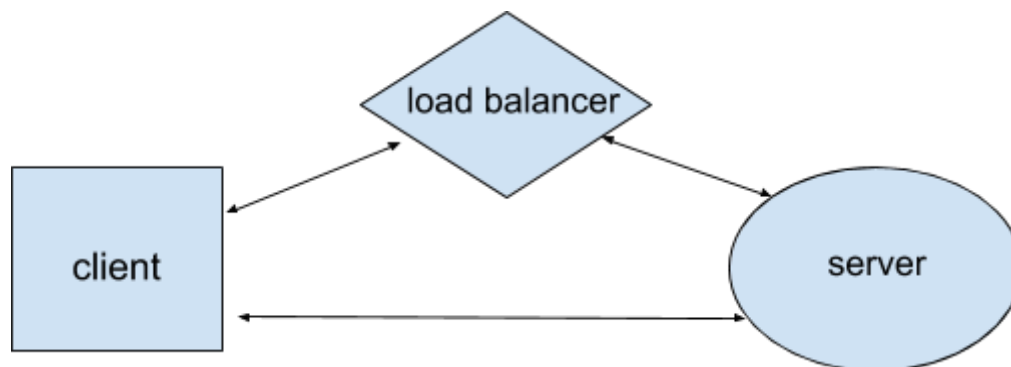


Assignment 2  
YeJee Lee

**Description:**



Used AWS RDS and MySQL WorkBench for database.

DBCPDataSource is a class that helps connecting to the MySQL Workbench. Here, we make a connection to the AWS RDS by providing the host, port, database, username, and password. To speed up the query, I used composite primary keys on SkierID, resortID, dayID, time which reduced the delay time.

SkierServlet.java is a servlet that handles both doPost() and doGet(). For doPost(), it validates if the urlPath equals "/liftrides" and then we read the JSON by using the BufferedReader then turn into a LiftRide object using the Gson dependency. Then, using the LiftRideDao, it can pass the LiftRide object to the Database. In doGet(), we validate whether the url wants "getVerticalSpecificDay" or "getVerticalByResort" by comparing the url length and if the query string is provided. Then, each method makes a connection with the database and gets the query result by sending the desired preparedStatement to the database. Here, in order to improve the runtime, I made sure the connection and preparedStatement are closed after they are done.

LiftRide.java is an object class that takes skierId, resortId, dayId, time and liftID. We can create this object to pass into LiftRideDao which will pass an object to the DB.

LiftRideDao.java is a DAO class that helps inserting the LiftRide object to the MySQLWorkBench. Here, it receives the LiftRide Object and inserts into the DB by calculating the vertical beforehand. I will have another column call vertical which has type Integer that is  $(10 * \text{liftID})$ . In this way, we don't have to calculate the vertical when doing doGet() from the database.

## Single Server Test:

### Thread# = 32

```
[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 32 20000 40 1 SilverMt h
tp://54.236.50.254:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 48360
Successful req: 48360
wall time (milliseconds): 52264
throughput (seconds) : 925.3023113424154
=====
Client Part 2
Mean for POSTs (milliseconds): 24.0998125
Mean for GETs#1 (milliseconds): 13.285714285714286
Mean for GETs#2 (milliseconds): 165.6875
Mean for All Response time (milliseconds): 24.27142266335815
Median for POSTs (milliseconds): 31.0
Median for GETs#1 (milliseconds): 19.5
Median for GETs#2 (milliseconds): 176.0
max for POSTs (milliseconds): 462
max for GETs#1 (milliseconds): 153
max for GETs#2 (milliseconds): 209
99th percentile for POST (milliseconds): 454
99th percentile for GET#1 (milliseconds): 6
99th percentile for GET#2 (milliseconds): 62
Total Wall Time (milliseconds): 52714
throughput: (totalRequest / wallTime (Seconds)): 917.4033463596008
```

### Thread# = 64

wallTime (seconds): 105 seconds

```
[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 64 20000 40 1 SilverMt ht
tp://54.236.50.254:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 96720
Successful req: 96720
wall time (milliseconds): 105243
throughput (seconds) : 919.0159915623841
=====
Client Part 2
Mean for POSTs (milliseconds): 46.70740625
Mean for GETs#1 (milliseconds): 57.1375
Mean for GETs#2 (milliseconds): 815.29375
Mean for All Response time (milliseconds): 48.039236972704714
Median for POSTs (milliseconds): 62.5
Median for GETs#1 (milliseconds): 34.5
Median for GETs#2 (milliseconds): 1011.5
max for POSTs (milliseconds): 623
max for GETs#1 (milliseconds): 547
max for GETs#2 (milliseconds): 1147
99th percentile for POST (milliseconds): 441
99th percentile for GET#1 (milliseconds): 18
99th percentile for GET#2 (milliseconds): 137
Total Wall Time (milliseconds): 105856
throughput: (totalRequest / wallTime_ (Seconds)): 913.6940749697702
```

