CS667 Distributed Operating Systems
Spring 2019
Lab 2 Performance & Evaluation Document
Team Name: STIMA

Name: Aggrey Muhebwa   **Name:** Zeal Shah
Github Handle: amuhebwa   **Github Handle:** zealshah95
Student ID: 32055729   **Student ID:** 31737150

1 Experimentation Summary

Three different kinds of experiments were conducted:

1. Sequential requests without delay.

2. Sequential requests with delay.

3. Concurrent requests.

Details of all the experiments are discussed in the next section. We ran this set of 3 experiments for two different scenarios:

1. Catalog, order, front end, and client on the same Edlab machine.

2. Catalog, order, front end, and client on different Edlab machines.

2 Experimentation Details

2.1 Sequential Requests Without Delay

- *How to run?* sequential_requests_times.py file should be run as a client for any of the two scenarios. In the code, please comment out the command time.sleep(0.15) to ensure there is no delay.

- Client sends 1000 sequential- search, lookup, and buy requests to the system. There is no intentional delay introduced between consecutive requests.

- We measure the response time per client search, lookup, and buy request. We also measure the end-to-end response time per client search request.

2.2 Sequential Requests With Delay

- *How to run?* sequential_requests_times.py file should be run as a client for any of the two scenarios. In the code, please un-comment the command time.sleep(0.15) to ensure there is delay present.

- Client sends 1000 sequential- search, lookup, and buy requests to the system. Intentional delay of 0.15 seconds is introduced between consecutive end-to-end client requests.

- We measure the response time per client search, lookup, and buy request. We also measure the end-to-end response time per client search request.

2.3   Concurrent Requests

- *How to run?* concurrent_requests.py file should be run as a client for any of the two scenarios.

- Multiple clients make concurrent requests to the system. We increase the number of clients making concurrent requests from 1 to 100.

- We measure the end-to-end response time observed by every group of clients. So basically, we vary the number of clients making concurrent requests and observer how the response time changes.

Results of all the experiments for both the scenarios have been summarized in the next section. The last section contains all the graphs recorded for the above-mentioned experiments.

3   Summarized Results

3.1   Scenario 1: All servers on the same machine

The following table gives component-wise and end-to-end average response times (in milliseconds) recorded for sequential requests experiments.

Experiment	Search	Look-up	Buy	E2E
1000 Sequential Requests w/o Delay	12.514	12.224	40.619	65.371
1000 Sequential Requests w/ Delay	13.305	12.916	54.556	80.790

3.2   Scenario 2: All servers on the different machines

The following table gives component-wise and end-to-end average response times (in milliseconds) recorded for sequential requests experiments.

Experiment	Search	Look-up	Buy	E2E
1000 Sequential Requests w/o Delay	13.817	13.523	43.156	70.513
1000 Sequential Requests w/ Delay	14.160	13.759	56.851	84.786

## 3.3   Concurrent Requests for Both Scenarios

The following table gives end-to-end response times (in seconds) observed by varying the number of clients sending concurrent requests. Number of clients sending concurrent requests in the actual experiment went from 1 to 100. But in the following table we summarize the results for number of clients going from 10 to 100 in steps of 10. Each column represents how many clients were sending concurrent requests. Each row represents a scenario- S1 is when all the servers are on the same machine, S2 is when all the servers are on different machines.

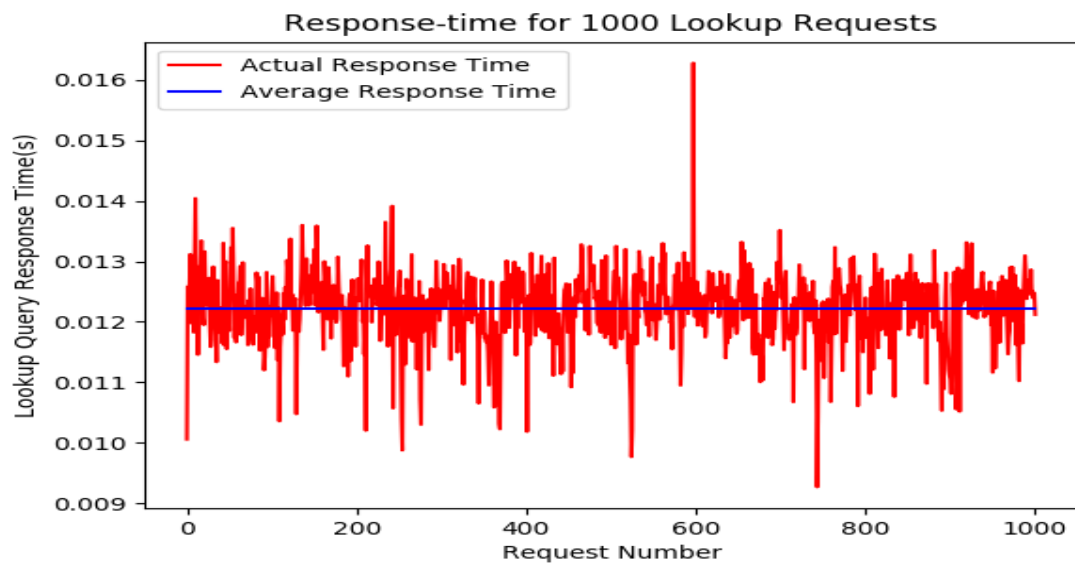|	10	20	30	40	50	60	70	80	90	100
S1	0.50	0.58	0.68	0.71	0.79	1.12	1.04	1.27	1.24	1.27
S2	0.50	0.71	1.09	1.10	1.22	1.45	2.82	2.71	2.14	3.41

