

Assignment 3 : Starting to Scale the Server

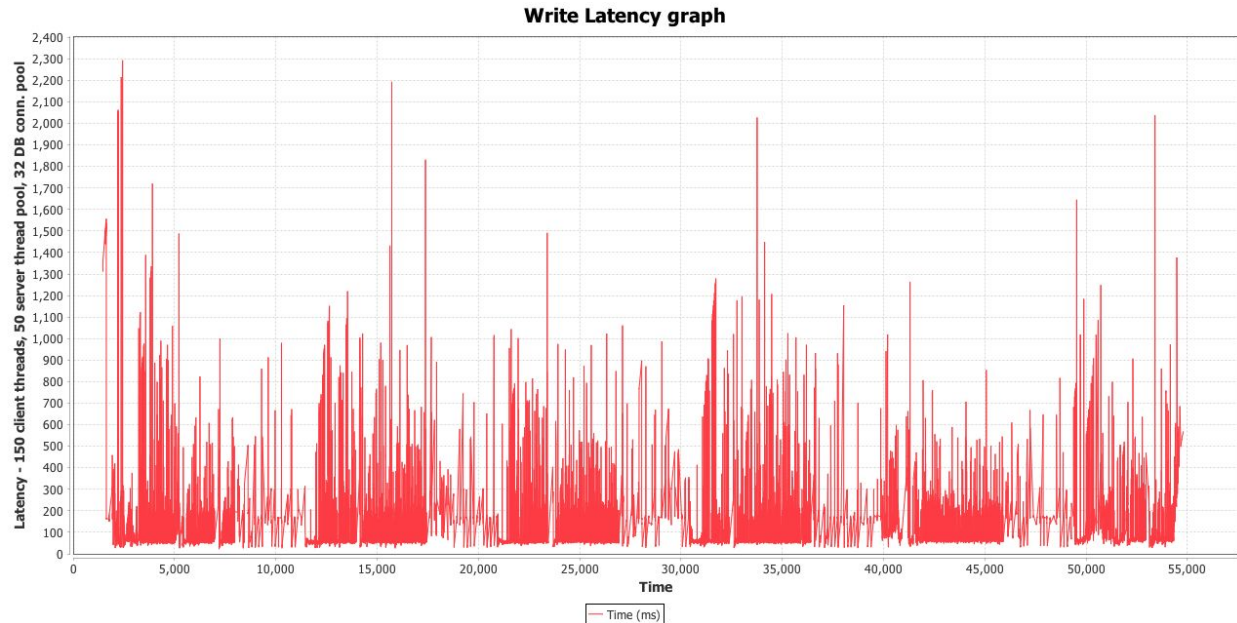
Amala Joshy

Step 1 - Scale the Server

So the first step was to scale the server, by configuring 3 instances with elastic load balancer. Client side with ELB and 3 server instances, Run screenshot for write Day999 :

