

Test Report

1. The code was tested using Postman for individual test and debugging; and loadtest for performance test. Those two software were used to send continuous requests to the nodejs backend.
2. The performance testing of the /postmessage route, which is responsible for handling posting new post is shown in picture 1. As stated, the longest request only took 49ms.

```

$ curl -X POST http://localhost:3000/postmessage -n 3000 -c 1 -k -d '{"topic": "ttest", "data": "dtest"}' -r "application/json" -m POST
[Wed Oct 27 2021 19:47:43 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/postmessage
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 3000
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Concurrence level: 1
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 3000
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Total time: 2.7788673 s
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 1080 a custom value
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 0.9 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO 50% 1 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO 90% 1 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO 95% 1 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO 99% 2 ms
[Wed Oct 27 2021 19:47:46 GMT-0400 (Eastern Daylight Time)] INFO 100% 49 ms (longest request)

```

Picture 1. Performance test for /postmessage

3. The size of data does impact the performance of the server. But for an application at this scale, the data must be very large to have any significant effect. The performance test for a longer data is shown in picture 2. The result is nearly identical to the previous result.

```
A loadtest http://localhost:3000/postmessage -n 3000 -c 1 -k -d-data "{ \"topic\": \"\\test\", \"data\": \"\\ctest\" }\" }" -T "application/json" -m POST
[Wed Oct 27 2021 19:54:25 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/postmessage
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 3000
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Concurrency level: 1
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 3000
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Total time: 2,6415542999999997 s
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 1136
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 0.8 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 50% 1 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 90% 1 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 95% 1 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 99% 2 ms
[Wed Oct 27 2021 19:54:28 GMT-0400 (Eastern Daylight Time)] INFO 100% 44 ms (longest request)
```

Picture 2. Performance test for larger data submitted

4. The number of requests directly affect the performance of the server. The server takes longer to response to all request the more requests it received, assuming that the concurrency and data are the same across tests. However, the time taken to respond to a single request appears to be similar regardless of the total requests sent, demonstrated in 2 pictures below.

```
λ loadtest -n 3000 -c 1 -k http://localhost:3000/posts
[Wed Oct 27 2021 19:48:20 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Requests: 2906 (97%), requests per second: 582, mean latency: 1.7 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/posts
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 3000
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Concurrency level: 1
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 3000
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Total time: 5.170558 s
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 580
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 1.7 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO 50% 1 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO 90% 2 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO 95% 2 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO 99% 3 ms
[Wed Oct 27 2021 19:48:25 GMT-0400 (Eastern Daylight Time)] INFO 100% 35 ms (longest request)
```

```
λ loadtest -n 100 -c 1 -k http://localhost:3000/posts
[Wed Oct 27 2021 20:01:49 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/posts
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 100
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Concurrency level: 1
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 100
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Total time: 1.393346 s
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 72
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 13.8 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO 50% 13 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO 90% 17 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO 95% 18 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO 99% 52 ms
[Wed Oct 27 2021 20:01:50 GMT-0400 (Eastern Daylight Time)] INFO 100% 52 ms (longest request)
```

1. The concurrency directly affects the performance of the server. The server responses to all requests faster the more concurrency level it uses, assuming that the number of requests and data are the same across tests. However, the time taken to respond to a single request appears to be similar regardless of the concurrency, demonstrated in 2 pictures below.

```
λ loadtest -n 3000 -c 1 -k http://localhost:3000/
[Wed Oct 27 2021 19:48:09 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 3000
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Concurrency level: 1
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 3000
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Total time: 2.6601554999999997 s
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 1128
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 0.9 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO 50% 1 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO 90% 1 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO 95% 1 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO 99% 2 ms
[Wed Oct 27 2021 19:48:11 GMT-0400 (Eastern Daylight Time)] INFO 100% 38 ms (longest request)
```

```
λ loadtest -n 3000 -c 10 -k http://localhost:3000/
[Wed Oct 27 2021 20:04:28 GMT-0400 (Eastern Daylight Time)] INFO Requests: 0 (0%), requests per second: 0, mean latency: 0 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Target URL: http://localhost:3000/
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Max requests: 3000
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Concurrency level: 10
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Agent: keepalive
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Completed requests: 3000
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Total errors: 0
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Total time: 1.2151955 s
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Requests per second: 2469
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Mean latency: 3.9 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO Percentage of the requests served within a certain time
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO 50% 3 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO 90% 5 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO 95% 6 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO 99% 9 ms
[Wed Oct 27 2021 20:04:29 GMT-0400 (Eastern Daylight Time)] INFO 100% 43 ms (longest request)
```