4 Graphs for Performance Evaluation on Single Machine

4.1 1000 Sequential Requests Without Delay
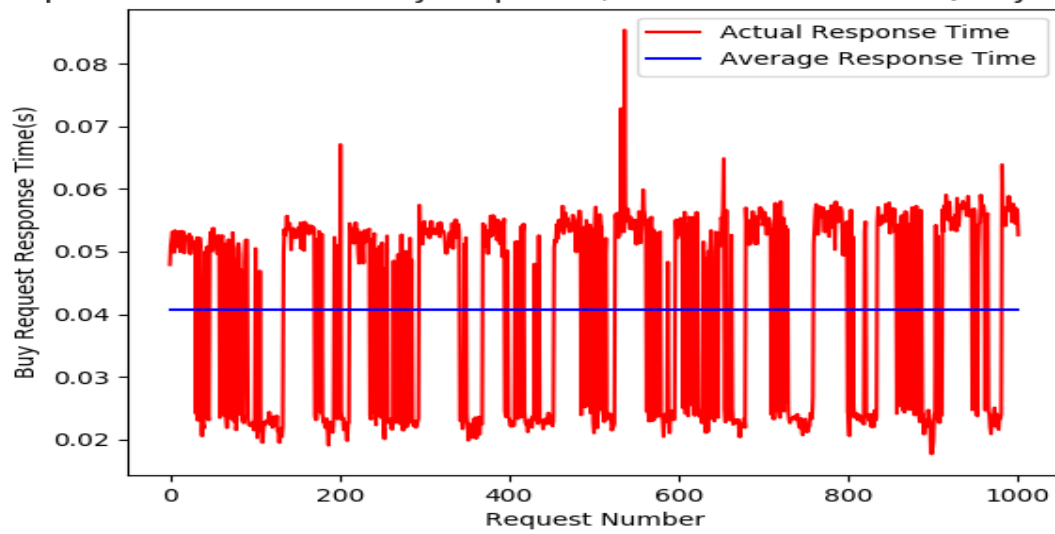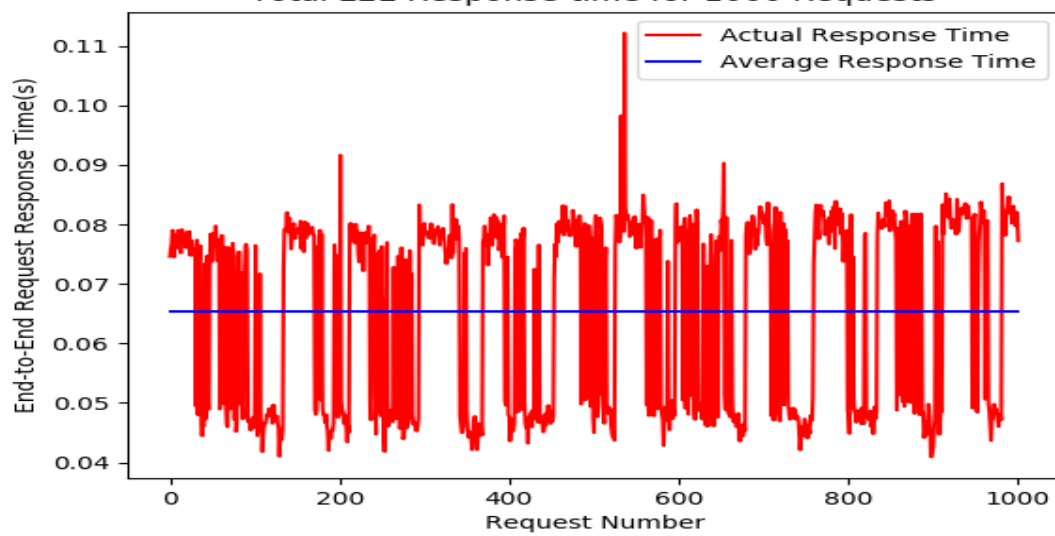
4.1.1 Search Response Time
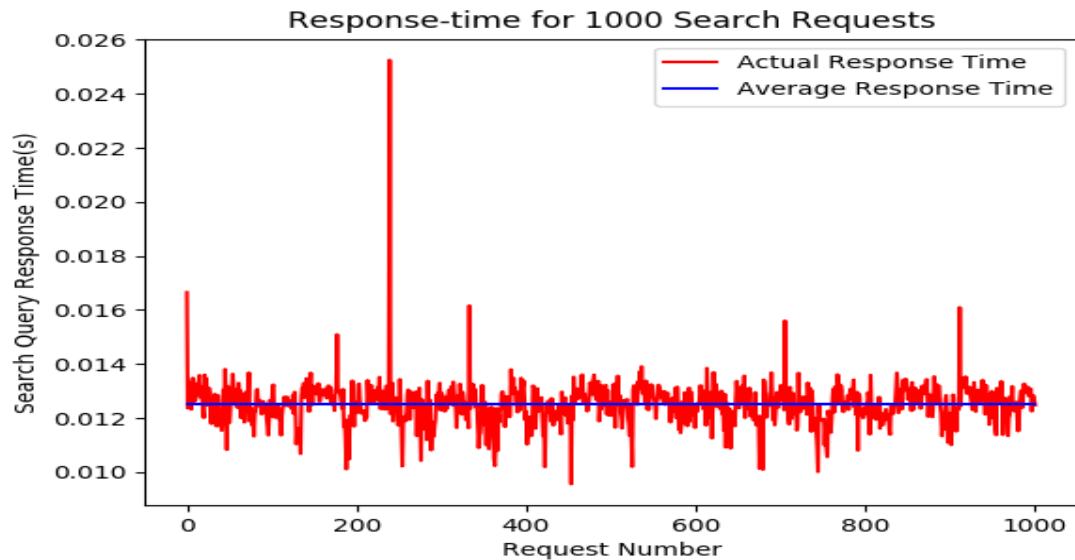
4.1.2 Lookup Response Time

