

COP5612 - Fall 2015

Project 3 - Chord

Group Members:

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What is working? (Status of the Project):

The Chord protocol has been implemented successfully as per the description given in the paper.

Largest Network:

The largest network that we were able to work with, was 10000 nodes and 10 requests. The average number of hops was found to be 7.3865 and it took around 10 minutes to complete execution.

Results and Analysis:

The code was tested under different conditions.

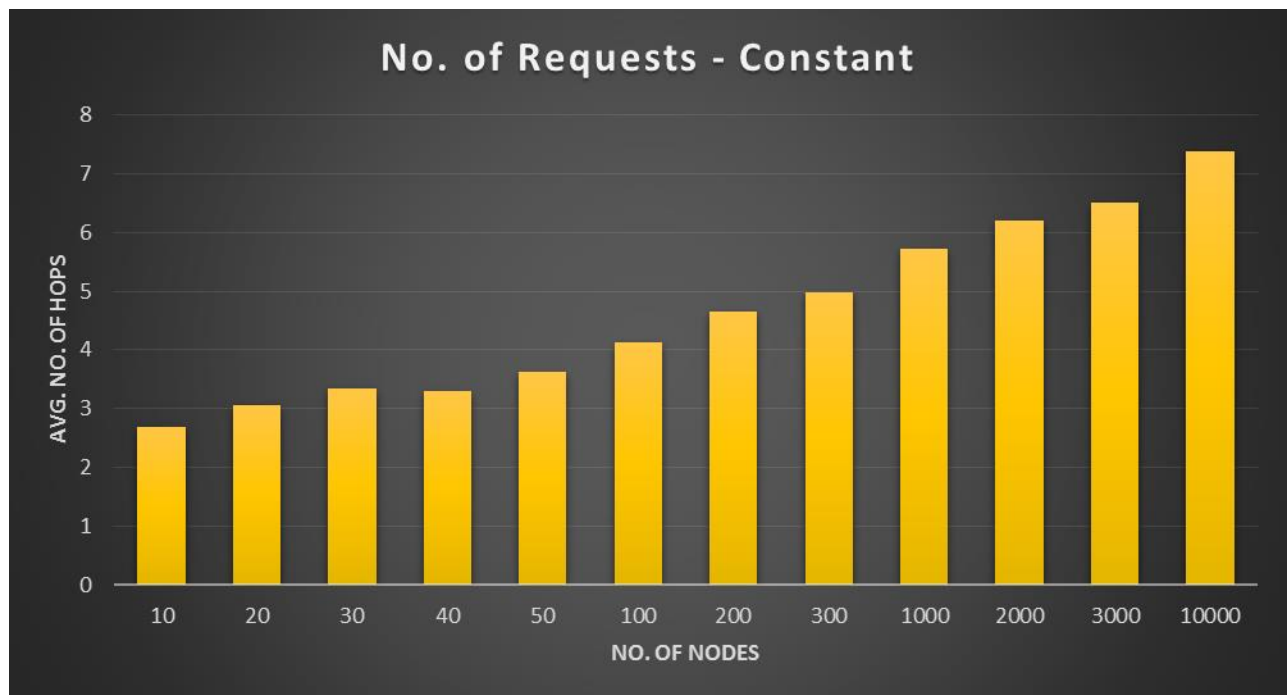
1. Changing Number of Nodes (Keeping no. of requests constant):

First, the no. of requests were kept constant at 10 and the no. of nodes were varied from 10 to 10000. The following tabular column clearly shows the execution times and the average number of hops for different network sizes:

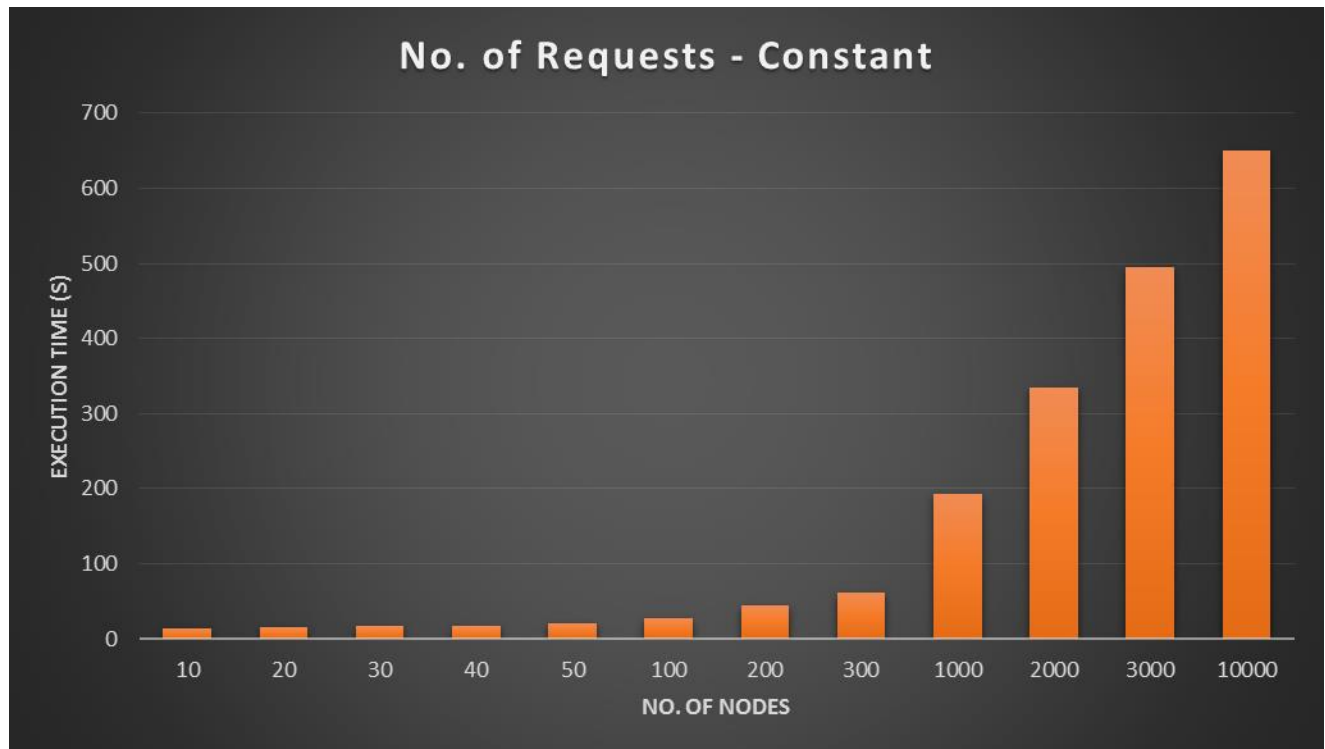
No. of Nodes	No. of Requests	Execution Time (s)	Avg. No of Hops
10	10	14	2.7
20	10	15	3.07
30	10	17	3.346
40	10	18	3.305
50	10	20	3.62
100	10	28	4.136

200	10	44	4.645
300	10	61	4.986
1000	10	193	5.7242
2000	10	334	6.2055
3000	10	495	6.515
10000	10	650	7.3865

The observed readings were plotted in the form of the following two graphs:



Graph 1: Variation in average number of hops when the number of nodes are changed (No. of Requests is kept constant at 10)



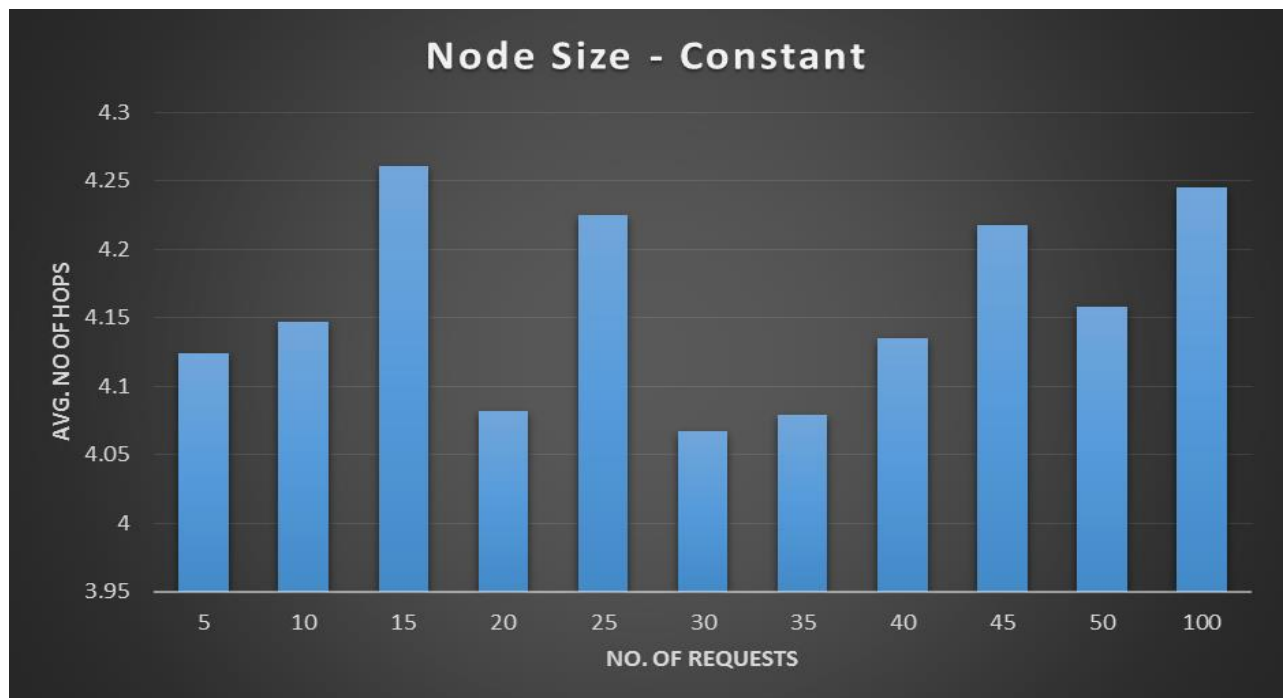
Graph 2: Variation in execution time when the number of nodes are changed (No. of Requests is kept constant at 10)

