Assignment 1

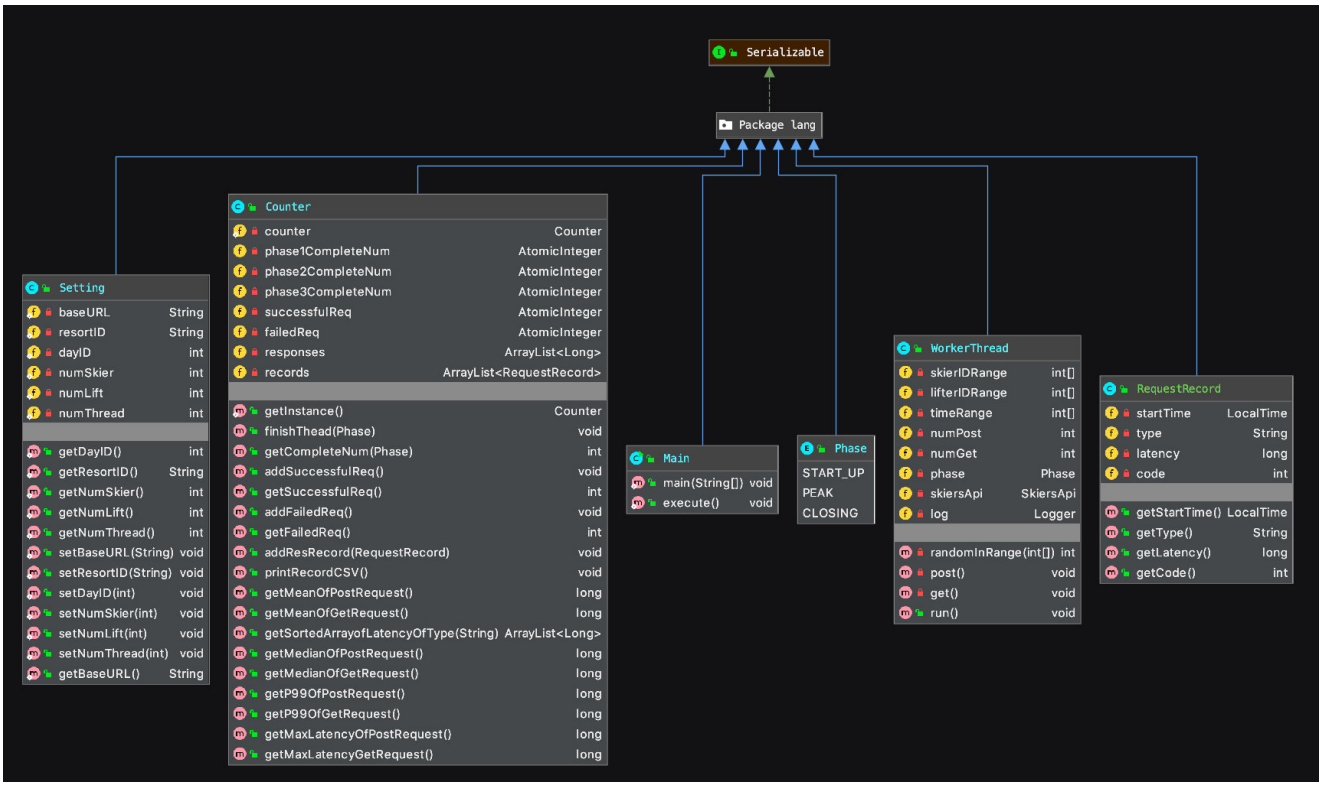
Github Repo

https://github.com/duskcloudxu/bsds2020fall_Assignment1

Server IP Address

```
http://54.227.95.209:8080/remoteServer_war/
```

Project Structure



Overview

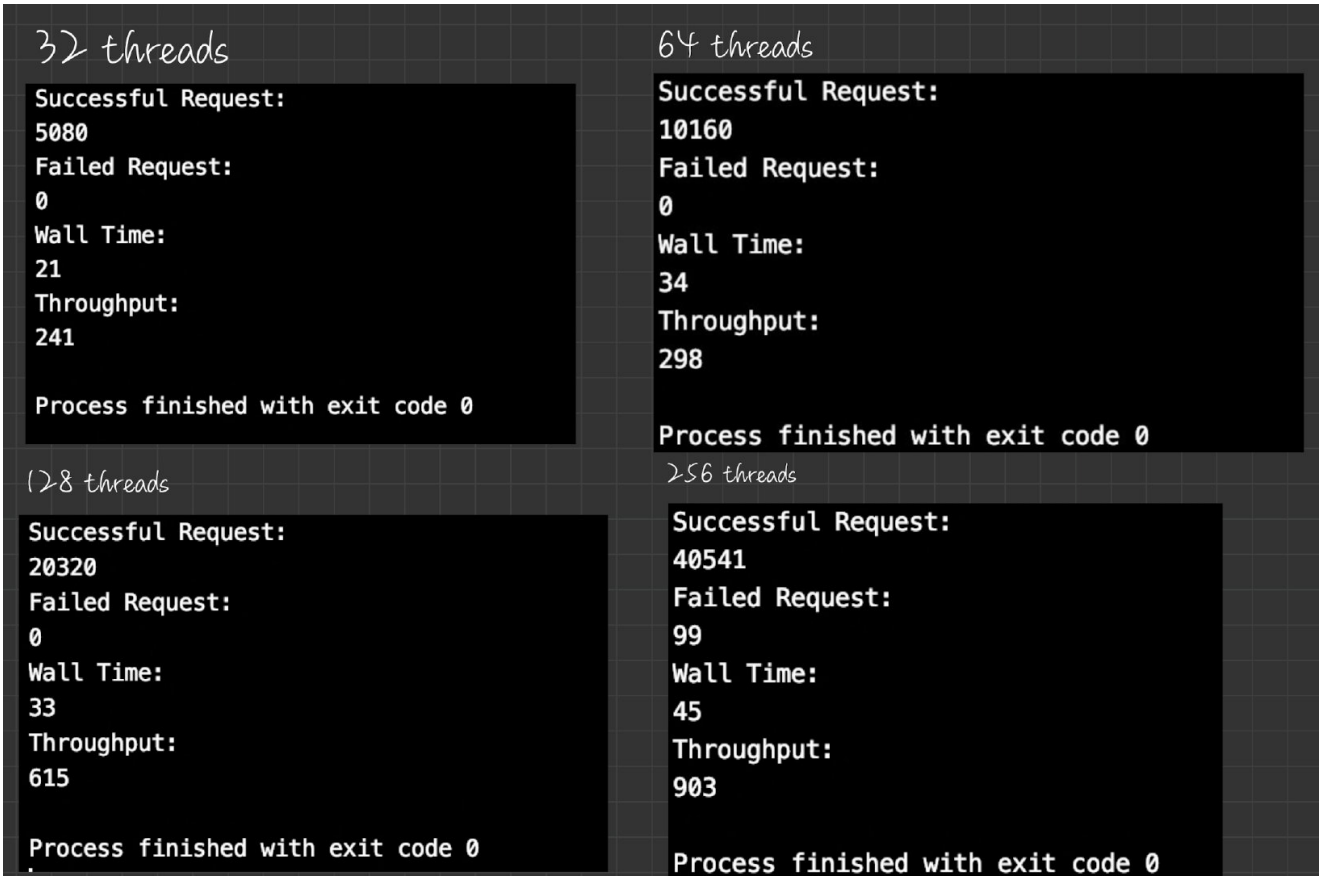
- `Setting`: **a static class** stores all necessary parameters, like serverURL, resortID and dayID etc. Those parameters come with default value accroding to the assignment description, and would be referenced by other component. In this way, we reduce the structure complexity by avoiding passing same value from component to component.
- `Phase`: **Enum** to represent 3 different phase for tagging threads of different phases.
- `Main`: **Entrance** of program, parse parameters and update those parameters into `Setting`,

create and start threads of three phases. With support of *apache cli* library, it supports standard style of commendline input. (e.g. `-T 256 -S 20000 -L 40`).