4.1.3 Buy Response Time

4.1.4 End-to-End Response Time

4.2   1000 Sequential Requests With Delay

4.2.1   Search Response Time
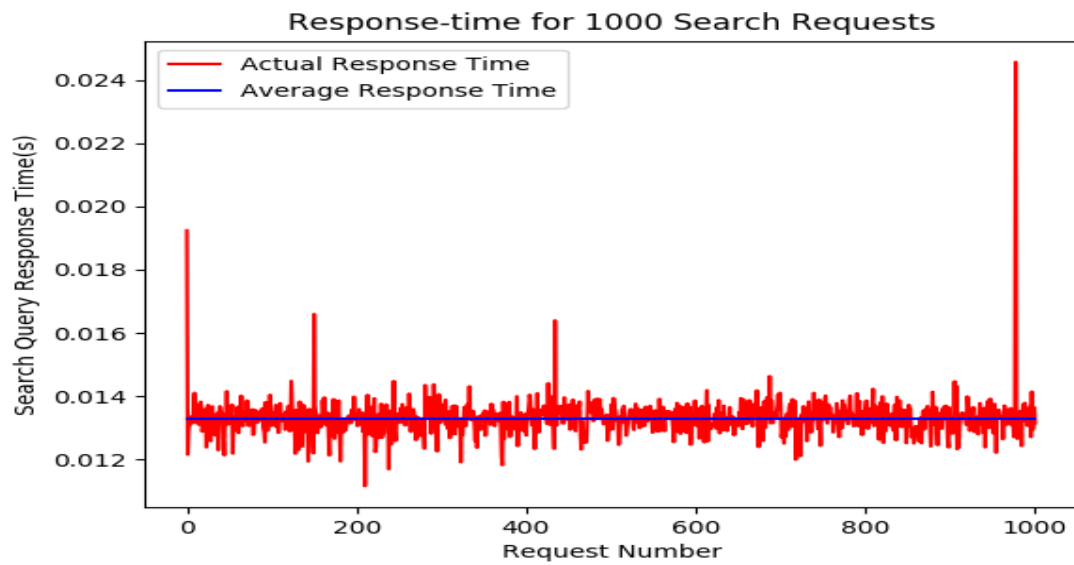
4.2.2   Lookup Response Time
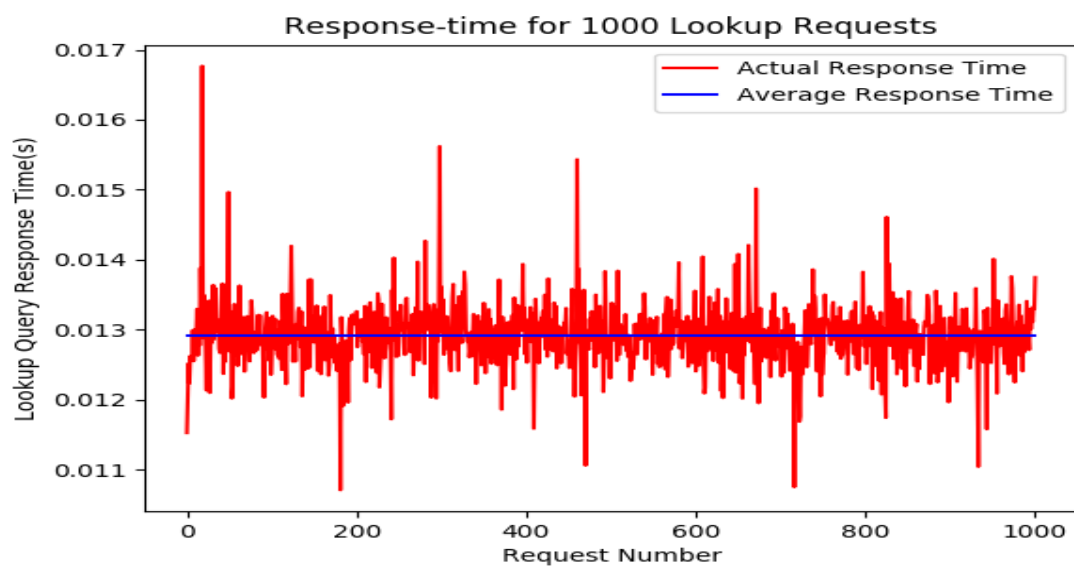
4.2.3   Buy Response Time

