COP5615

Distributed Operating Systems Principles

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Project III (Bonus)

Chord with Failure Model

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1. Instructions for running the project

1. Unzip the attached zipped file to temporary location on the machine.

2. Running Project3_bonus

a) Open command prompt and cd to the location of the "Project3" directory contained in the zipped file (make sure sbt is installed on the machine)

b) Run as below

sbt "run numNodes numRequests failureRate"

Note:

- numNodes should be greater than 1.
- numRequests should be greater than 0.
- failureRate should be greater than 0 but smaller than 1.

2.Handling Failures

The failure model we use is the successor list mentioned in the tech report [2]. For each node, we maintain a successor list with

length of Log(N). In practice, if one successor failed, we send message to the next successor in the successor list. If all the nodes in this successor list failed, then it fails.

3. Successful rate and average

Observations

Successful rate keeps stable when the failure rate is smaller than 0.5, then decreases very quickly due to the key nodes dead.

Number of nodes	Number of requests	Failures Rate	Successful Rate	Average Hops
100	10	0.1	1	3.835
300	10	0.1	1	6.421
500	10	0.1	1	4.809
1000	10	0.3	1	4.583
1000	10	0.5	0.98	4.481
1000	10	0.8	0.59	5.798
3000	10	0.3	0.91	7.049
3000	10	0.5	0.87	7.909
3000	10	0.8	0.45	8.076
10000	10	0.3	0.926	9.071
10000	10	0.5	0.648	10.11
10000	10	0.8	0.37	8.076
20000	10	0.3	0.92	13.026
30000	10	0.3	0.914	14.057
50000	10	0.3	0.936	15.681

Reference:

1. Stoica, I.; Morris, R.; Karger, D.; Kaashoek, M. F.; Balakrishnan, H. (2001). "Chord: A scalable peer-to-peer lookup service for internet applications" (PDF). ACM SIGCOMM Computer Communication Review 31 (4): 149. doi:10.1145/964723.383071.

2. STOICA, I., MORRIS, R., KARGER, D., KAASHOEK, M. F., AND BALAKRISHNAN, H. Chord: A scalable peer-to-peer lookup service for internet applications. Tech. Rep. TR-819, MIT LCS, March 2001. http://www.pdos.lcs.mit.edu/chord/papers/.