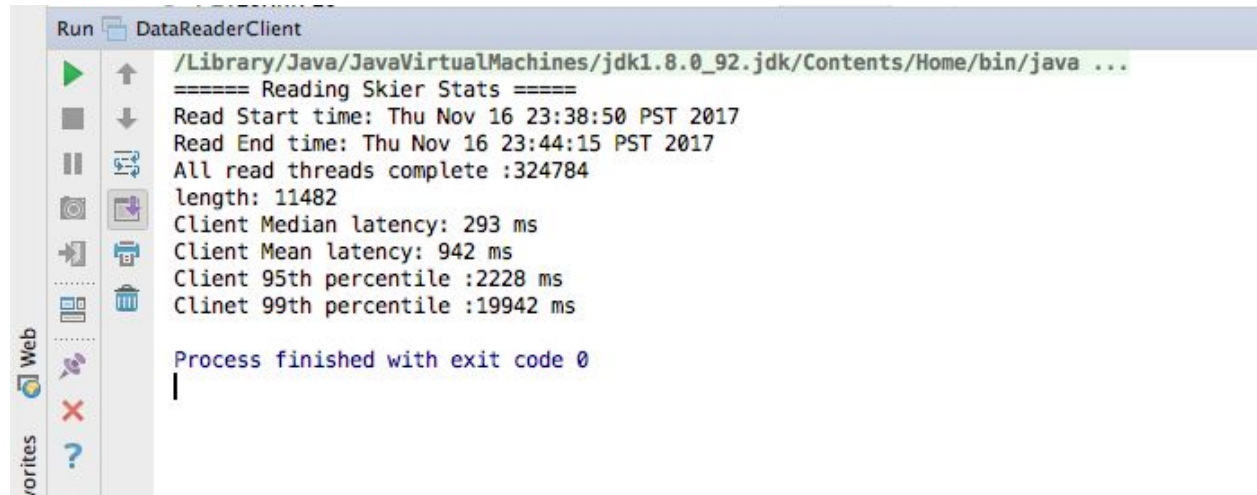
```
Run DataWriterClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
Read csv: 59999 entries
===== Writing Skier data =====
Write Start time: Thu Nov 16 23:00:03 PST 2017
Write End time: Thu Nov 16 23:00:57 PST 2017
All write threads complete :54798
length: 15371
Client Median latency: 62 ms
Client Mean latency: 127 ms
Client 95th percentile :379 ms
Client 99th percentile :908 ms

Process finished with exit code 0
```



To compare the performance, Mean latency to write the data seems to be way much less than than before configuring the load balancer, mean latency used to be around ~500ms where as now its 127ms. The performance have gone up, you can see the rest of the parameter values from the run screen shot.

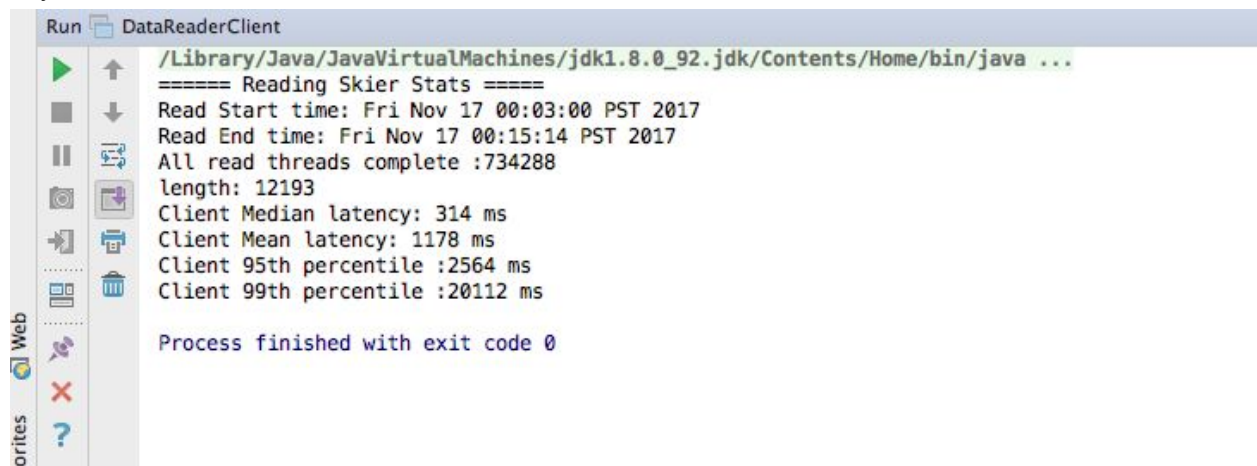
Sample output from few reads on Client with ELB configured : Day 999



```
Run DataReaderClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
===== Reading Skier Stats =====
Read Start time: Thu Nov 16 23:38:50 PST 2017
Read End time: Thu Nov 16 23:44:15 PST 2017
All read threads complete :324784
length: 11482
Client Median latency: 293 ms
Client Mean latency: 942 ms
Client 95th percentile :2228 ms
Client 99th percentile :19942 ms

Process finished with exit code 0
```

Day 1 :