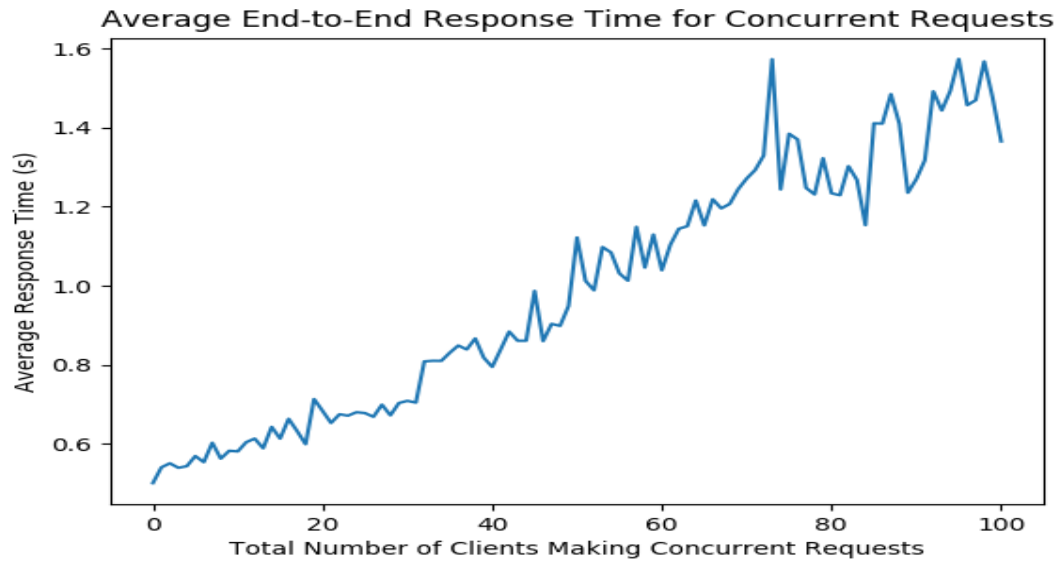Response-time for 1000 Buy Requests (includes Verification Query & Update
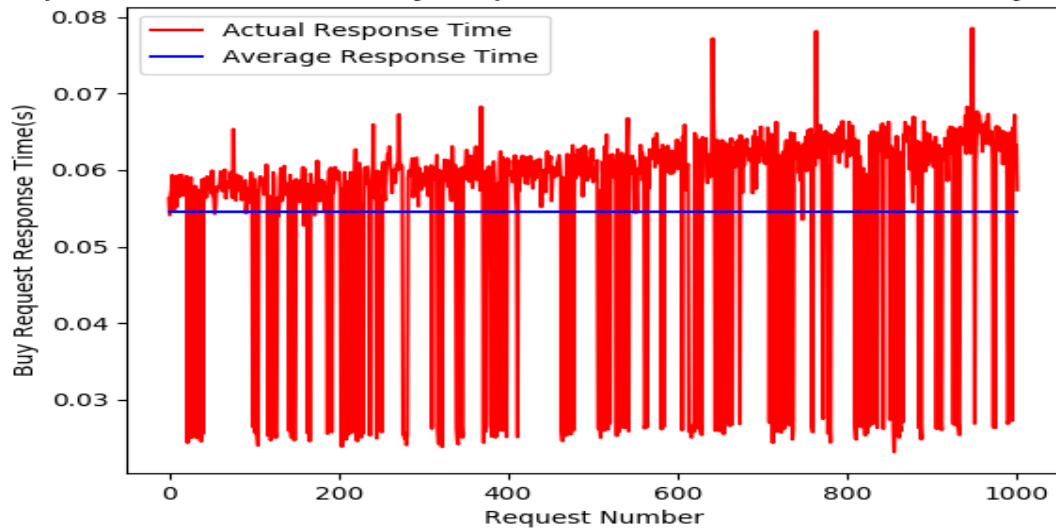
4.2.4   End-to-end Response Time
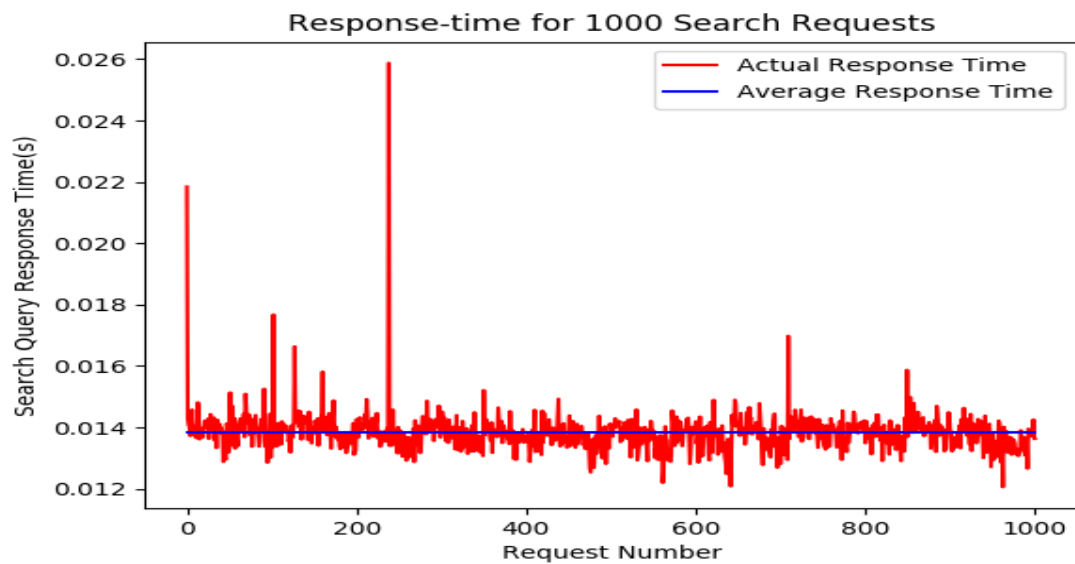