### Thread# = 128

```

[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 128 20000 40 1 SilverMt ]
http://54.236.50.254:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 193440
Successful req: 193440
wall time (milliseconds): 214497
throughput (seconds) : 901.8307948362914
=====
Client Part 2
Mean for POSTs (milliseconds): 92.81211979166666
Mean for GETs#1 (milliseconds): 197.73035714285714
Mean for GETs#2 (milliseconds): 1428.584375
Mean for All Response time (milliseconds): 95.62930107526881
Median for POSTs (milliseconds): 119.0
Median for GETs#1 (milliseconds): 86.0
Median for GETs#2 (milliseconds): 2212.0
max for POSTs (milliseconds): 1656
max for GETs#1 (milliseconds): 1540
max for GETs#2 (milliseconds): 2509
99th percentile for POST (milliseconds): 492
99th percentile for GET#1 (milliseconds): 60
99th percentile for GET#2 (milliseconds): 329
Total Wall Time (milliseconds): 215415
throughput: (totalRequest / wallTime_(Seconds)): 897.9876053199638

```

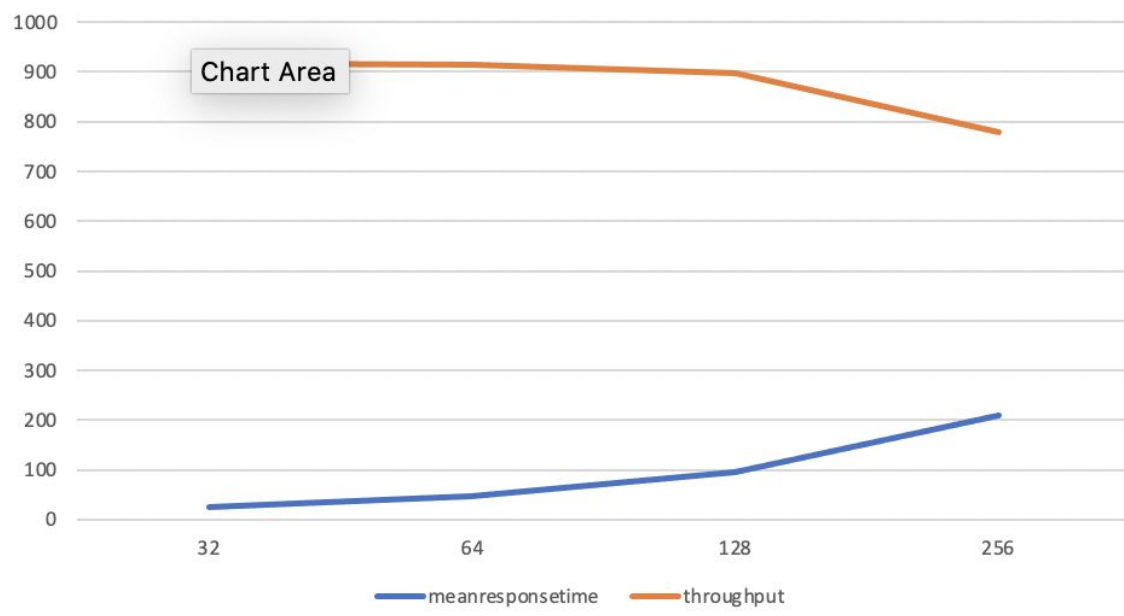
## Thread# = 256

```

[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 256 20000 40 1 SilverMt http:
//54.236.50.254:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 386880
Successful req: 386880
wall time (milliseconds): 495093
throughput (seconds) : 781.4289436530106
=====
Client Part 2
Mean for POSTs (milliseconds): 201.406078125
Mean for GETs#1 (milliseconds): 633.078125
Mean for GETs#2 (milliseconds): 3286.928125
Mean for All Response time (milliseconds): 209.00967483457404
Median for POSTs (milliseconds): 63.0
Median for GETs#1 (milliseconds): 154.5
Median for GETs#2 (milliseconds): 3946.0
max for POSTs (milliseconds): 5360
max for GETs#1 (milliseconds): 5257
max for GETs#2 (milliseconds): 5064
99th percentile for POST (milliseconds): 578
99th percentile for GET#1 (milliseconds): 116
99th percentile for GET#2 (milliseconds): 303
Total Wall Time (milliseconds): 496748
throughput: (totalRequest / wallTime_(Seconds)): 778.8254809279555