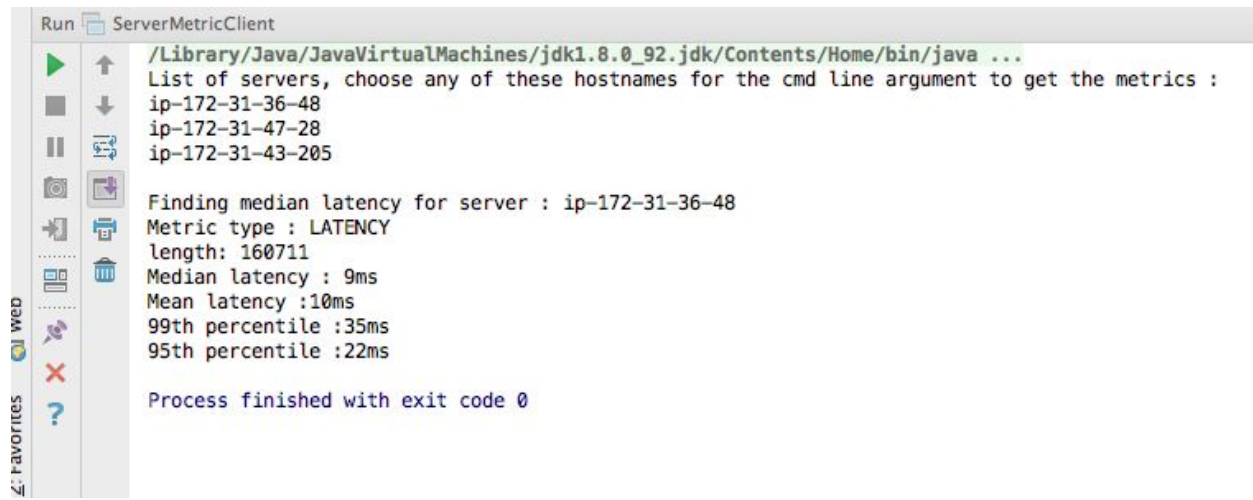
```
Run DataReaderClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
===== Reading Skier Stats =====
Read Start time: Fri Nov 17 00:03:00 PST 2017
Read End time: Fri Nov 17 00:15:14 PST 2017
All read threads complete :734288
length: 12193
Client Median latency: 314 ms
Client Mean latency: 1178 ms
Client 95th percentile :2564 ms
Client 99th percentile :20112 ms

Process finished with exit code 0
```

Step 2 - Instrument the Server

The command line program ServerMetricClient lets you give the desired server metric specification to get the performance parameter values like Latency for Read and Writes, DB latencies and Error count. Metric data is written to an RDS metric table from where the parameters will be calculated. Monitoring code is the MetricReporter class which captures the latency points without much overhead and error counts to db. Enum Metric -> helps measure the performance parameters easily. Metric reporter writes the collected latency values to the database in fixed intervals.

Latency metric for Read day 999 :

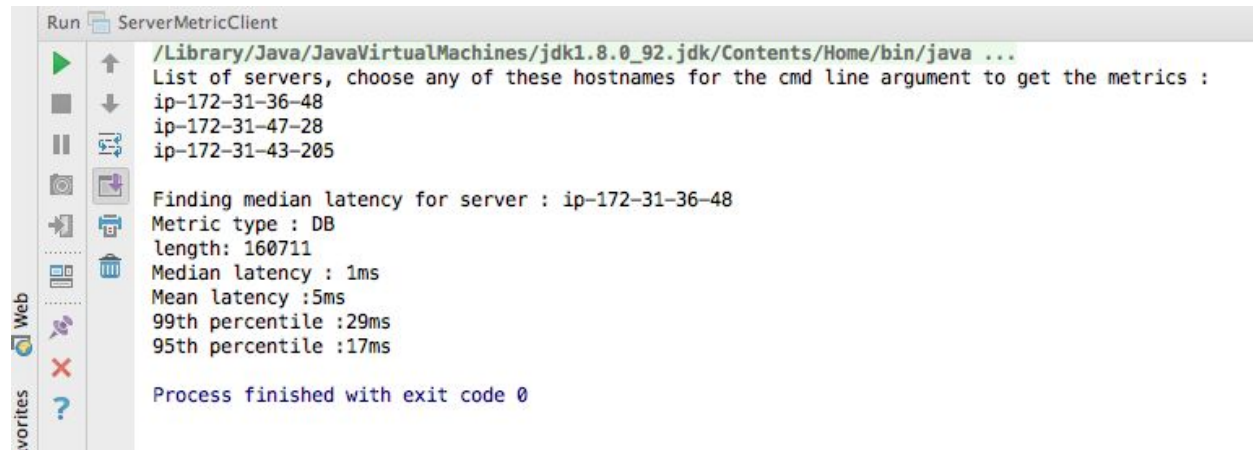


```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-36-48
ip-172-31-47-28
ip-172-31-43-205

Finding median latency for server : ip-172-31-36-48
Metric type : LATENCY
length: 160711
Median latency : 9ms
Mean latency : 10ms
99th percentile : 35ms
95th percentile : 22ms

Process finished with exit code 0
```