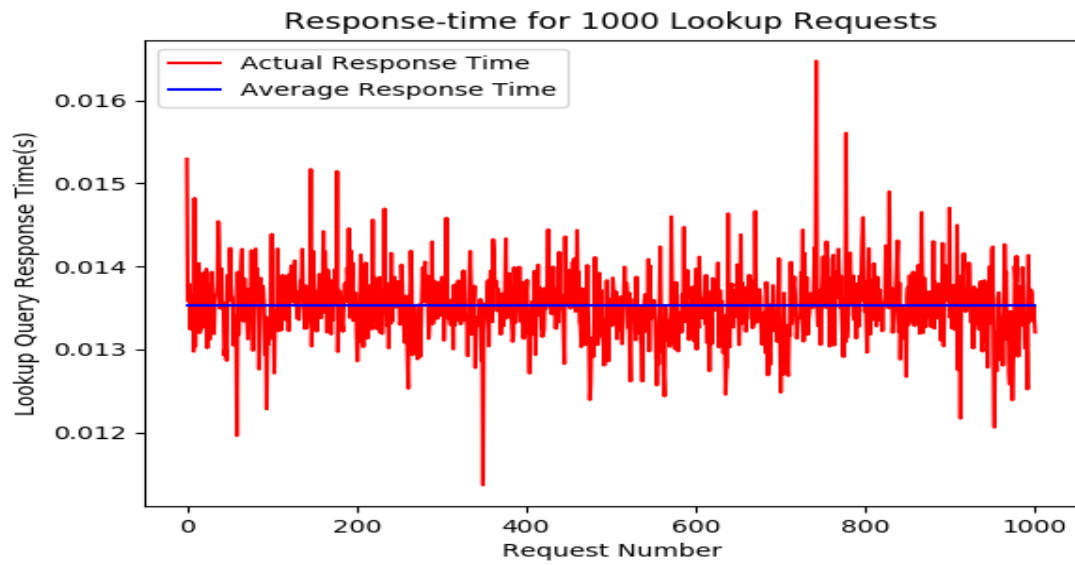Total E2E Response-time for 1000 Requests