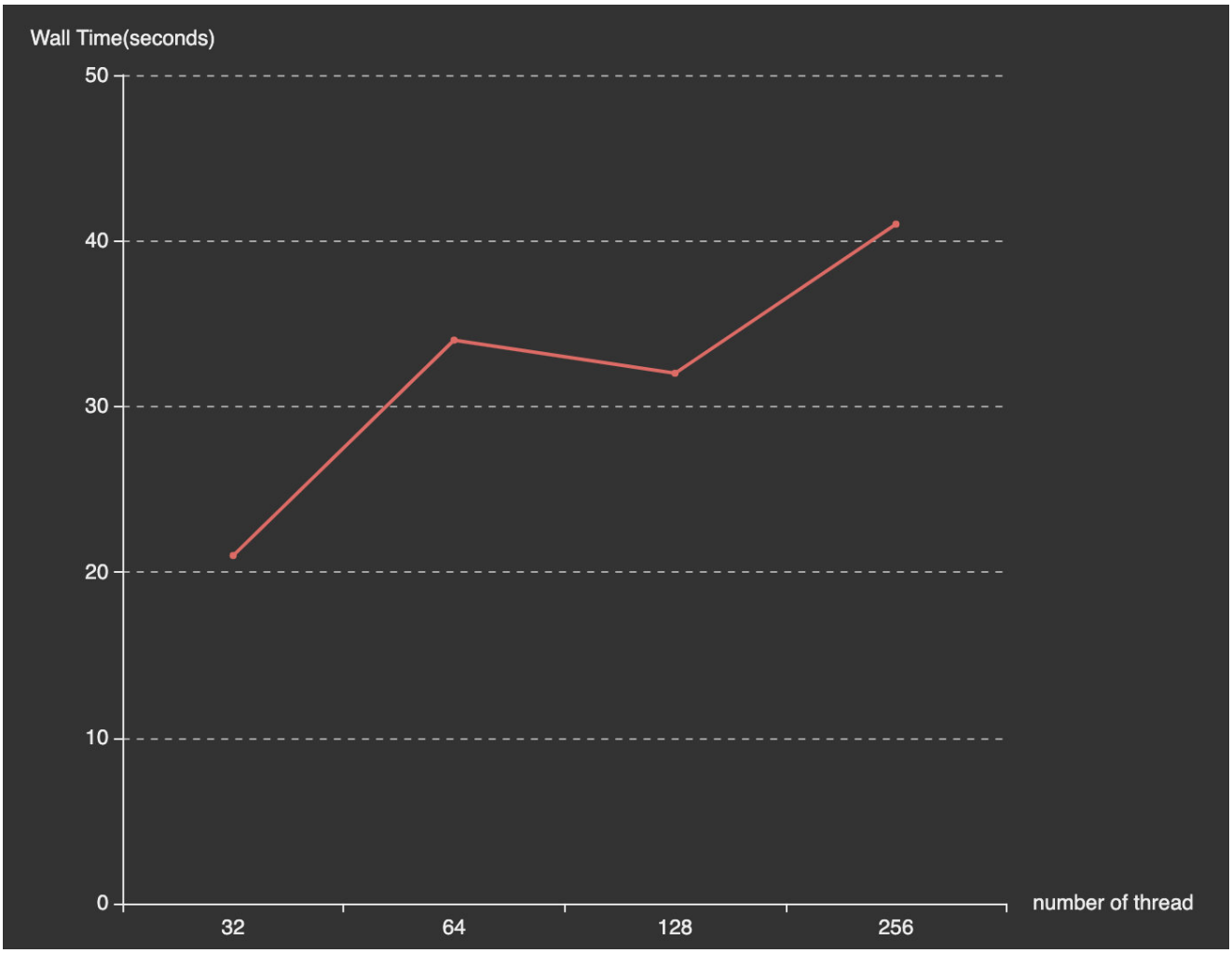
- `WorkerThread`: **Subclass** of Thread, execute requests to the server and monitor status of each requests. All the failed requests would be logged and reported to `Counter`.
- `Counter`: **a *thread-safe* class** under *single instance* design. It manage the state of threads, requests and request records (e.g. number of failed requests, number of start-up phase threads finished) . Also it would calculate the metrics in the end of the program and return corresponding data to `Main`.
- `RequestRecord`: **a *model* class** to store necessary information for a request record(start time, type(post or get), latency and returned status code), for convenience of printing csv.