DB latency metric for Read day 999



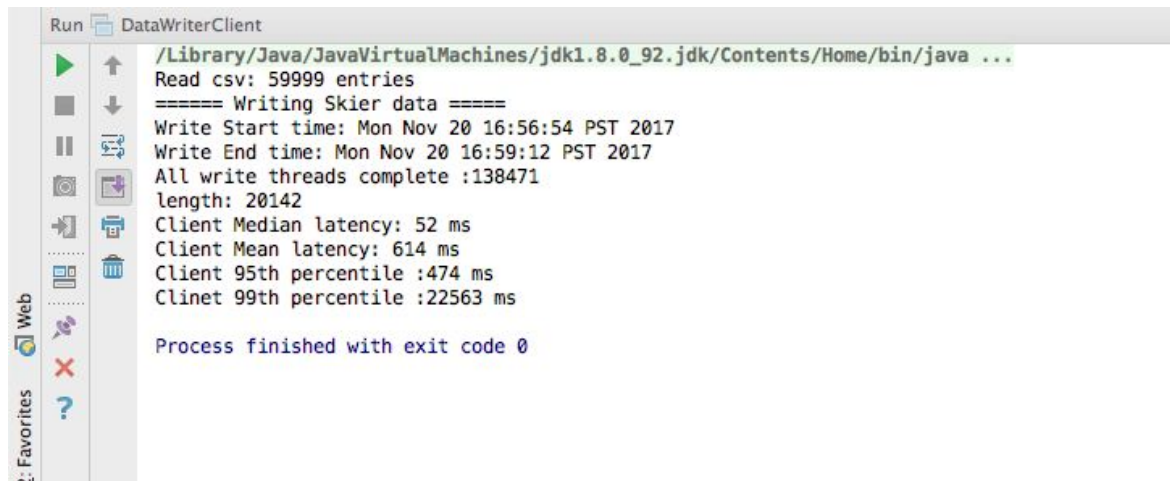
```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-36-48
ip-172-31-47-28
ip-172-31-43-205

Finding median latency for server : ip-172-31-36-48
Metric type : DB
length: 160711
Median latency : 1ms
Mean latency : 5ms
99th percentile : 29ms
95th percentile : 17ms

Process finished with exit code 0
```

