Gossip Algorithm

Full:

No of nodes	Convergence time (microseconds)
50	311245
100	315689
200	335495
350	338146
500	390086
700	379767
1000	407312

3DGrid:

No of nodes	Convergence time (microseconds)
50	301438
100	334571
200	355008
350	456373
500	459311
700	458498
1000	506709

Random2DGrid:

No of nodes	Convergence time (microseconds)
350	699763
500	624568
700	555550
1000	566006

Sphere:

No of nodes	Convergence time (microseconds)
50	333437
100	390683
200	445383
350	558143
500	659514
700	705155
1000	800812

Line:

No of nodes	Convergence time (microseconds)
50	1192774
100	2325484
200	2786326
350	5924397
500	6407674
700	12666630
1000	18949529

Imperfect Line:

No of nodes	Convergence time (microseconds)
50	308024
100	550377
200	397679
350	486497
500	475558
700	499437
1000	610742

Graph:
The convergence time for line was too high compared to other topologies. So we took logarithm scale on y-axis and it represents the time in milliseconds.
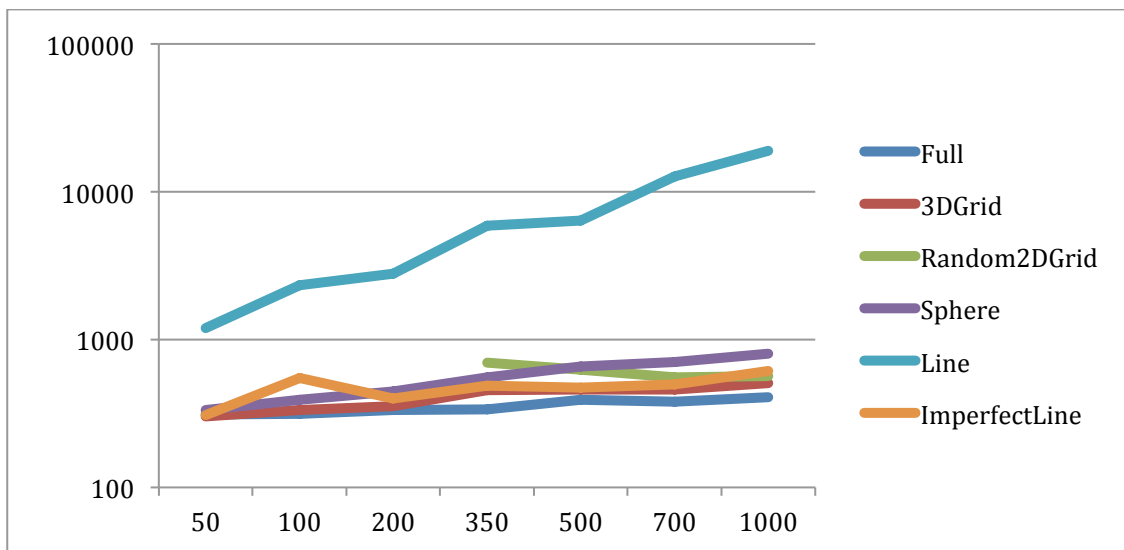
PushSum Algorithm

Full:

No of nodes	Convergence time (microseconds)
50	29489
100	38905
200	78345
350	182443
500	299182
700	515048
1000	1029774

3DGrid:

No of nodes	Convergence time (microseconds)
50	17275
100	36203
200	81166
350	360718
500	337338
700	693369
1000	1462659

Random2DGrid:

No of nodes	Convergence time (microseconds)
50	27355
100	140929
200	9963
350	10362
500	13184
700	19846
1000	19046

Sphere:

No of nodes	Convergence time (microseconds)
50	31338
100	61219
200	158066
350	373825
500	753871
700	1625097
1000	2248335

Line:

No of nodes	Convergence time (microseconds)
50	254136
100	529220
200	326965
350	154474
500	14812426
700	27526827
1000	69242680

Imperfect Line:

No of nodes	Convergence time (microseconds)
50	36930
100	14911
200	33171
350	83187
500	122781
700	137819
1000	127475

Graph:
The convergence time for line was too high compared to other topologies. So we took logarithm scale on y-axis and it represents the time in milliseconds.
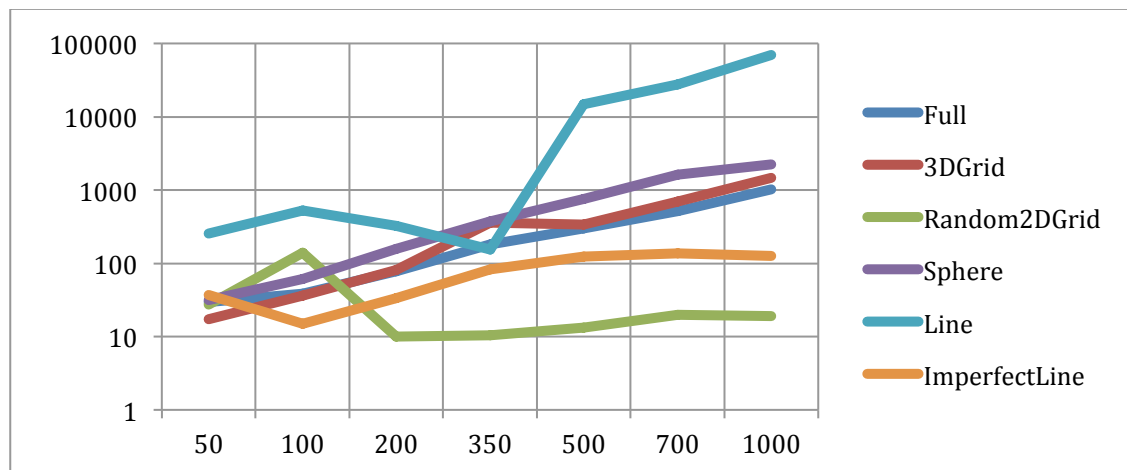
Interesting findings

- Among all the topologies, line topology took the longest time to converge in both Gossip and PushSum algorithm.
- The order of convergence for the topologies is as follows for PushSum algorithm:
  T(Random2DGrid)<T(ImperfectLine)<T(Full)<T(3DGrid)<T(Sphere)<T(Line)
- The order of convergence for the topologies is as follows for Gossip algorithm:
  T(Full)<T(3DGrid)<T(Random2DGrid)<T(ImperfectLine)<T(Sphere)<T(Line)
- After calculating the convergence time for Gossip and PushSum, we found out that PushSum took longer time when compared to Gossip as we increased the number of nodes.
- Another interesting find was the different average values in PushSum for each topology.
- The nodes in Random2DGrid did not converge until we increased the number of nodes to 350 in Gossip Algorithm.
- The time to converge increased exponentially after a certain number of nodes.

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