

Assignment 2

CS6650 Fall 2022

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Github Repository URL:

<https://github.com/elioxiaolan/Assignment02>

Server Design:

The most functionalities of Server will be implemented in the class **SkierServlet**:

The class **SkierServlet** inherits the most part of one in Assignment 1. When the servlet is initialized, it will initialize a RabbitMQ channel pool. After verifying the URL, the Server will record the parameters in URL, and then use a shared and synchronized RabbitMQ channel pool, which is implemented by **BlockingQueue**, and then threads will publish messages, and send corresponding response back.

Packages:

The packages used in the Server include Swagger client, the JavaX Servlet packages, and RabbitMQ AMQP Client packages.

Consumer Design:

The most functionalities of Consumer will be implemented in the class **Consumer**:

In the class Consumer, each thread will declare a channel to the message queue, use the push model of message consumption, and provides a callback method to the message broker. Besides, the consumer will record the SkierId and LiftId into **ConcureentHashMap**. Once the Consumer complete all processing, the Consumer will acknowledges the message.

Packages:

The packages used in the Server include Swagger client, the JavaX Servlet packages, RabbitMQ AMQP Client packages, and Gson package.

Test Results:

Single Instance Results:

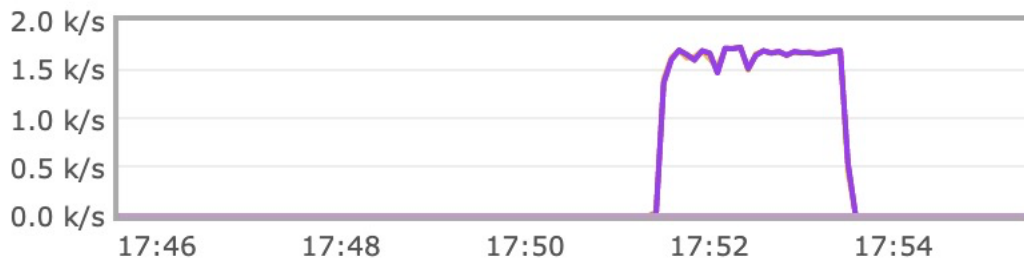
In single EC2 instance, I use a local client with 32, 64, and 128 threads to send requests to test the performance, the results are as followed:

32 Threads:

Queued messages last ten minutes ?



Message rates last ten minutes ?



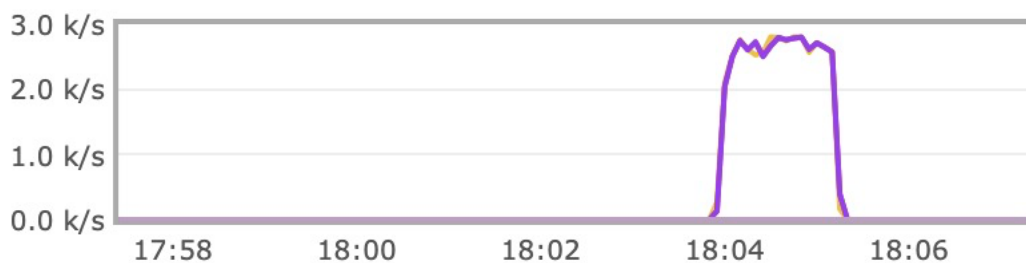
```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 122850
The mean response time: 19.473445197429292
The median response time: 18.0
Throughput: 1639 requests/second
The p99 (99th percentile) response time: 45.0
The max response time: 653.0
The min response time: 11.0
```

64 Threads:

Queued messages last ten minutes ?



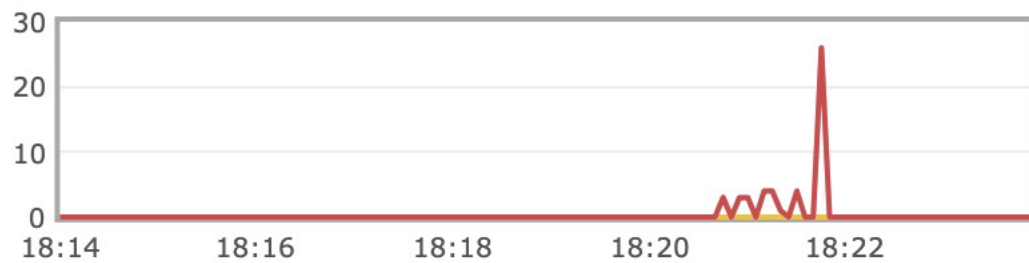
Message rates last ten minutes ?