Step 3 : Write(POST) Day 999

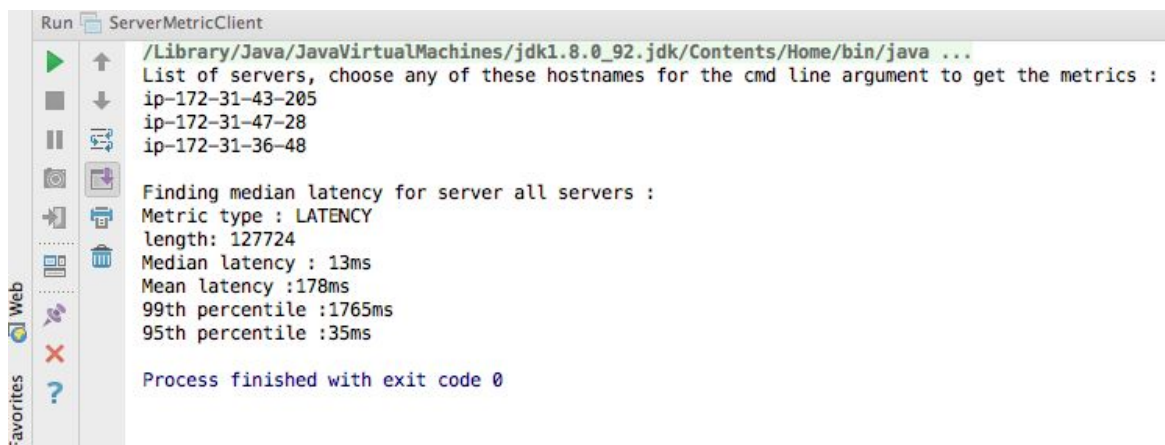
Client write metrics :



```
Run DataWriterClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
Read csv: 59999 entries
===== Writing Skier data =====
Write Start time: Mon Nov 20 16:56:54 PST 2017
Write End time: Mon Nov 20 16:59:12 PST 2017
All write threads complete :138471
length: 20142
Client Median latency: 52 ms
Client Mean latency: 614 ms
Client 95th percentile :474 ms
Client 99th percentile :22563 ms

Process finished with exit code 0
```

Server write metrics :

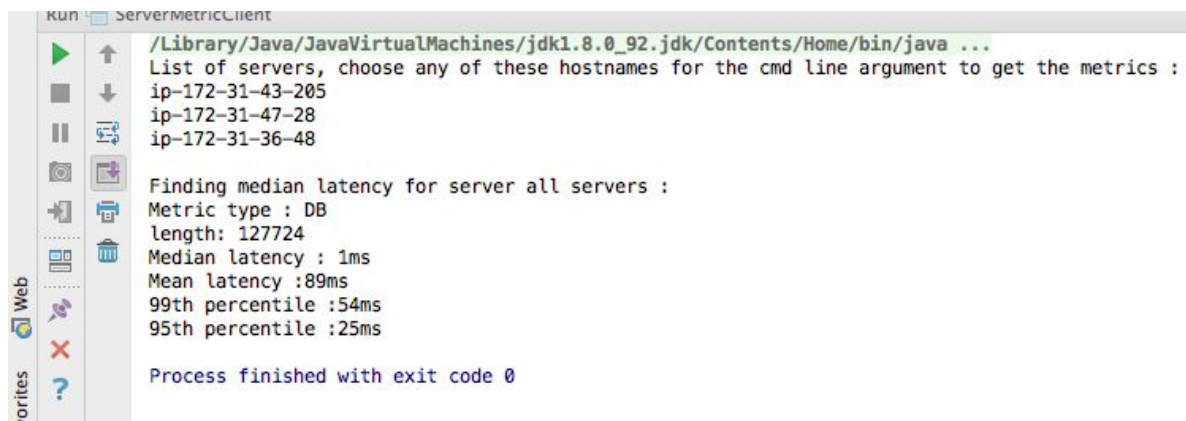


```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-43-205
ip-172-31-47-28
ip-172-31-36-48

Finding median latency for server all servers :
Metric type : LATENCY
length: 127724
Median latency : 13ms
Mean latency :178ms
99th percentile :1765ms
95th percentile :35ms

Process finished with exit code 0
```

DB latency metrics :



