**Project 2 Report**

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# Gossip Convergence Graph

# Evaluation (Gossip)

The graph above depicts the convergence time for all four topologies (full, imperfect 2D grid, 2D grid and line) for the Gossip algorithm. An value of 1000 was incremented each time and stopped when at node number 5000. The x-axis represents the number of nodes used to run the algorithm and the y-axis represents the time it took for all the actor to converge, the time is represented in milliseconds. The following bullet points will analyze the graph in depth.

* First off, the purple line for the “Line” topology seems way different than the rest and it also ends midway. The reason for this is because of the way the algorithm works (talk about how the algo works in brief?) and running it with more than 4000 nodes can take up to 15 minutes to converge, hence we stopped running it at 3000, where it took about 8 minutes to finish running.
* The rest of the topologies (“Full”, “Imperfect 2-D” and “2D”) converged much faster, with “Full” being the fasted with 67775 ms for 1000 nodes, which is actually pretty good. Another thing to notice is there are times when “Full” and “Imperfect 2-D” will overlap. \_\_\_\_ is the reason why they can overlap at times.
* Lastly, some interesting details that we were able to catch were \_\_\_\_.

# Evaluation (Raw Data)

The following table represents the raw data where the values are time converged in milliseconds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # of Nodes | Full | Imp2D | 2D | Line |
| 1000 | 18825 | 28533 | 28264 | 121476 |
| 2000 | 27841 | 44792 | 60364 | 448188 |
| 3000 | 43989 | 80006 | 117644 | 933546 |
| 4000 | 54530 | 111740 | 141700 |  |
| 5000 | 67775 | 127941 | 199564 |  |

# Push Sum Convergence Graph

# Evaluation (Push Sum)

The graphs above depicts the convergence time for all four topologies (full, imperfect-2d-grid) for the Push Sum algorithm. It is broken up in two different graphs for the purpose of clear visibility. The x-axis represents the number of nodes used to run the algorithm and the y-axis represents the time it took for all the actor to converge, the time is represented in milliseconds. The following bullet points will analyze the graph in depth.

* As can be seen from the graphs, push sum takes much longer to convert regardless of the topology. The reason for this is because every actor is calculating and sending their sum and weight to almost every other actor.
* “Full” again is the fastest to converge even in this algorithm and that’s because full can send a message to anyone, so it has more number of neighbors to choose than compared with the other topologies.
* “Line” is the slowest here as well because \_\_\_\_.

# Raw Data (Push Sum)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # of Nodes | Full | Imp2D | 2D | Line |
| 100 | 327 | 665 | 2001 | 38465 |
| 200 | 515 | 1384 | 8696 | 406122 |
| 300 | 767 | 2233 | 21124 |  |
| 400 | 1030 | 3631 | 44191 |  |
| 500 | 1075 | 3809 | 77812 | 5E+06 |
| 600 | 1768 | 5678 | 134192 |  |
| 700 | 2594 | 7668 | 310418 |  |
| 800 | 3100 | 9029 |  |  |
| 900 | 3513 | 10630 |  |  |
| 1000 | 7851 | 11265 |  |  |