6
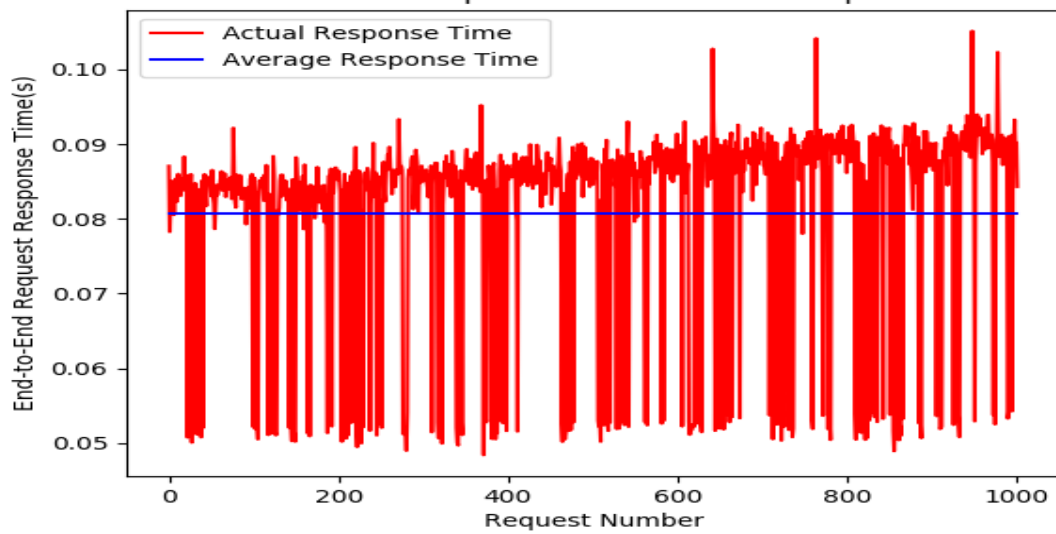
4.3 Concurrent Requests

5 Graphs for Performance Evaluation on Multiple Machines
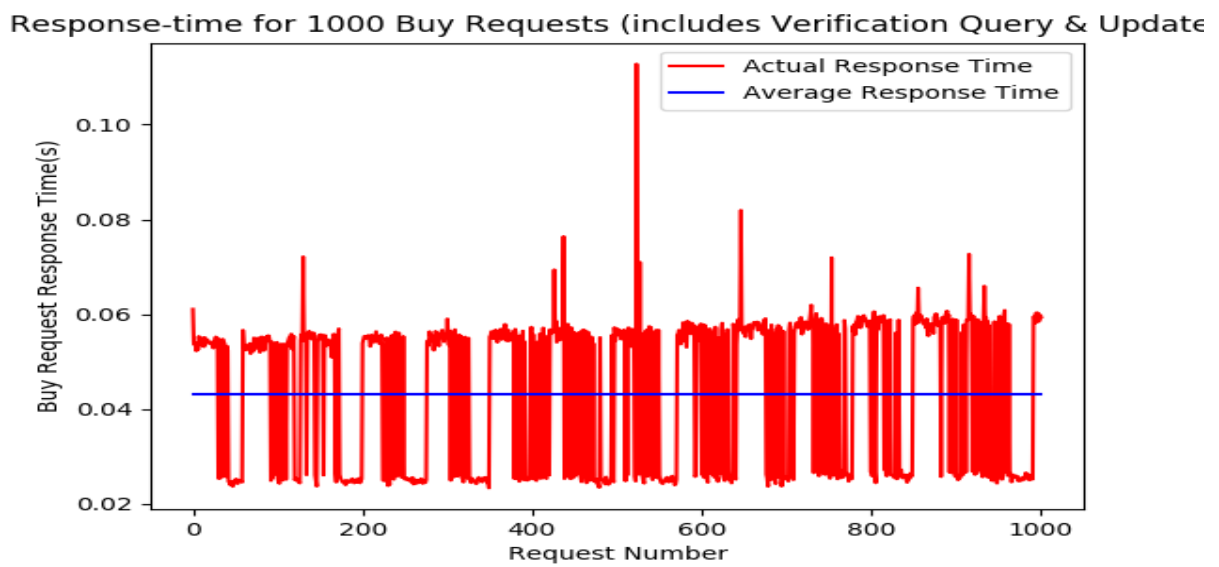
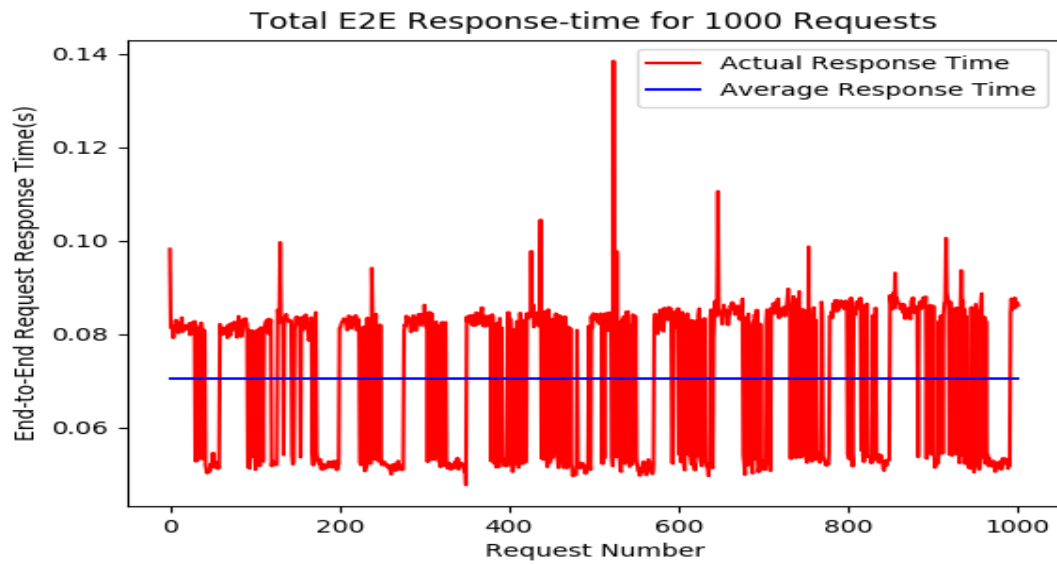### 5.1 1000 Sequential Requests Without Delay

