

1. Group members

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2. How to run the code

Steps: 1. Enter root folder (project2).
 2. using commend: **mix escript.build**
 3. type commend as: **escript project2 num_node topology algorithm**

3. What is working

Determine the convergence of gossip and push_sum through different topologies(full, line, rand2D, 3Dtorus, honeycomb and randhoneycomb) based on actors written in Elixir.

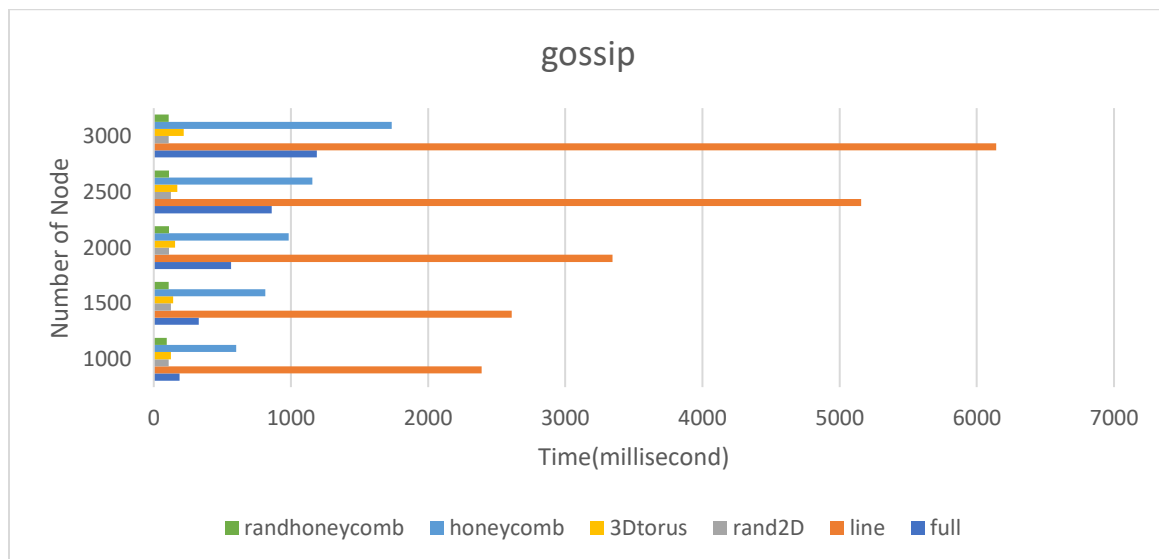
4. Largest network

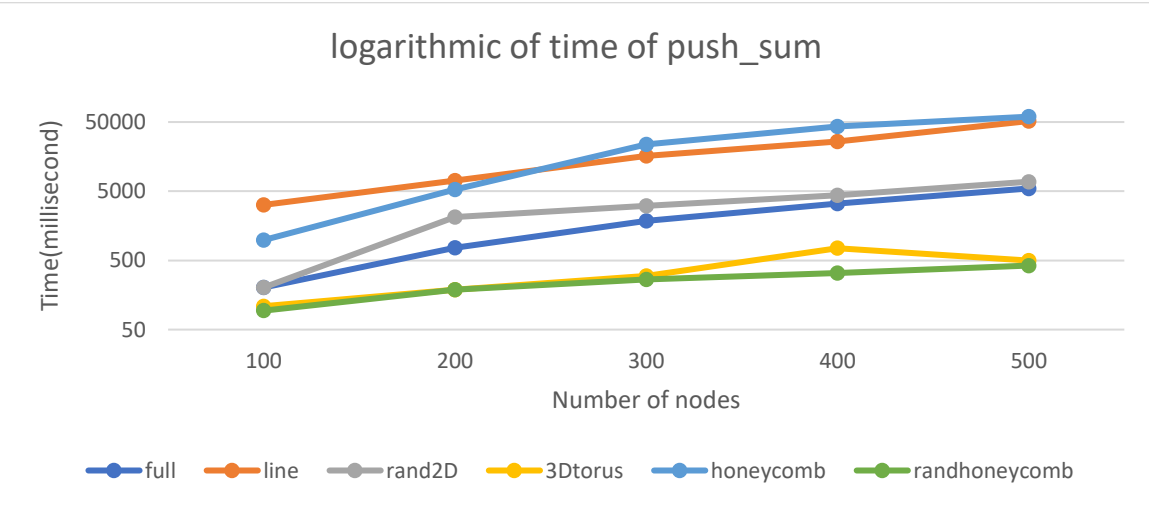
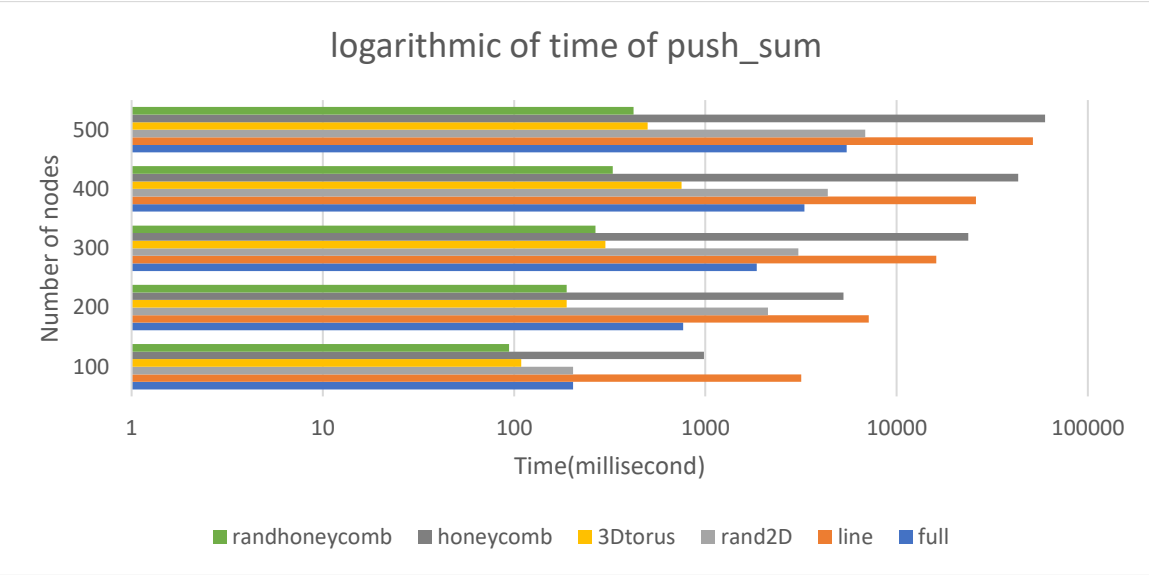
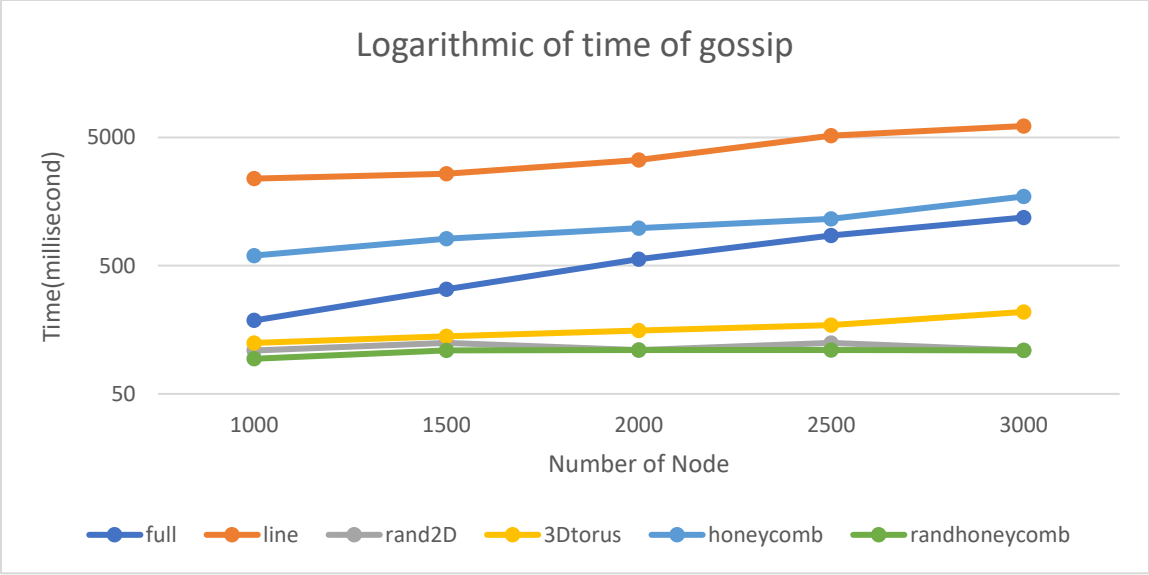
We test the gossip network from 1000 to 3000 as interval of 500 and push_sum network from 100 to 500 as interval of 100.

5. Time measuring

Using `:timer.tc` in erlang to measure the time of our project. Measure the time from the first node begin spreading to the algorithm converge. Ignore the time of building graphs (finding neighbors).

6. Result





7. Observation

Gossip:

Full: time cost to converge increase linearly when number of nodes increased.

Line: same as full, but slowest topology when running gossip.

Rand2D: faster than two topologies above. Time cost to converge is not influenced much by the number of nodes. However, need more time to build the graph (find neighbors).

3Dtorus: time cost increase slightly when number of nodes increased. Faster than full, line and honeycomb.

Honeycomb: time cost increase linearly when number of nodes increased. Faster than line topology and slower than full topology.

Randhoneycomb: fastest topology. Time cost is not influenced much by number of nodes

Push_sum:

Full: time cost to converge increase linearly when number of nodes increased.

Line: time cost to converge increase linearly when number of nodes increased. Slower than full.

Rand2D: time cost to converge increase rapidly when number of nodes change from 100 to 200, then increase slightly when number of nodes increase after 200.

3Dtorus: Time cost to converge increase to peak at 400 nodes, then drop down.

Honeycomb: faster than line topology before 300 nodes, then become the slowest topology to converge.

Randhoneycomb: fastest topology to converge. Time cost change slightly when number of nodes increase.