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Distributed Operating Systems

Project 2 Report

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Running the code:

1) Go to the directory in which Project2.scala is located using cd commands (path: GossipSimulator\src\)
2) Run scalac Project2.scala
3) After compilation give the input and hit return and wait for the output.
   (Input format: **scala Project2 #ofNodes topology(full, line, 3D or imp3D) action(gossip or pushsum)**)

Observations:

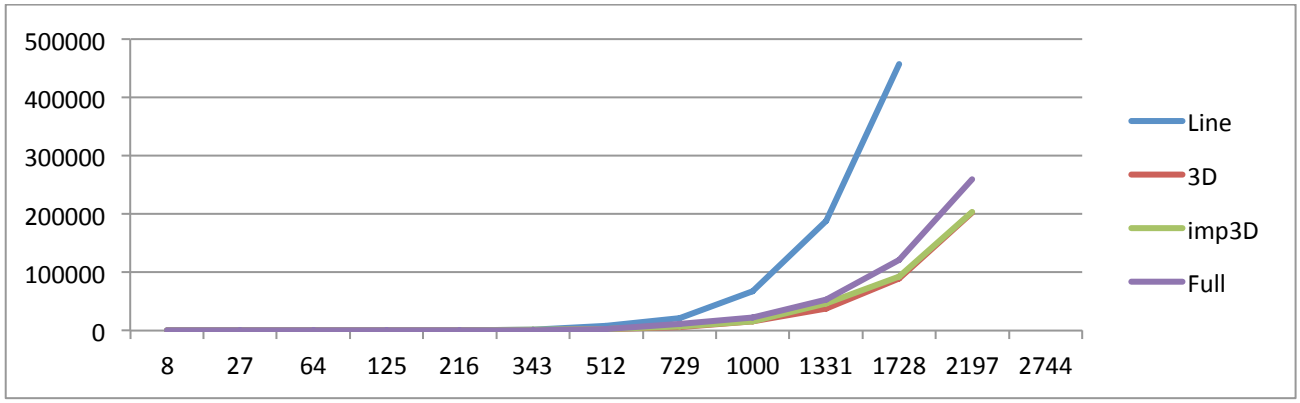
What's working:

We implemented the code in the following way:

1) We implemented the four topologies first.
2) We defined a master who is responsible for initializing and terminating the gossip or push sum.
3) The neighbors are formed depending on the topology selected.

Different Topologies for Gossip:

Below is the graph for gossip algorithm with Full, Line, 3D and imp3D topologies:



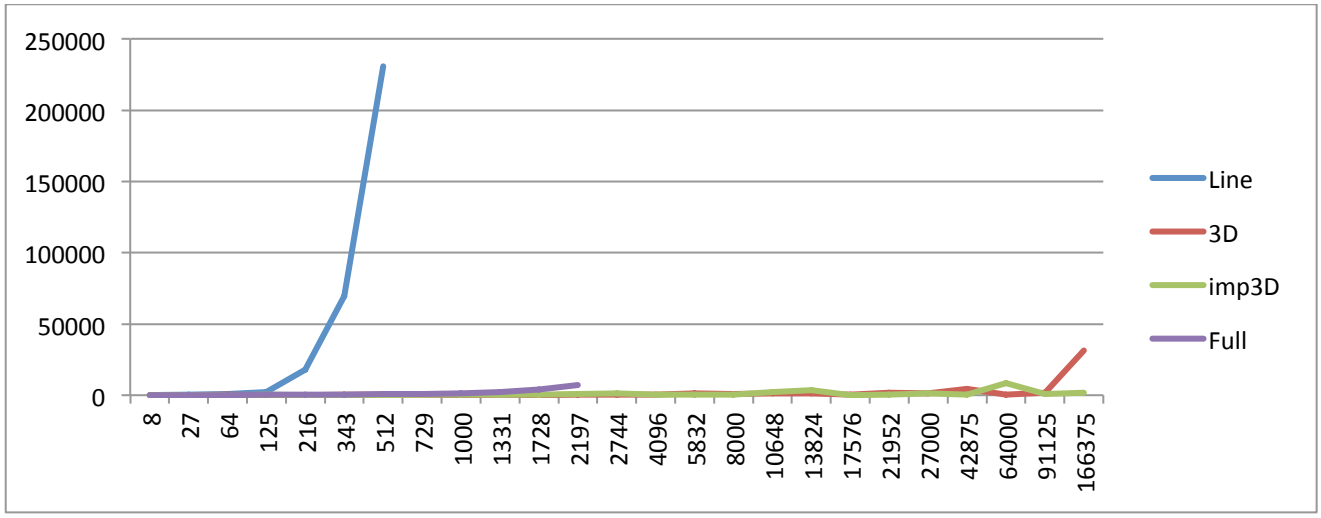
The x-axis shows the number of nodes and the y-axis shows their corresponding times to implement each topology.

