Report_Bonus:

Members

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Graphs and analysis:

For analysis, we have taken data for both the algorithms for every topology by randomly terminating few number of nodes

Gossip Algorithm

For data-collection we have run the gossip for 10,50 and 100 nodes for every topology. And collected the performance by killing 10%,25%,50% and 75% percentage of total nodes.

Full

NON/Time	Killed	time	Killed	time	Killed	time	Killed	time
10	0	424	3	362	5	380	7	344
50	0	732	13	589	25	554	38	540
100	0	1102	25	1246	50	1617	75	1115

2D

NON/Time	Killed		Killed		Killed		Killed	
10	0	549	3	463	5	549	7	334
50	0	743	13	541	25	532	38	554
100	0	1513	25	1113	50	1002	75	998

imp2D

NON/Time	Killed		Killed		Killed		Killed	
10	0	339	3	333	5	308	7	286
50	0	645	13	639	25	555	38	541
100	0	1067	25	1040	50	1036	75	1006

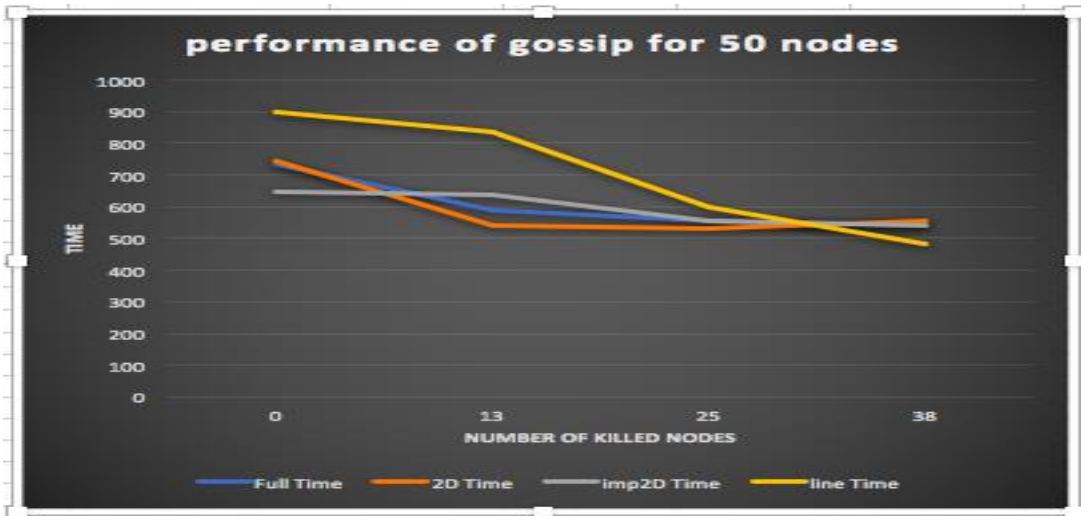
line

NON/Time	Killed		Killed		Killed		Killed	
10	0	455	3	371	5	325	7	304
50	0	901	13	838	25	601	38	485
100	0	6467	25	1848	50	1821	75	1620

The below table depicts the collected data for 50 nodes and its plot .All the time values are collected in milliseconds. Here we are considering terminating random nodes at random time once gossip starts as a parameter and analyzing the performance

Total number of nodes=50

	Full	2D	imp2D	line
No of killedNodes	Time	Time	Time	Time
0	732	743	645	901
13	589	541	639	838
25	554	532	555	601
38	540	554	541	485



x-axis=> number of killed nodes
y-axis=>convergence time in milliseconds

Interesting observation:
In an ideal condition the performance of any topology should improve as more number of process is killed. That is application should converge faster. But in actual execution we see the following behavior
1.The performance for line topology improves considerably as more number of actors are killed. This is because connectivity of nodes is decreasing as more actors are killed.
2.The performance of 2D and full is similar because here connectivity is more as compared to line topology. Killing random actors has less effect on overall performance as a particular actor has other connected live neighbor for it to converge.
3.For imperfect 2D when 10% (less) of nodes are killed, there is no change in performance. When more process are killed we see a better convergence which is expected.

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Push-Sum:

We have taken data for 20 nodes in killing 10%,25%,50% and 75% of data

	Full	2D	imp2D	Line
	Time	Time	Time	Time
0	123304	3615340	380247	2735061
5	94255	154029	272918	1333895
10	50415	51119	164423	345180
15	69316	20069	74387	69449

x-axis=> number of killed nodes
y-axis=>convergence time in milliseconds

Interesting observation:
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1.For densely connected topology like full and imp2D there is, there is not much change in the performance when there are node failures. This is because killing random actors has less effect on overall performance as a particular actor has other connected live neighbor for it to converge.
2.For line and 2D there is significant improvement in performance as number of actors killed increases. This is expected as more and more disjoint actors are formed and leads to faster convergence.