```

Single Server



## load balanced test:

**maxThread# = 32**

```
[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 32 20000 40 1 SilverMt h
ttp://a2-892017696.us-east-1.elb.amazonaws.com:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 48360
Successful req: 48360
wall time (milliseconds): 53427
throughput (seconds) : 905.1603122016958
=====
Client Part 2
Mean for POSTs (milliseconds): 24.656625
Mean for GETs#1 (milliseconds): 16.492857142857144
Mean for GETs#2 (milliseconds): 154.975
Mean for All Response time (milliseconds): 24.824937965260546
Median for POSTs (milliseconds): 34.0
Median for GETs#1 (milliseconds): 8.0
Median for GETs#2 (milliseconds): 193.5
max for POSTs (milliseconds): 486
max for GETs#1 (milliseconds): 219
max for GETs#2 (milliseconds): 217
99th percentile for POST (milliseconds): 467
99th percentile for GET#1 (milliseconds): 28
99th percentile for GET#2 (milliseconds): 64
Total Wall Time (milliseconds): 53899
throughput: (totalRequest / wallTime (Seconds)): 897.2337149112228
```

**maxThread# = 64**

**walltime(seconds) = 107.31 seconds**

```
[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 64 20000 40 1 SilverMt
http://a2-892017696.us-east-1.elb.amazonaws.com:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 96720
Successful req: 96720
wall time (milliseconds): 107310
throughput (seconds) : 901.3139502376292
=====
Client Part 2
Mean for POSTs (milliseconds): 47.92208333333333
Mean for GETs#1 (milliseconds): 56.448214285714286
Mean for GETs#2 (milliseconds): 889.41875
Mean for All Response time (milliseconds): 49.36350289495451
Median for POSTs (milliseconds): 73.5
Median for GETs#1 (milliseconds): 53.0
Median for GETs#2 (milliseconds): 994.0
max for POSTs (milliseconds): 676
max for GETs#1 (milliseconds): 589
max for GETs#2 (milliseconds): 1143
99th percentile for POST (milliseconds): 514
99th percentile for GET#1 (milliseconds): 62
99th percentile for GET#2 (milliseconds): 419
Total Wall Time (milliseconds): 107938
throughput: (totalRequest / wallTime (Seconds)): 896.0699660916451
```

**maxThread# = 128**

walltime :213 seconds

```
[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 128 20000 40 1 SilverMt
http://a2-892017696.us-east-1.elb.amazonaws.com:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 193440
Successful req: 193440
wall time (milliseconds): 213662
throughput (seconds) : 905.3551871647743
=====
Client Part 2
Mean for POSTs (milliseconds): 91.96175520833333
Mean for GETs#1 (milliseconds): 208.35357142857143
Mean for GETs#2 (milliseconds): 1590.478125
Mean for All Response time (milliseconds): 95.11458850289496
Median for POSTs (milliseconds): 111.0
Median for GETs#1 (milliseconds): 64.0
Median for GETs#2 (milliseconds): 2101.0
max for POSTs (milliseconds): 1498
max for GETs#1 (milliseconds): 3037
max for GETs#2 (milliseconds): 3686
99th percentile for POST (milliseconds): 513
99th percentile for GET#1 (milliseconds): 76
99th percentile for GET#2 (milliseconds): 145
Total Wall Time (milliseconds): 214632
throughput: (totalRequest / wallTime (Seconds)): 901.2635580901264
```

maxThread# = 256

walltime (seconds) : 523.375 seconds

```
[[ec2-user@ip-172-31-59-95 webapps]$ java -jar swagger-java-client.jar 256 20000 40 1 SilverMt
http://a2-892017696.us-east-1.elb.amazonaws.com:8080/SkierServer_war/
----START-----
PHASE1: 10% completed
PHASE2: 10% completed
All Threads completed!
=====
Client Part 1
total req: 386880
Successful req: 386880
wall time (milliseconds): 523375
throughput (seconds) : 739.202292811082
=====
Client Part 2
Mean for POSTs (milliseconds): 192.94216927083335
Mean for GETs#1 (milliseconds): 857.9089285714285
Mean for GETs#2 (milliseconds): 4935.646875
Mean for All Response time (milliseconds): 204.63793165839536
Median for POSTs (milliseconds): 151.0
Median for GETs#1 (milliseconds): 139.0
Median for GETs#2 (milliseconds): 5725.5
max for POSTs (milliseconds): 5627
max for GETs#1 (milliseconds): 5630
max for GETs#2 (milliseconds): 9482
99th percentile for POST (milliseconds): 634
99th percentile for GET#1 (milliseconds): 81
99th percentile for GET#2 (milliseconds): 358
Total Wall Time (milliseconds): 524891
throughput: (totalRequest / wallTime (Seconds)): 737.0673149282424
```

Load Balancer

