sum are working

Large Topologies

- 1) Line- gossip : 1 Lakh nodes
- 2) Line – push sum : 1 Lakh nodes
- 3) 3d – gossip : 8000 nodes
- 4) Imp3d – gossip: 8000 nodes
- 5) Full – gossip: 4000 nodes
- 6) Full – push-sum: 3000 nodes
- 7) 3d push sum: 2197 nodes
- 8) Imp 3d push sum: 2197 nodes

Note this denotes algorithm converging in decent amount of time.

If more time is given node size can be increased

Interesting Finding

- 1) We have not used the condition of each node receiving the rumour atleast once for convergance. Because of this assumption we found that Line Topology converges quickly as compared to other topologies. However, it does not spread the rumour to many nodes. A lot of nodes remain without getting the rumour.
- 2) We have found that Full Topology takes a lot of time to converge. However in terms of rumour reaching all the nodes it performs exceptionally well as compared to other algorithms. Most of the times all nodes receive message atleast once.

Challenges Faced

- 1) One very interesting challenge was creating a 3d topology. We tried to use different algorithms for this. For example, trying to calculate level of the given node to help establish the number of neighbours it will have. ($\text{nodeNumber} / \text{nearestRoot} * \text{nearestRoot}$). However, we found that co-ordinate system would be the simplest way to build the topology. It does have a bad time complexity of $O(n^3)$.

If We had more time...

- 1) We will try to find a better solution to build the 3d topology that has a better time complexity.

- 2) We would have tried to spread gossip in a topology called the oct-tree in which a 3 dimensional space is eventually divided into eight octants. We would have assigned a master to each octant and applied a hierarchical gossip algorithm to this datastructure.