5.1.1 Search Response Time

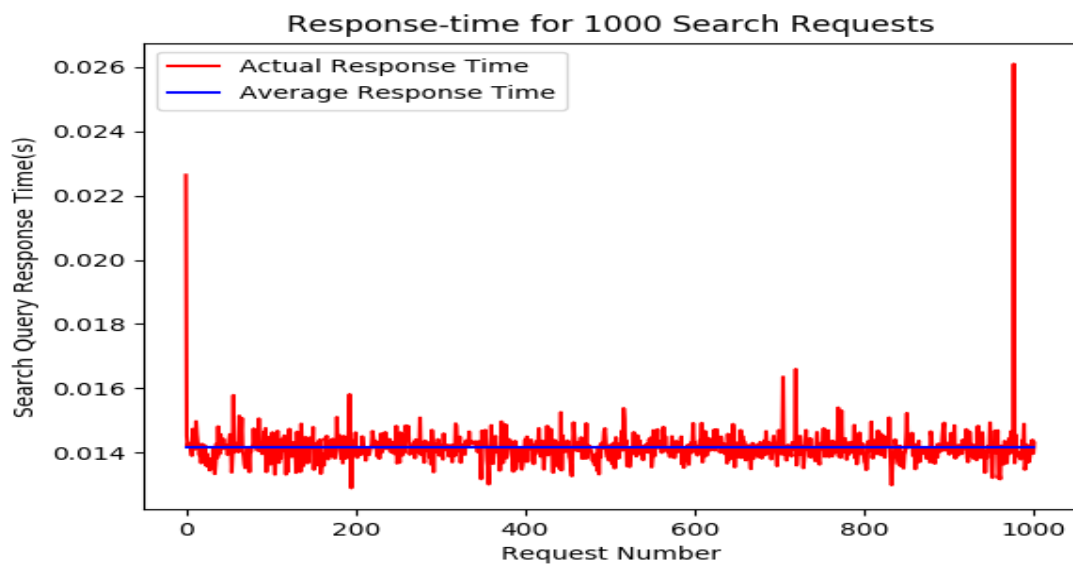### 5.1.2 Lookup Response Time

5.1.3 Buy Response Time
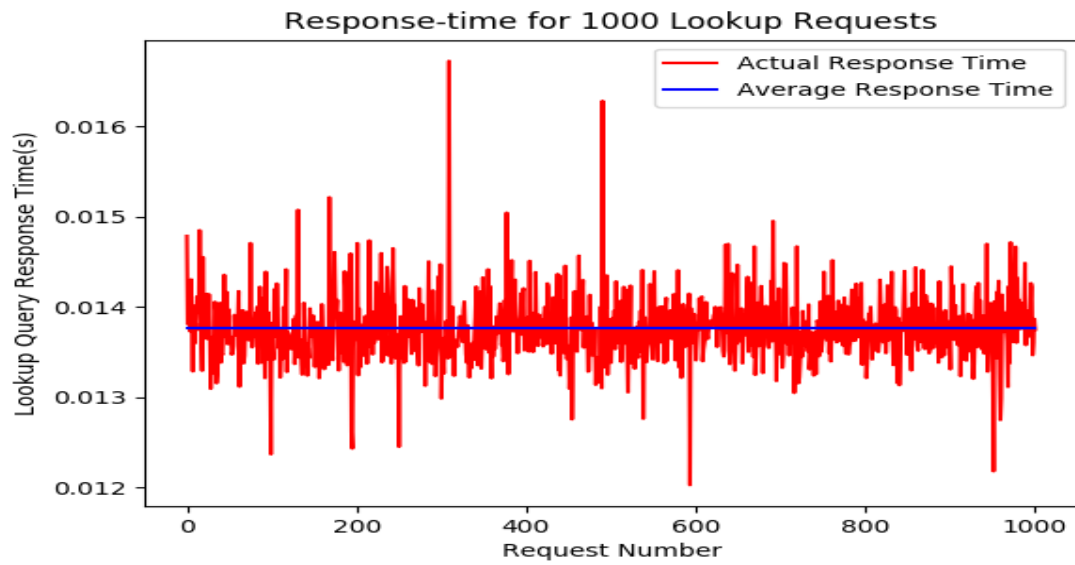
5.1.4 End-to-End Response Time
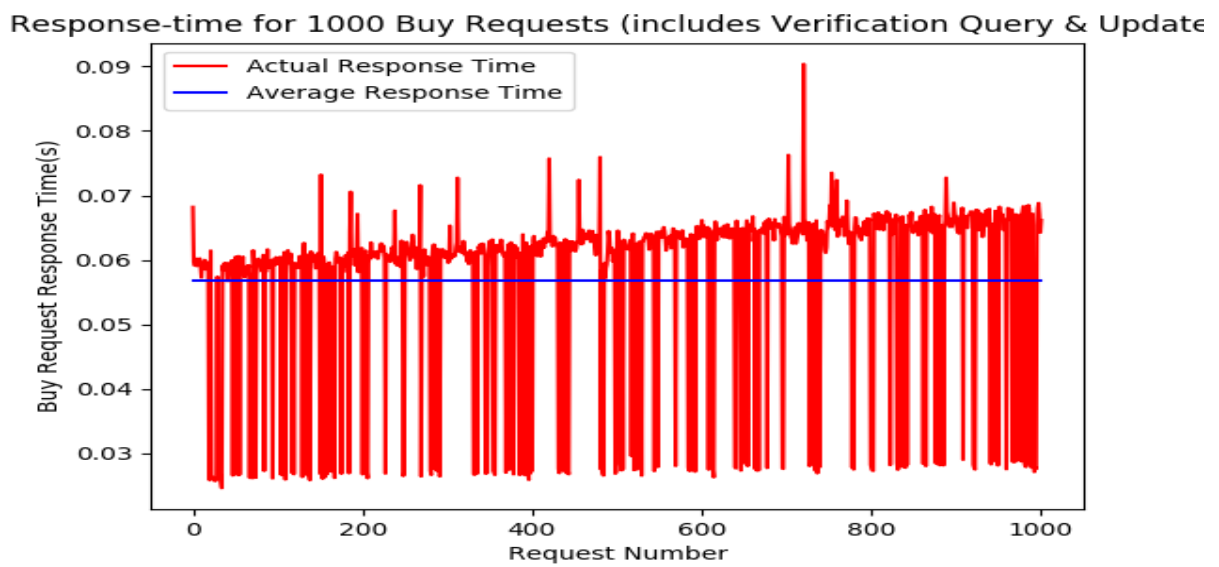

5.2 1000 Sequential Requests With Delay
