Git URL: https://github.ccs.neu.edu/yihtian/CS6650/tree/master/Assignment3

Results:

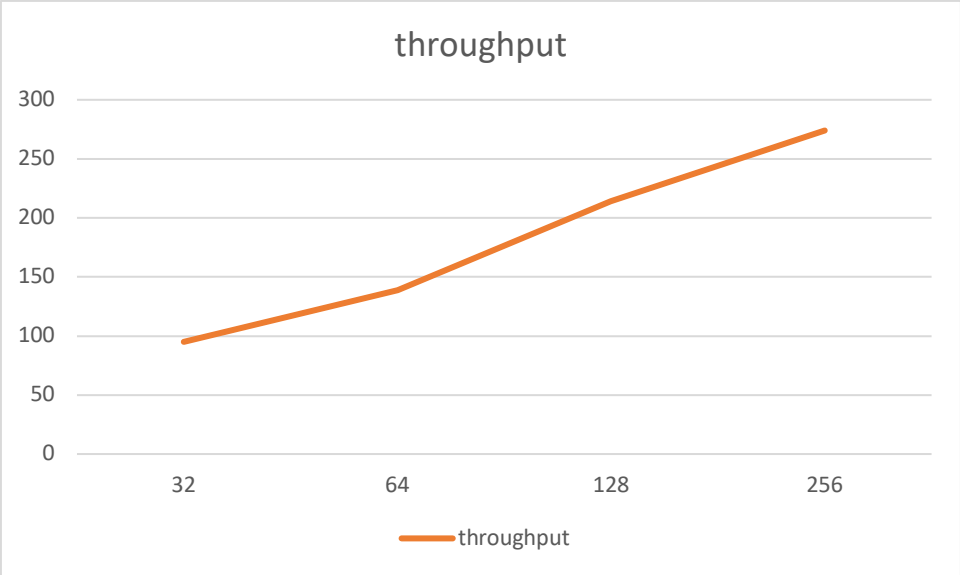
```
=============Progress Finished=============
Total threads: 32
Total requests posted: 440000
Execution time: 4621221 millisecs
Total successful request sent: 439999

=============Statistic Results=============
Mean response time: 201 millisecs
Median response time: 178 millisecs
99th percentile: 1020 millisecs
Max response time: 8261 millisecs
Throughput: 95

Process finished with exit code 0
```

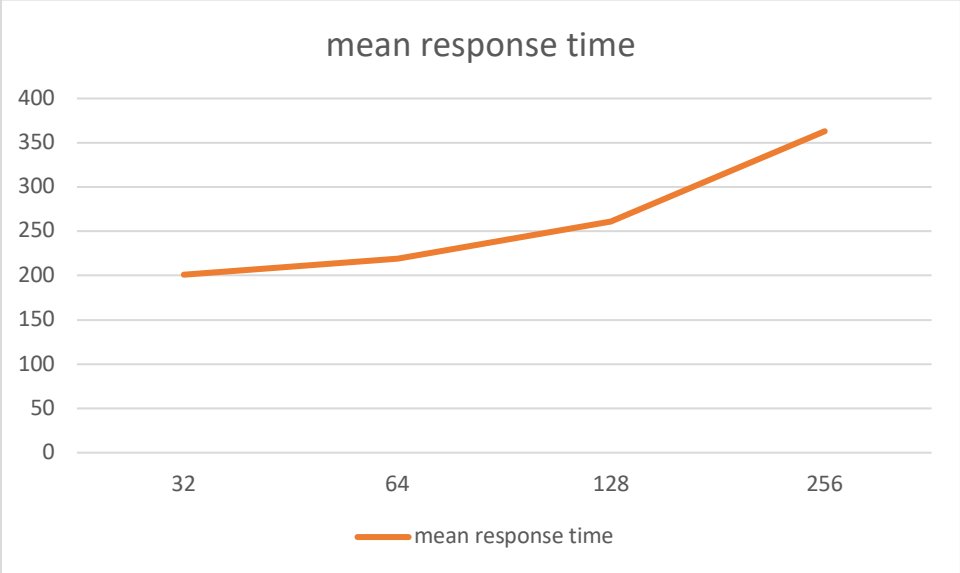
```
=============Progress Finished=============
Total threads: 64
Total requests posted: 440000
Execution time: 3160131 millisecs
Total successful request sent: 439488

=============Statistic Results=============
Mean response time: 219 millisecs
Median response time: 181 millisecs
99th percentile: 1462 millisecs
Max response time: 9366 millisecs
Throughput: 139

Process finished with exit code 0
```

```
==========Progress Finished==========
Total threads: 128
Total requests posted: 440000
Execution time: 2045922 millisecs
Total successful request sent: 439488

==========Statistic Results==========
Mean response time: 261 millisecs
Median response time: 186 millisecs
99th percentile: 1661 millisecs
Max response time: 9119 millisecs
Throughput: 214

Process finished with exit code 0
```

```
==========Progress Finished==========
Total threads: 256
Total requests posted: 440000
Execution time: 1599075 millisecs
Total successful request sent: 439295

==========Statistic Results==========
Mean response time: 363 millisecs
Median response time: 192 millisecs
99th percentile: 3504 millisecs
Max response time: 9391 millisecs
Throughput: 274

Process finished with exit code 0
```

Charts for throughput and mean response time:





GCP compare to AWS:
Compare to AWS, GCP runs slower, where AWS mean response time is around 100ms and GCP mean response time around 200ms, thus wall time for GCP running seems much longer than AWS performance. And one specific thing is, when running for POST and GET methods, AWS response time for both POST and GET are similar, don't have great difference, but GCP GET responses with much longer time, which is around 3000ms per request, while POST only costs around 200ms. To improve this performance, I added a concurrent hushmap in servlet to act as a simple cache layer, and this reduced partial GET request respond time to around 150ms and improved total performance.
The cost for both services looks similar, no great difference.
Both services required almost same webapp structure, except for GCP requires extra appengine-web.xml file. But to upload and allows server start working is more easier on GCP, which requires less commands and settings.