COMPSCI 677
Lab 1 - Performance Document
Peer-to-peer Market

In order to get an idea about how the system is behaving given the different topologies as well as the random assignment of roles(buyer/ seller/ both) and product to buy/sell, we ran a few experiments. The context of the experiment as well as observed results can be found below.

The main aspects we focussed on for the performance evaluation are:

1. **Average response time for each unique lookup request** generated by buyer nodes within a particular network topology. This represents the average time it took for this buyer node to receive responses from potential sellers for each of the look up requests this buyer generated and flooded the network with. This metric would be heavily dependant on how the network is initialized in terms of the distribution of buyers and sellers, the choice of product to be bought as well as the availability of the product that this buyer is looking to purchase at a given instant. This statistic may reflect how commonly available the product that this buyer is looking for is, within the given request cycle.

2. **Average response time for a node across all its requests** refers to the summation of average response times for each lookup request divided by the number of requests generated by the node. This could reflect whether the node is in an isolated position within the network or well connected to other peers.

3. **Average response time across topologies** refers to the average response time observed by a buyer node across topologies with a changing number of neighbors. This would reflect how the availability of a greater or fewer number of channels to flood lookup requests influences the response times observed by a buyer node

In order to observe these metrics, we ran 3 test cases with different topologies and recorded the results. All 3 test cases were first executed on EDLAB first and then on our local machines in an attempt to also observe if there are any changes in the average response times that are introduced due to the environment that the nodes are being executed in

The topologies we chose were Test cases #1, #2 and #3. More details about these test cases and their topologies can be found within the Test Document.

Unfilled cells represent that the node was only a seller for the given iteration

Test case - # 1

1) Tested locally

Peer ID : 1		Peer ID : 2		Peer ID : 3		Peer ID : 4	
RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time
1	270	1	164	1	303	1	74
2	75	2	53	2	116	2	49
3	28	3	107	3	146	3	121
4	0	4	83	4	0	4	66
5	24	5	0	5	0	5	0

Avg. response time across all requests:
79

Avg. response time across all requests:
81

Avg. response time across all requests:
113

Avg. response time across all requests:
62

Peer ID : 5		Peer ID : 6	
RequestId	Avg. Response Time	RequestId	Avg. Response Time
1	78	---	---
2	21		
3	131		
4	73		
5	0		

Avg. response time across all requests:
60

Avg. response time across all requests: ---

2) Tested on EDLAB

Peer ID : 1	
RequestId	Avg. Response Time
1	167
2	0
3	12
4	20
5	0

Avg. response time across all requests:
39

Peer ID : 2	
RequestId	Avg. Response Time
1	0
2	0
3	0
4	20
5	16

Avg. response time across all requests:
7

Peer ID : 3	
RequestId	Avg. Response Time
1	24
2	0
3	18
4	13
5	11

Avg. response time across all requests:
13

Peer ID : 4	
RequestId	Avg. Response Time
1	0
2	0
3	0
4	6
5	0

Avg. response time across all requests:
1

Peer ID : 5	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 6	
RequestId	Avg. Response Time
1	11
2	6
3	7
4	6
5	6

Avg. response time across all requests:
7

Test case - # 2

1) Tested locally

Peer ID : 1	
RequestId	Avg. Response Time
1	104
2	80
3	65
4	120
5	0

Avg. response time across all requests:
73

Peer ID : 2	
RequestId	Avg. Response Time
1	203
2	102
3	86
4	17
5	0

Avg. response time across all requests:
81

Peer ID : 3	
RequestId	Avg. Response Time
1	228
2	19
3	28
4	16
5	89

Avg. response time across all requests:
76

Peer ID : 4	
RequestId	Avg. Response Time
1	320
2	110
3	63
4	82
5	31

Avg. response time across all requests:
121

Peer ID : 5	
RequestId	Avg. Response Time
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Avg. response time across all requests:

Peer ID : 6	
RequestId	Avg. Response Time
1	143
2	42
3	83
4	18
5	74

Avg. response time across all requests:
72

Peer ID: 7	
RequestId	Avg. Response Time
1	113
2	53
3	146
4	24
5	90

Avg. response time across all requests:
85

2) Tested on EDLAB

Peer ID : 1	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 2	
RequestId	Avg. Response Time
1	181
2	18
3	13
4	35
5	13

Avg. response time across all requests:
52

Peer ID : 3	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 4	
RequestId	Avg. Response Time
1	43
2	15
3	6
4	7
5	11

Avg. response time across all requests:
16

Peer ID : 5	
RequestId	Avg. Response Time
1	43
2	14
3	13
4	13
5	20

Avg. response time across all requests:
20

Peer ID : 6	
RequestId	Avg. Response Time
1	37
2	22
3	15
4	12
5	13

Avg. response time across all requests:
19

Peer ID : 7	
RequestId	Avg. Response Time
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Avg. response time across all requests:

Test case - # 3

1) Tested locally

Peer ID : 1		Peer ID : 2		Peer ID : 3		Peer ID : 4	
RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time
1 2 3 4 5	154 43 102 154 54	1 2 3 4 5	84 91 145 35 101	---	---	1 2 3 4 5	242 89 143 146 65

Peer ID : 1 — **Avg. response time across all requests: 101**

Peer ID : 2 — **Avg. response time across all requests: 91**

Peer ID : 3 — **Avg. response time across all requests: ---**

Peer ID : 4 — **Avg. response time across all requests: 137**

Peer ID : 5		Peer ID : 6		Peer ID : 7		Peer ID : 8	
RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time	RequestId	Avg. Response Time
---	---	---	---	1 2 3 4 5	118 78 0 49 26	---	---

Peer ID : 5 — **Avg. response time across all requests: ---**

Peer ID : 6 — **Avg. response time across all requests: ---**

Peer ID : 7 — **Avg. response time across all requests: 54**

Peer ID : 8 — **Avg. response time across all requests: ---**

2) Tested on EDLAB

Peer ID : 1	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 2	
RequestId	Avg. Response Time
1	182
2	15
3	14
4	19
5	12

Avg. response time across all requests:
48

Peer ID : 3	
RequestId	Avg. Response Time
1	16
2	8
3	5
4	6
5	4

Avg. response time across all requests:
7

Peer ID : 4	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 5	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 6	
RequestId	Avg. Response Time
---	---

Avg. response time across all requests:

Peer ID : 7	
RequestId	Avg. Response Time
1	12
2	21
3	6
4	6
5	17

Avg. response time across all requests:
12

Peer ID : 8	
RequestId	Avg. Response Time
1	58
2	29
3	33
4	24
5	20

Avg. response time across all requests:
32

Thus from the above results, a few observations we made were that :

1) Average response times across all requests for all nodes appear to be generally lower on EDLAB as compared to our local machines. This maybe because of combined resources from multiple machines

2) We can observe a general trend that shows that as the number of neighbours increases, average response time tends to decrease, but this varies depending on initialization states of all the peers