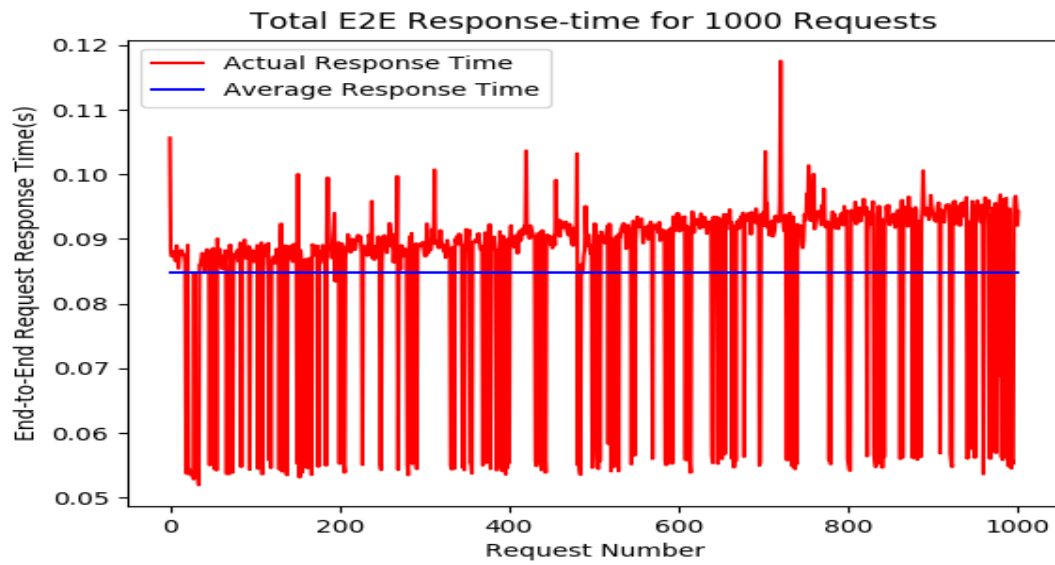
5.2.1 Search Response Time

5.2.2 Lookup Response Time

5.2.3 Buy Response Time

5.2.4 End-to-End Response Time

Total E2E Response-time for 1000 Requests

5.3 Concurrent Requests

Average End-to-End Response Time for Concurrent Requests