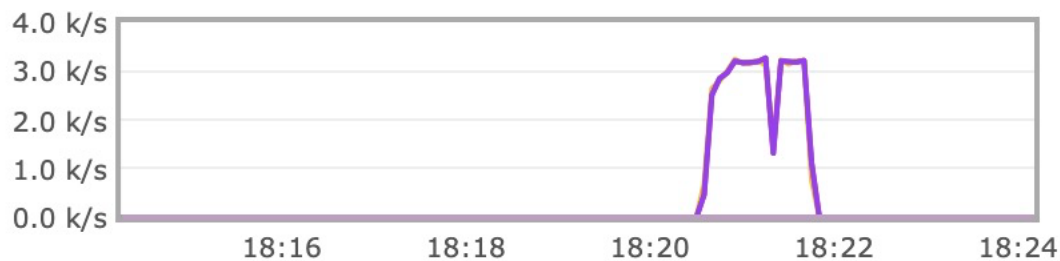
```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 78693
The mean response time: 24.83039403002991
The median response time: 22.0
Throughput: 2564 requests/second
The p99 (99th percentile) response time: 65.0
The max response time: 966.0
The min response time: 12.0
```

128 Threads:

Queued messages last ten minutes ?



Message rates last ten minutes ?



```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 71751
The mean response time: 41.9278307195918
The median response time: 39.0
Throughput: 2816 requests/second
The p99 (99th percentile) response time: 106.0
The max response time: 2210.0
The min response time: 12.0
```

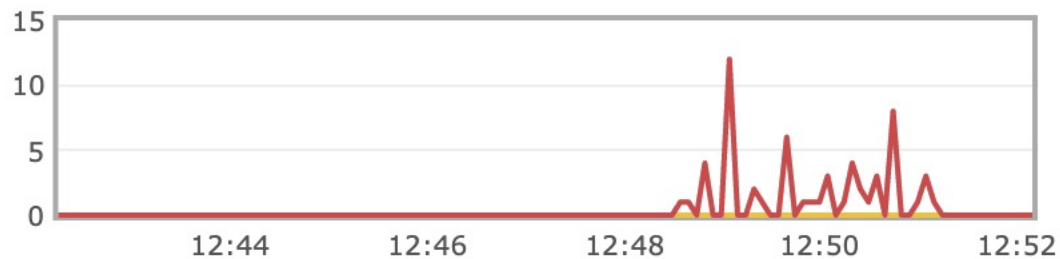
Load Balancer Results:

To build a load balancer, I created an AMI from my initial server instance. When the AMI is created, I launched two new instances from this AMI, and they are exact replicas of my initial

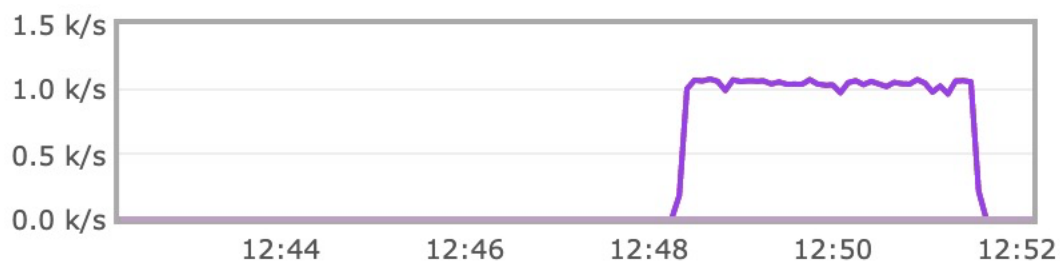
instance that hosts your servlet. When all instances have been launched, I placed them into an application load balancer, and the test results are as followed:

32 Threads:

Queued messages last ten minutes ?



