Project2 Report

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Introduction:

Gossip:

In the Gossip Algorithm, we have a superior actor to store all the information of the actors, updating the list if the actor has terminated. The superior actor will create all the actors first, the store the actor name and PID in the record, then it will send the list of neighbors to each node depending on the topology, after that all the actors will start to send rumor.

Since 10 times is too long for our computer, we changed the criteria of termination that each actor keeps track of rumors and how many times he has heard the rumor. It stops transmitting once it has heard the rumor 4 time.

To the topology, there are four kinds of topology: full, 2D, line and imperfect 3D.

Full topology: full means that each node can send rumor to any other nodes, that represents the neighbors are all the other nodes, so the actor can choose random nodes in the list of all the nodes and send rumor.

2D topology: the way that we use to construct 2D topology is round up to get the square. So we choose to treat each node in the topology as a point, in the form of {X, Y}, and started from {0,0}. Then we can get the neighbor from four directions: up, down, left and right.

Line topology: line means all the node are in the same line and they can only get the neighbor of num-1 and num+1.

Imperfect 3D topology: firstly, 3D topology means that the node gets its neighbor from four directions in the same plane and one in the upper plane and one in the down plane. Imperfect means adding one more random point different from the 6 neighbors.

Gosssip Data of largest nodes for each topology:

|  |  |  |
| --- | --- | --- |
|  | Largest Node | Running Time |
| Full | 10000 | 342820 |
| 2D | 2000 | 53471 |
| Line | 10000 | 109885 |
| Imp3D | 2000 | 64528 |

Since after the node becoming bigger and more than 2000, it is much easier to have the situation of deadlock, so the largest node for 2D and Imp3D is 2000. And according to the data, we found that the gossip protocol execution time order for different topologies, for up to 3000 nodes:

**Full < Line < 2D < Imp3D.**

Graph:

Chart, bar chart

Description automatically generated