

COP5615_Chord Protocol_Project_Bonus

Team Members

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Outline of the project

This project aims to design the Chord protocol and a simplistic object access service to demonstrate the Chord protocol's utility using Erlang and Actor Model.

Commands to run the program

- Compile all the .erl files in the zip folder (main, nodeCreation, stabilizeChordRing, chordRing, utilityFunctions).
- Run the project by running the command "main:start()." in the erl shell.
- Enter the number of nodes, message requests and failure nodes, for example, 1000,10,10.

What is working?

- Upon incorporating the failure nodes strategy in the existing chord protocol, it was found that the average number of hops required for a node to search another node seemed to increase compared to when there were no failure nodes.
- We observed that as the number of failure nodes increases, the average number of hops also increases.
- During our observation of the implementation of failure nodes, we tried to gather results for 10 failure nodes with 10 messages each. This time, the average number of hops came out to be 3.95 when it was averaged across 20 runs which is an increase over the previous implementation of no failure nodes.

Observations:

Number of Nodes	Average Hops
100	2.9
500	3.6
1000	4.1
2000	5.2

Running program for 1000 nodes, 10 message requests, 10 failure nodes:

```
rsrivastav54@Rishabhs-MacBook-Pro src % erl
Erlang/OTP 25 [erts-13.1.1] [source] [64-bit] [smp:8:8] [ds:8:8:10] [async-threads:1] [jit] [dtrace]

Eshell V13.1.1 (abort with ^G)
1> main:start().
Enter number of Nodes: 1000
Enter number of message requests: 10
Enter the number of failure nodes: 10
```

```
342 Found 193 via Node: 287 in 1 Hops
584 Found 193 via Node: 223 in 1 Hops
255 Found 193 via Node: 302 in 1 Hops
451 Found 193 via Node: 744 in 1 Hops
392 Found 193 via Node: 362 in 1 Hops
552 Found 193 via Node: 467 in 1 Hops
390 Found 193 via Node: 640 in 2 Hops
587 Found 193 via Node: 44 in 3 Hops
203 Found 193 via Node: 207 in 4 Hops
691 Found 193 via Node: 438 in 2 Hops
520 Found 193 via Node: 193 in 2 Hops
65 Found 193 via Node: 682 in 1 Hops
876 Found 193 via Node: 567 in 1 Hops
Task completion achieved
Average hops: 4.103292929292929
termination
```