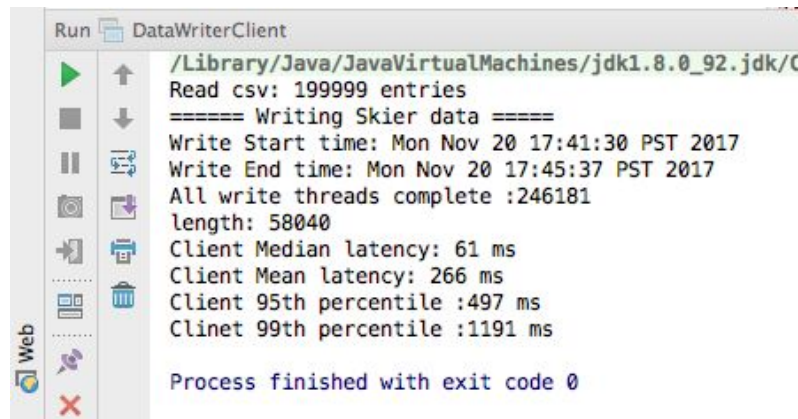
```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-43-205
ip-172-31-47-28
ip-172-31-36-48

Finding median latency for server all servers :
Metric type : DB
length: 127724
Median latency : 1ms
Mean latency :89ms
99th percentile :54ms
95th percentile :25ms

Process finished with exit code 0
```


Data Write (POST) - Day 3

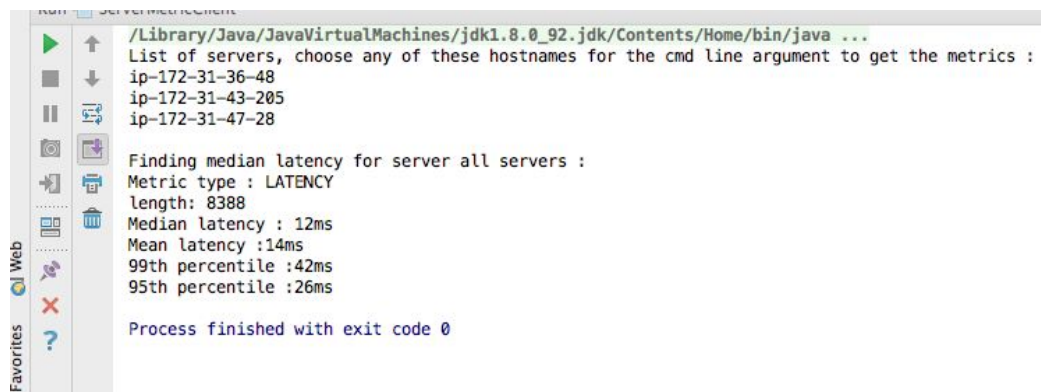
Client metrics:



```
Run DataWriterClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
Read csv: 199999 entries
===== Writing Skier data =====
Write Start time: Mon Nov 20 17:41:30 PST 2017
Write End time: Mon Nov 20 17:45:37 PST 2017
All write threads complete :246181
length: 58040
Client Median latency: 61 ms
Client Mean latency: 266 ms
Client 95th percentile :497 ms
Client 99th percentile :1191 ms

Process finished with exit code 0
```

Server metrics :

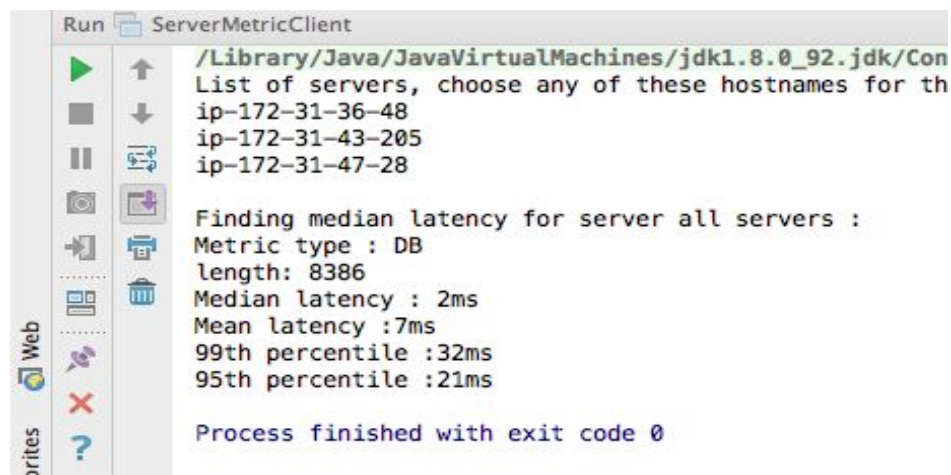


```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-36-48
ip-172-31-43-205
ip-172-31-47-28

Finding median latency for server all servers :
Metric type : LATENCY
length: 8388
Median latency : 12ms
Mean latency :14ms
99th percentile :42ms
95th percentile :26ms

Process finished with exit code 0
```

