

DISTRIBUTED OPERATING SYSTEMS

COP5615 – Fall 2020

PROJECT REPORT: 3

PASTRY PROTOCOL

Members:

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System Information:

- MacBook Air early 2015 model
- Processor: 1.6 GHz Dual-Core Intel Core i5
- 8 Gb RAM

Execution:

- Run program in a terminal using the command
dotnet fsi "--langversion:preview" project3.fsx Nodes NumRequests
- Nodes - Number of Nodes or peers
- NumRequests - Number of requests each peer has to make

Results:

What is working:

Our program initializes the states of each pastry node – leaf set (set of pastry nodes that have nodeIds numerically closer to the current pastry node) and routing table set (a list of list containing nodeIds with certain number of matching prefixes). When a new node wants to join the network, it finds a node in the pastry network which is numerically closest to it and sends a message. This message passing is done in logarithmic time and this way Average hops is calculated, which is the number of lookups a pastry node perform numRequest times the requests, divided by total number of message requests transmitted in the pastry network.

What is the largest network you managed to deal with for each type of topology and algorithm:

We noticed that the number of hops increases logarithmically with the total number of requests that gets transmitted over the network.

Number of Nodes	Number of Requests	Avg Hop Size
100	10	2.276888889
500	10	3.0866
1000	10	3.240863889
2000	10	3.347638889
5000	10	3.87065833
10000	10	4.096277222

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TERMINAL  PROBLEMS 67  OUTPUT  DEBUG CONSOLE  1: dotnet
(base) ~/Projects/dos > dotnet fsi "--langversion:preview" Project.fsx 100 10
Real: 00:00:00.000, CPU: 00:00:00.001, GC gen0: 0, gen1: 0, gen2: 0

/Users/sayedafif/Projects/dos/Project.fsx(73,67): warning FS0064: This construct causes code to be less generic than indicated by the type annotations. The
type variable 'T' has been constrained to be type 'string'.

/Users/sayedafif/Projects/dos/Project.fsx(133,15): warning FS0026: This rule will never be matched

Average Hop size 2.276888889
Real: 00:00:09.008, CPU: 00:00:01.528, GC gen0: 5, gen1: 1, gen2: 0
(base) ~/Projects/dos > dotnet fsi "--langversion:preview" Project.fsx 500 10
Real: 00:00:00.000, CPU: 00:00:00.001, GC gen0: 0, gen1: 0, gen2: 0

/Users/sayedafif/Projects/dos/Project.fsx(73,67): warning FS0064: This construct causes code to be less generic than indicated by the type annotations. The
type variable 'T' has been constrained to be type 'string'.

/Users/sayedafif/Projects/dos/Project.fsx(133,15): warning FS0026: This rule will never be matched

Average Hop size 3.0866
Real: 00:00:35.056, CPU: 00:00:05.353, GC gen0: 21, gen1: 3, gen2: 0
(base) ~/Projects/dos > dotnet fsi "--langversion:preview" Project.fsx 1000 10
Real: 00:00:00.000, CPU: 00:00:00.001, GC gen0: 0, gen1: 0, gen2: 0

/Users/sayedafif/Projects/dos/Project.fsx(73,67): warning FS0064: This construct causes code to be less generic than indicated by the type annotations. The
type variable 'T' has been constrained to be type 'string'.

/Users/sayedafif/Projects/dos/Project.fsx(133,15): warning FS0026: This rule will never be matched

Average Hop size 3.240863889
Real: 00:01:07.434, CPU: 00:00:09.381, GC gen0: 44, gen1: 4, gen2: 0
(base) ~/Projects/dos > dotnet fsi "--langversion:preview" Project.fsx 2000 10
Real: 00:00:00.000, CPU: 00:00:00.001, GC gen0: 0, gen1: 0, gen2: 0

/Users/sayedafif/Projects/dos/Project.fsx(73,67): warning FS0064: This construct causes code to be less generic than indicated by the type annotations. The
type variable 'T' has been constrained to be type 'string'.

/Users/sayedafif/Projects/dos/Project.fsx(133,15): warning FS0026: This rule will never be matched

Average Hop size 3.347638889
```