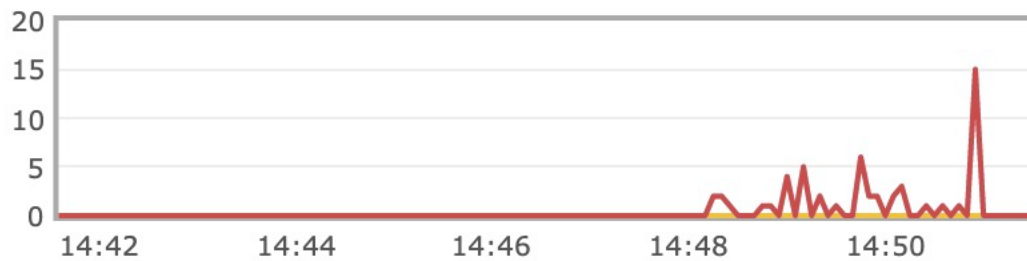
Message rates last ten minutes ?



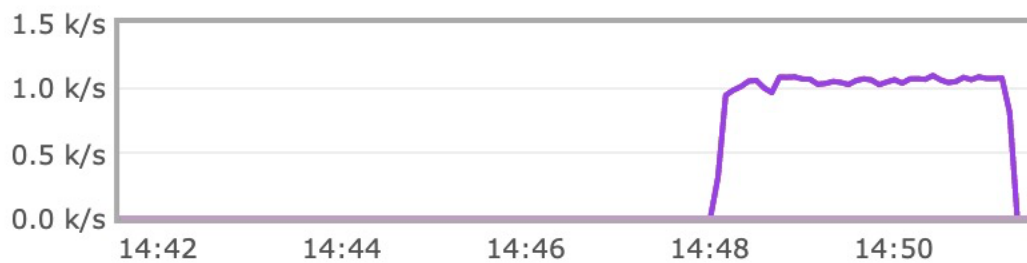
```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 194832
The mean response time: 31.006345951892783
The median response time: 30.0
Throughput: 1030 requests/second
The p99 (99th percentile) response time: 54.0
The max response time: 1650.0
The min response time: 18.0
*****
```

64 Threads:

Queued messages last ten minutes ?



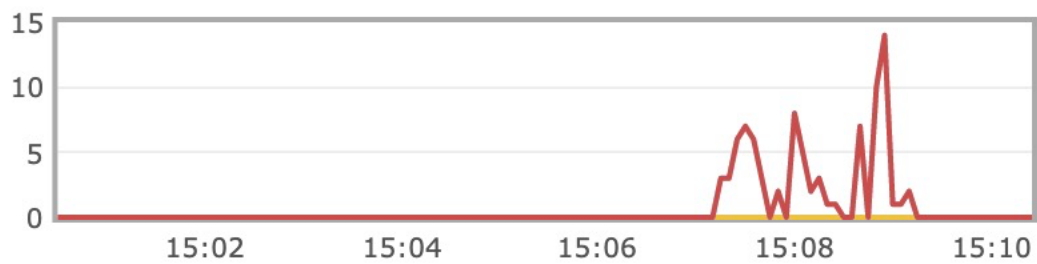
Message rates last ten minutes ?



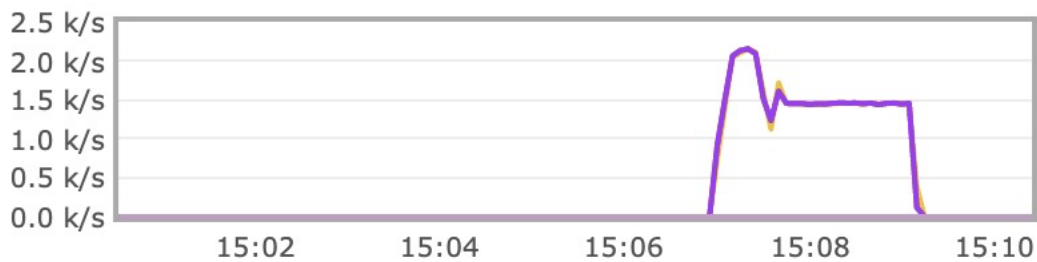
```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 193653
The mean response time: 30.685374770566494
The median response time: 30.0
Throughput: 1036 requests/second
The p99 (99th percentile) response time: 55.0
The max response time: 1778.0
The min response time: 16.0
```

128 Threads:

Queued messages last ten minutes ?



Message rates last ten minutes ?



```
*****
Number of successful requests: 200000
Number of failed requests: 0
Total wall time: 132088
The mean response time: 41.658061483218894
The median response time: 32.0
Throughput: 1515 requests/second
The p99 (99th percentile) response time: 132.0
The max response time: 2326.0
The min response time: 16.0
```