DB Latency metrics:



```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :
ip-172-31-36-48
ip-172-31-43-205
ip-172-31-47-28

Finding median latency for server all servers :
Metric type : DB
length: 8386
Median latency : 2ms
Mean latency :7ms
99th percentile :32ms
95th percentile :21ms

Process finished with exit code 0
```

Error count :

```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1
List of servers, choose any of these h
ip-172-31-36-48
ip-172-31-43-205
ip-172-31-47-28
Count of error in requests : 8389
```

Read Day 3 Metrics :

Client metrics :

```
Run DataReaderClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Content
===== Reading Skier Stats =====
Read Start time: Mon Nov 20 19:19:52 PST 2017
Read End time: Mon Nov 20 19:25:36 PST 2017
All read threads complete :344221
length: 10769
Client Median latency: 389 ms
Client Mean latency: 714 ms
Client 95th percentile :2164 ms
Client 99th percentile :5208 ms
```

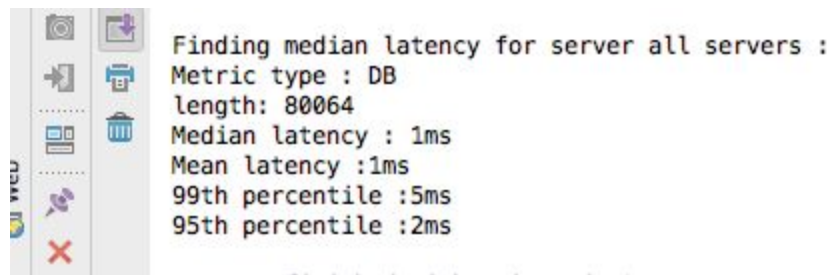
Server metrics for latency :

```
Run ServerMetricClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Cont
List of servers, choose any of these hostnames for the
ip-172-31-47-28
ip-172-31-36-48
ip-172-31-43-205

Finding median latency for server all servers :
Metric type : LATENCY
length: 80064
Median latency : 2ms
Mean latency :2ms
99th percentile :6ms
95th percentile :3ms

Process finished with exit code 0
```

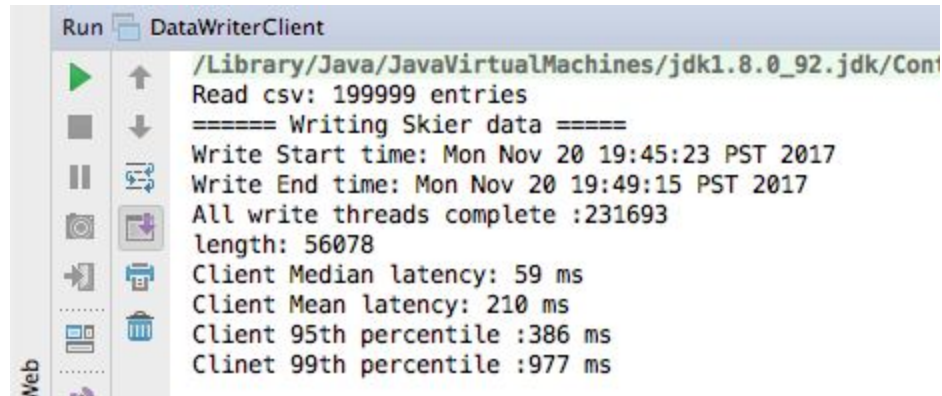
DB latency metrics :



Finding median latency for server all servers :
Metric type : DB
length: 80064
Median latency : 1ms
Mean latency :1ms
99th percentile :5ms
95th percentile :2ms