Largest Network for each topology - Gossip:

1) For 3D the largest network we implemented is with 2197 nodes.
2) For imp3D the largest network we implemented is also with 2197 nodes.
3) For Full the largest network we implemented is with 2197 nodes.
4) For Line the largest network we implemented is with 1728 nodes.

Different topologies for PushSum:

Below is the graph for gossip algorithm with Full, Line, 3D and imp3D topologies:



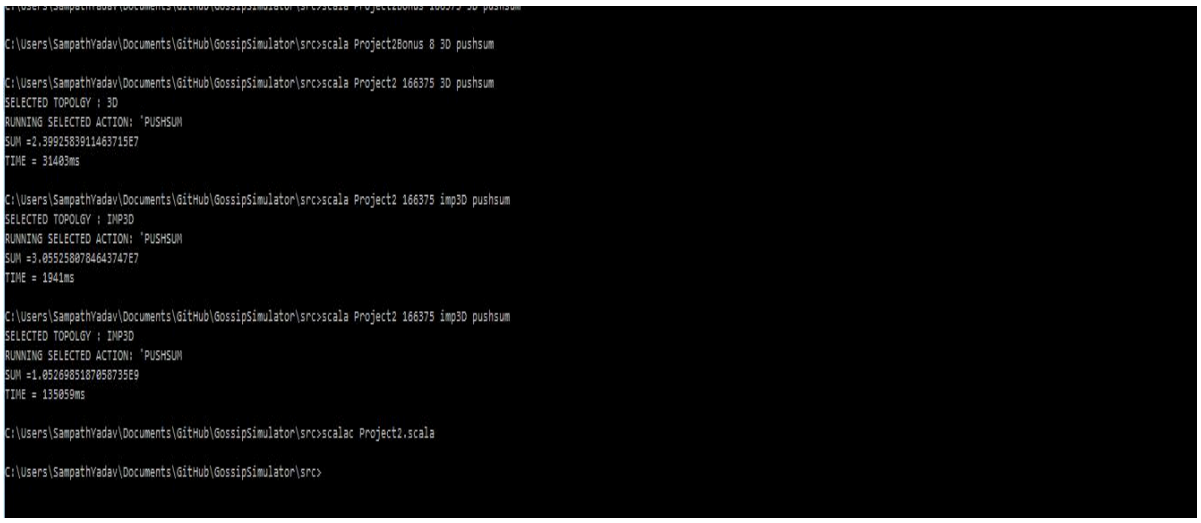
The x-axis shows the number of nodes and the y-axis shows their corresponding times to implement each topology.

Largest Network for each topology - PushSum:

1) For 3D the largest network we implemented is with 166375 nodes.
2) For imp3D the largest network we implemented is also with 166375 nodes.
3) For Full the largest network we implemented is with 2197 nodes.
4) For Line the largest network we implemented is with 512 nodes.

Interesting findings:

1) We can observe from the above two graphs implementation of 3D and imp3D networks are taking similar times to finish gossiping or finding the pushsum after the network is established.
2) Also for pushsum line network is the worst network which can be observed in the graph above(steep rise in time for smaller number of nodes).
3) We found it interesting that for pushsum the 3D and imp3D topology timings are mostly nearly constant and the timings are fluctuating (i.e. the timings are sometimes decreasing for more number of nodes). But for 166375 nodes, time for 3D topology is starting to rise while imp3D is still constant. We stopped at 166375 because it is taking a long time to establish the network grid.
4) For the same input the timing is fluctuating for any 2 different runs.



Files Attached:

1. Report.pdf
2. Report-Bonus.pdf
3. Project2_data.xlsx
4. Project2-Bonus_data.xlsx