Client Part 1 running Screenshot and plot

numThread\metric	Successful Request	Failed Request	Wall Time(Sec)	Throughput(per Sec)
32	5080	0	21	241
64	10160	0	34	298
128	20320	0	33	615
256	40541	99	45	903

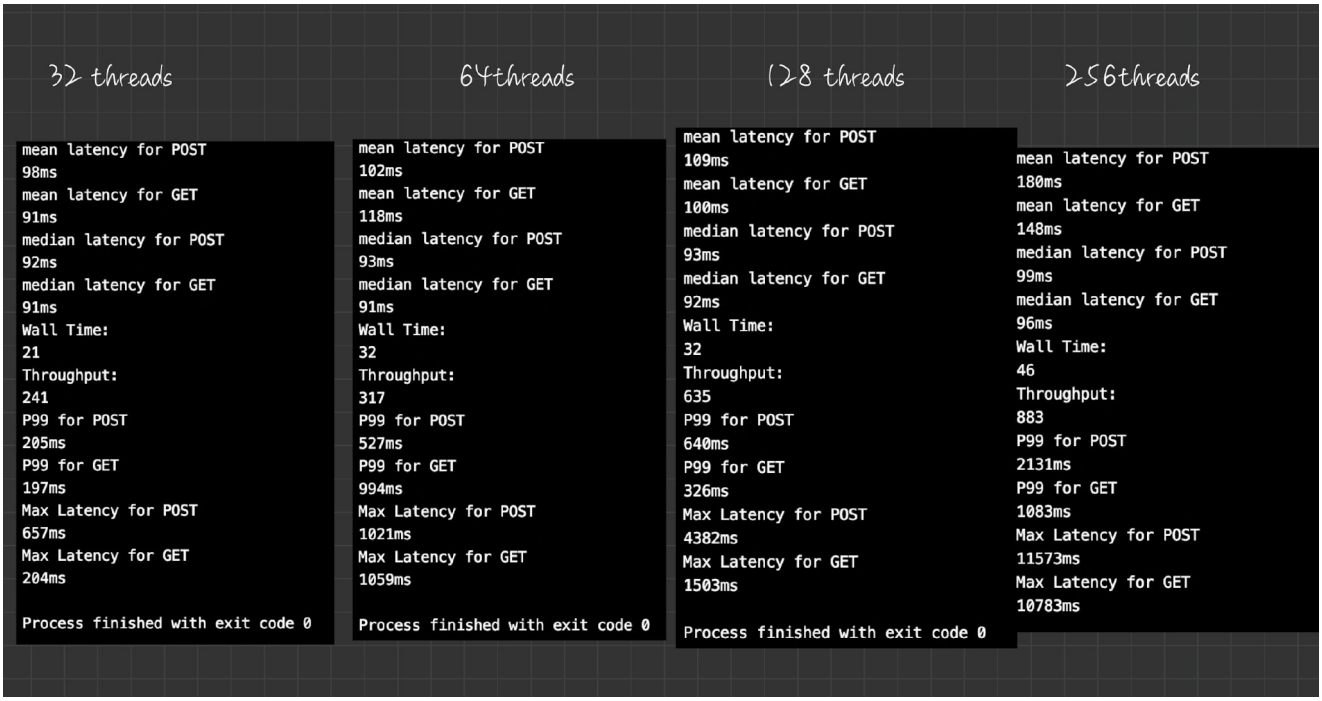


Plot

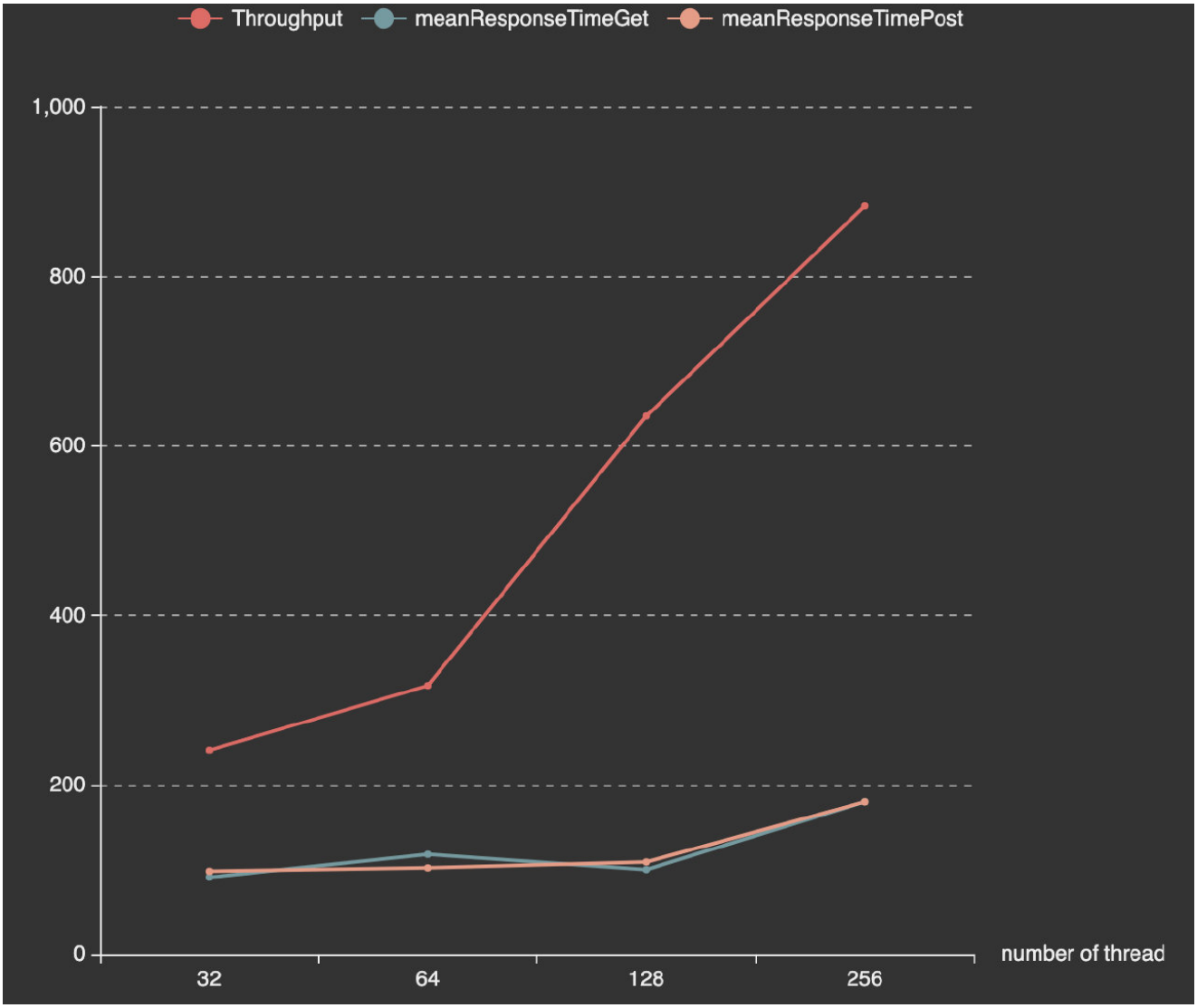


Client Part 2

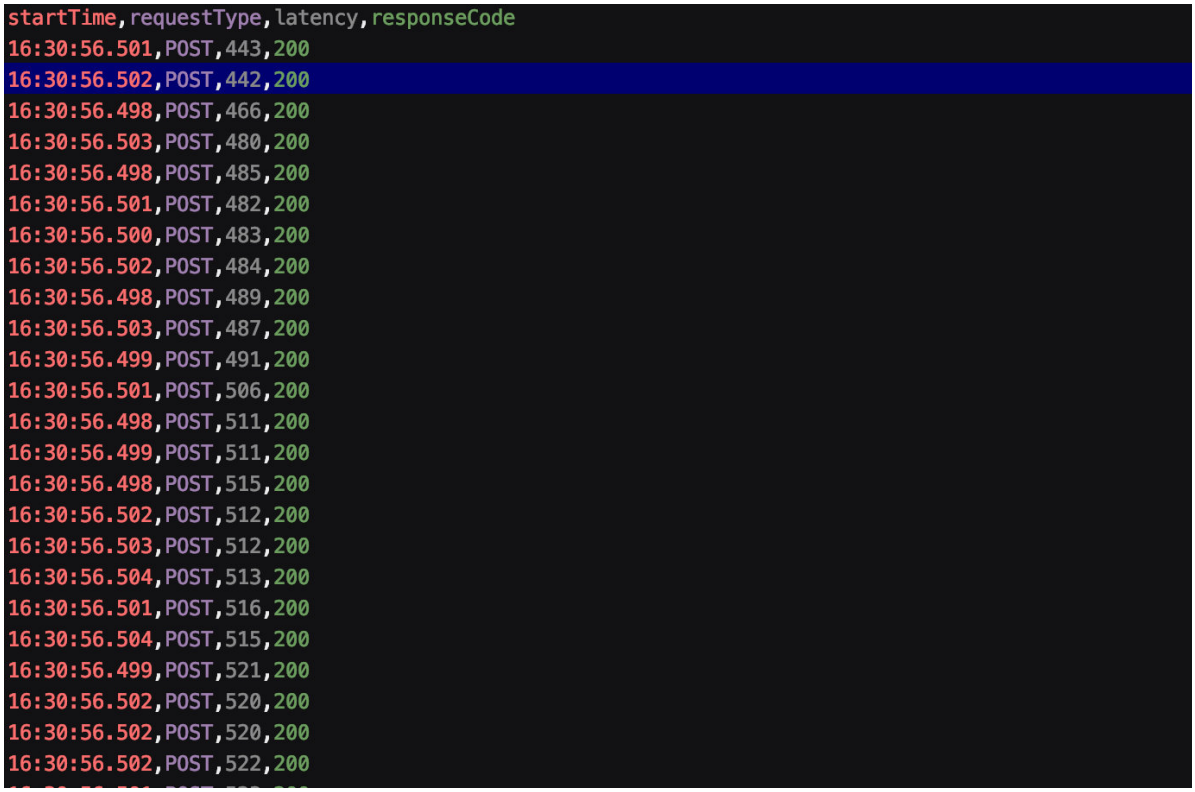
numThread\metric	Mean Post Latency	Mean Get Latency	Median Post Latency	Median Get Latency	Wall Time(Sec)	Throughput(per Sec)	P99 of Post	P99 of Get	Max Response of Post	Max Response of Get
32	98	91	92	91	21	241	205	197	657	204
64	102	118	93	91	32	317	527	994	1021	1059
128	109	100	93	92	32	635	640	326	4382	1503
256	180	148	99	96	46	883	2131	1083	11573	10783



Plot of throughput, meanResponseTimeGet and mean ResponseTimePost against number of threads



- A CSV file named "record_output.csv" would be generated at the root directory, which contains the information of every request, namely start time, request type, latency and reponse model

- 

Break Things

- result intefered by network traffic *(run client locally and server remotely)*

  when numThread comes to 256 or above, it would be heavily interfered by network traffic. Number of failed Request varies depending on when you run it. For example, result of midnight is usually better than result of afternoon. It still holds even if you changed the maxthread in your tomcat server

- Break server with 1000+ threads

  tried to run the client with `maxThread=1024`, and caused server crashed. All the queries to the server return time out error, and cannot use ssh to connect and restart the server. Finally figured out this problem by completely shutting down and restart the EC2 instance.