2. Changing Number of Requests (Keeping no. of nodes constant)

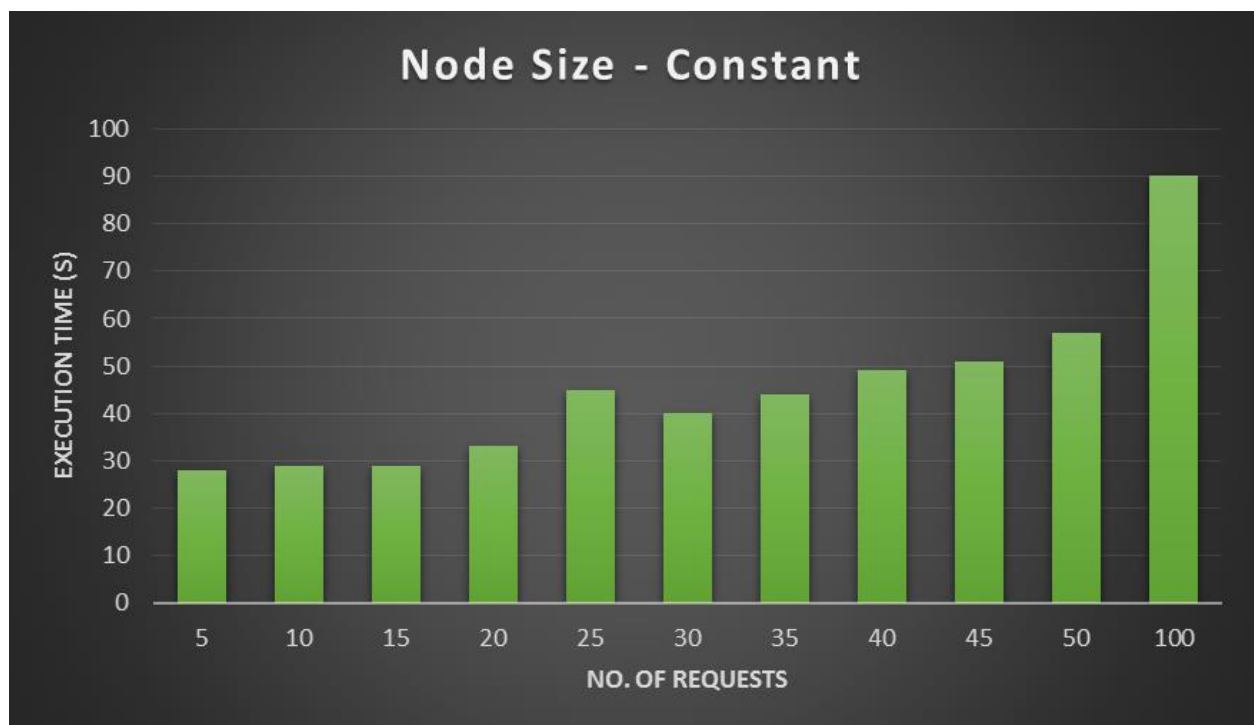
Next, the no. of nodes were kept constant at 100 and the no. of requests were varied from 5 to 100. The following tabular column clearly shows the execution times and the average number of hops for this condition:

No. of Nodes	No. of Requests	Execution Time (s)	Avg. No of Hops
100	5	28	4.124
100	10	29	4.147
100	15	29	4.261
100	20	33	4.082
100	25	45	4.225
100	30	40	4.067
100	35	44	4.079
100	40	49	4.135
100	45	51	4.218
100	50	57	4.158
100	100	90	4.245

These observed readings were plotted in the form of graphs shown below:



Graph 3: Variation in average number of hops when number of requests is changed (Node Size is kept constant at 100)



Graph 4: Variation in execution time when number of requests is changed (Node Size is kept constant at 100)

The following interesting observations have been made from these plots:

- The execution time increases with an increase in the network size. This is due to the fact that it takes more to build the topology for a large network.
- Similarly, there is an increase in execution time as the number of requests increase. This behavior is due to the fact that the chord algorithm takes a longer time to converge.
- When the no. of requests are changed, keeping the network size constant, the average number of hops does not change much. Only the execution time increases a little
- The largest network size that we were able to work with, is 10000. And the maximum no. of requests that it supports is 10.