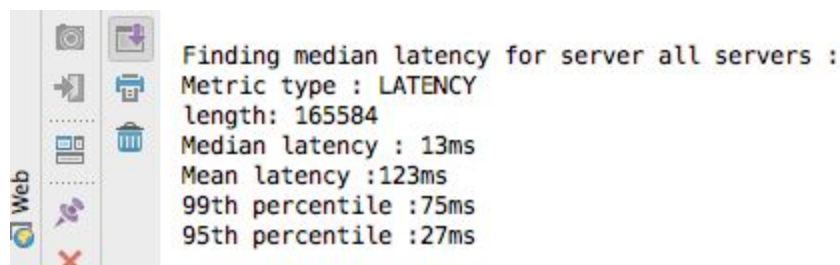
Day 4 - Write (POST) Metrics :

Client metrics :




Run DataWriterClient
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Cont
Read csv: 199999 entries
===== Writing Skier data =====
Write Start time: Mon Nov 20 19:45:23 PST 2017
Write End time: Mon Nov 20 19:49:15 PST 2017
All write threads complete :231693
length: 56078
Client Median latency: 59 ms
Client Mean latency: 210 ms
Client 95th percentile :386 ms
Client 99th percentile :977 ms

Server metrics all hosts combined :



Finding median latency for server all servers :
Metric type : LATENCY
length: 165584
Median latency : 13ms
Mean latency :123ms
99th percentile :75ms
95th percentile :27ms

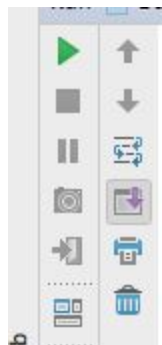
DB latency :



Finding median latency for server all servers :
Metric type : DB
length: 165584
Median latency : 2ms
Mean latency : 62ms
99th percentile : 36ms
95th percentile : 22ms

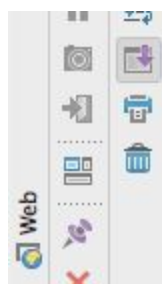
Read Day 4 performance stats :

Client metrics :




/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk
===== Reading Skier Stats =====
Read Start time: Mon Nov 20 21:37:58 PST 2017
Read End time: Mon Nov 20 21:44:52 PST 2017
All read threads complete : 413165
length: 13177
Client Median latency: 381 ms
Client Mean latency: 1083 ms
Client 95th percentile : 3277 ms
Client 99th percentile : 17564 ms

Server metrics :



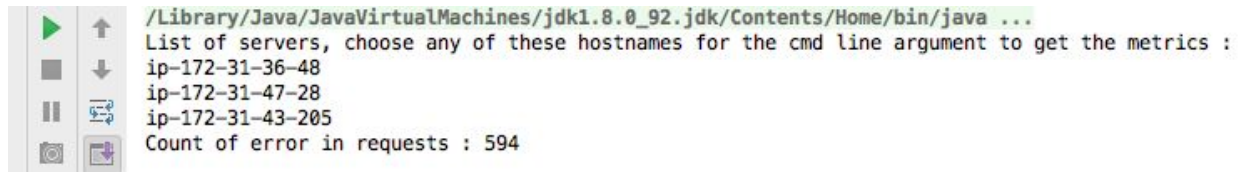
ip-172-31-43-205
Finding median latency for server all servers :
Metric type : LATENCY
length: 33420
Median latency : 2ms
Mean latency : 701ms
99th percentile : 24027ms
95th percentile : 612ms

DB latency metrics:



Finding median latency for server all servers :
Metric type : DB
length: 33421
Median latency : 1ms
Mean latency : 351ms
99th percentile : 15796ms
95th percentile : 4ms

Error count :

A screenshot of a Java IDE console window. The window has a toolbar on the left with icons for running, stepping through, and other debugging actions. The console text shows the Java path, a list of server hostnames, and a count of error requests.

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_92.jdk/Contents/Home/bin/java ...  
List of servers, choose any of these hostnames for the cmd line argument to get the metrics :  
ip-172-31-36-48  
ip-172-31-47-28  
ip-172-31-43-205  
Count of error in requests : 594
```

The reports suggests that the server metrics are clearly faster than the latencies reported by the client. With my design, the delay in writing the metrics in fixed intervals, this process would continue even after the read or write process is finished, could have used an external queue resource to avoid this slow reporting.