# Project 2 Gossip Algorithms – Report

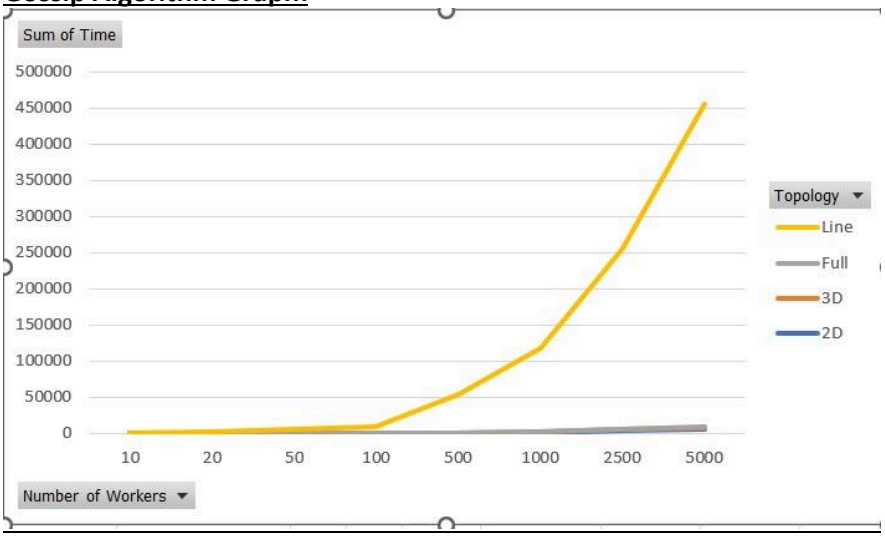
**Team Members:**

**Vamsi Pachamatla – 1708 0059**
**Yashas Kuchimanchi - 5043 1189**

**Graph Plots:**

For plotting the graphs for both the algorithms, we plot the **worker's count** on **X-axis** and **Time taken** to generate the convergence on **Y-Axis.**

**Gossip Algorithm Graph:**




**Tabulation data:**

Line topology:

| Topology | Algorithm | Used Workers | Time got |
|---|---|---|---|
| Line | Gossip | 10 | 602 |
| Line | Gossip | 20 | 1456 |
| Line | Gossip | 50 | 4521 |
| Line | Gossip | 100 | 7845 |
| Line | Gossip | 500 | 51985 |
| Line | Gossip | 1000 | 115480 |
| Line | Gossip | 2500 | 249524 |
| Line | Gossip | 5000 | 447303 |

Full topology:

| | | | |
|---|---|---|---|
| Full | Gossip | 10 | 15 |
| Full | Gossip | 20 | 100 |
| Full | Gossip | 50 | 245 |
| Full | Gossip | 100 | 175 |
| Full | Gossip | 500 | 195 |
| Full | Gossip | 1000 | 214 |
| Full | Gossip | 2500 | 629 |
| Full | Gossip | 5000 | 867 |
| Full | Gossip | 12000 | 10450 |

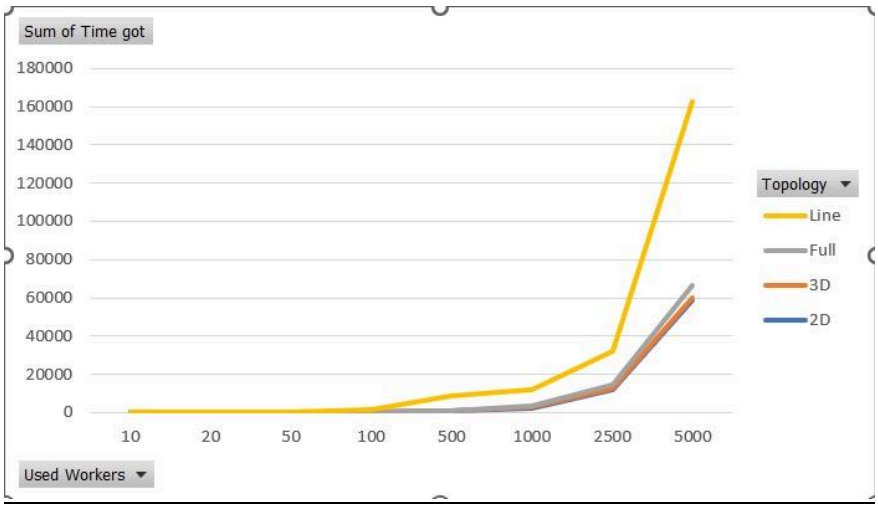
2D Grid topology:

| | | | |
|---|---|---|---|
| 2D | Gossip | 10 | 423 |
| 2D | Gossip | 20 | 526 |
| 2D | Gossip | 50 | 646 |
| 2D | Gossip | 100 | 842 |
| 2D | Gossip | 500 | 945 |
| 2D | Gossip | 1000 | 1500 |
| 2D | Gossip | 2500 | 4602 |
| 2D | Gossip | 5000 | 6500 |
| 2D | Gossip | 12000 | 22120 |

Imp3D topology:

| | | | |
|---|---|---|---|
| 3D | Gossip | 10 | 101 |
| 3D | Gossip | 20 | 125 |
| 3D | Gossip | 50 | 154 |
| 3D | Gossip | 100 | 201 |
| 3D | Gossip | 500 | 245 |
| 3D | Gossip | 1000 | 501 |
| 3D | Gossip | 2500 | 985 |
| 3D | Gossip | 5000 | 1450 |
| 3D | Gossip | 12000 | 2781 |

**PushSum Algorithm Graph:**




**Tabulation Data:**

Line topology:

| Topology | Algorithm | Used Workers | Time got |
|---|---|---|---|
| Line | PushSum | 10 | 14 |
| Line | PushSum | 20 | 23 |
| Line | PushSum | 50 | 132 |
| Line | PushSum | 100 | 1136 |
| Line | PushSum | 500 | 7654 |
| Line | PushSum | 1000 | 9012 |
| Line | PushSum | 2500 | 18015 |
| Line | PushSum | 5000 | 96452 |
| Line | PushSum | 7000 | 113997 |

Full topology:

| | | | |
|---|---|---|---|
| Full | PushSum | 10 | 5 |
| Full | PushSum | 20 | 7 |
| Full | PushSum | 50 | 9 |
| Full | PushSum | 100 | 16 |
| Full | PushSum | 500 | 120 |
| Full | PushSum | 1000 | 412 |
| Full | PushSum | 2500 | 1836 |
| Full | PushSum | 5000 | 6361 |
| Full | PushSum | 10000 | 163566 |

2D Grid topology:

| | | | |
|---|---|---|---|
| 2D | PushSum | 10 | 7 |
| 2D | PushSum | 20 | 8 |
| 2D | PushSum | 50 | 22 |
| 2D | PushSum | 100 | 73 |
| 2D | PushSum | 500 | 863 |
| 2D | PushSum | 1000 | 2457 |
| 2D | PushSum | 2500 | 11652 |
| 2D | PushSum | 5000 | 58748 |

Imp3D topology:

| | | | |
|---|---|---|---|
| 3D | PushSum | 10 | 5 |
| 3D | PushSum | 20 | 8 |
| 3D | PushSum | 50 | 16 |
| 3D | PushSum | 100 | 36 |
| 3D | PushSum | 500 | 86 |
| 3D | PushSum | 1000 | 348 |
| 3D | PushSum | 2500 | 869 |
| 3D | PushSum | 5000 | 1382 |
| 3D | PushSum | 20000 | 5114 |

**Observations:**

We can observe from the graphs for both algorithms that the best efficiency is found for impartial 3D topology. While using Gossip algorithm, there is constant increase in time taken with respect to the increase in workers with worst case from line topology and in case of Push Sum algorithm both line and 2D topologies we can see the worst case.