Introduction

The original requirement is to build a very simple backend system to fetch data through command line. Adding to the original requirement, I would also like to build a small full-stack system as POC of Microservice and AWS, also I would like to experiment mulit database(SQL/noSQL) access through Springdata. I would like to challenge myself as a one day's job to finish it, some might not be reachable for current approached, which will be continue to implemented later once getting more time.

Design:

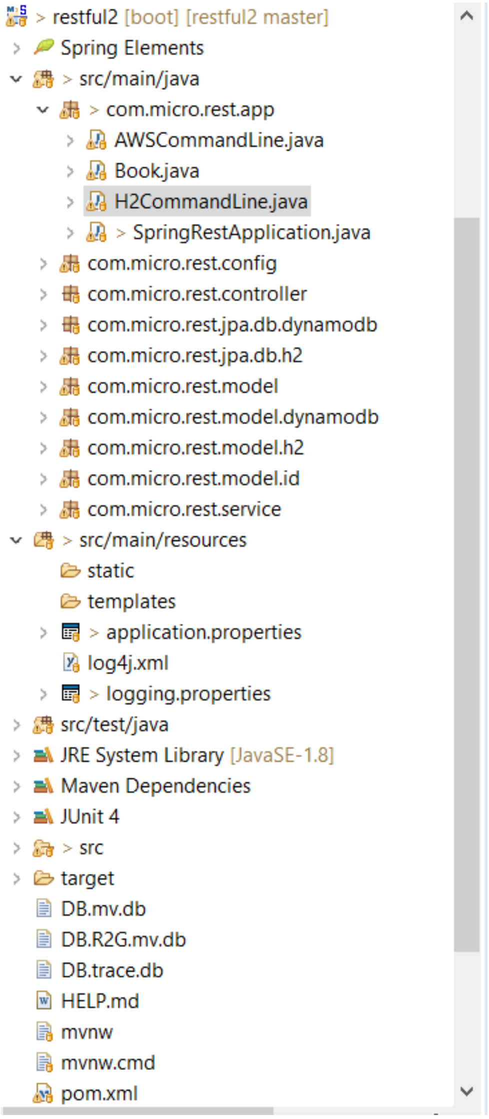
System is implemented on SpringBoot's Microservices/Restful API. User can operate CRUD function through shell client application or web. The system is also designed on multiple database sources: H2 and DynamoDB to compare the SpringBoot implementation on SQL/noSQL, also, I would like to deploy the application to AWS later, which DynamoDB would be ideal economically.

Accomplishment
Application is successfully up running, Full fill the requirement on server side, directly service call from standalone application.
Rest Service is operated correctly on top of SpringBoot
CRUD function is operated correctly on H2
Docker and SAM local have successfully tested on both DynamoDB and H2
Service side implementation on all functions
Add Spring Security on top of microservice, to access remotely through microservice, user criterial needed (client/client)
Implement Client Side function that support the commands, calling through microservice on H2, add microservice, the user still update and fetch data locally, but through microservice.
Add Logs on both Client and Server Side
Build deployment package

Todo
Add logic into stock, the warehouse capacity limitation
Add logic into unstock, should be able to update the current number of products in stock
Enhance on error/exception handler and log mechanism
Enhance on end to end testing
Java9 JShell Implementation
Implement ORM on DynamoDB
Add Web Client calling Microservice

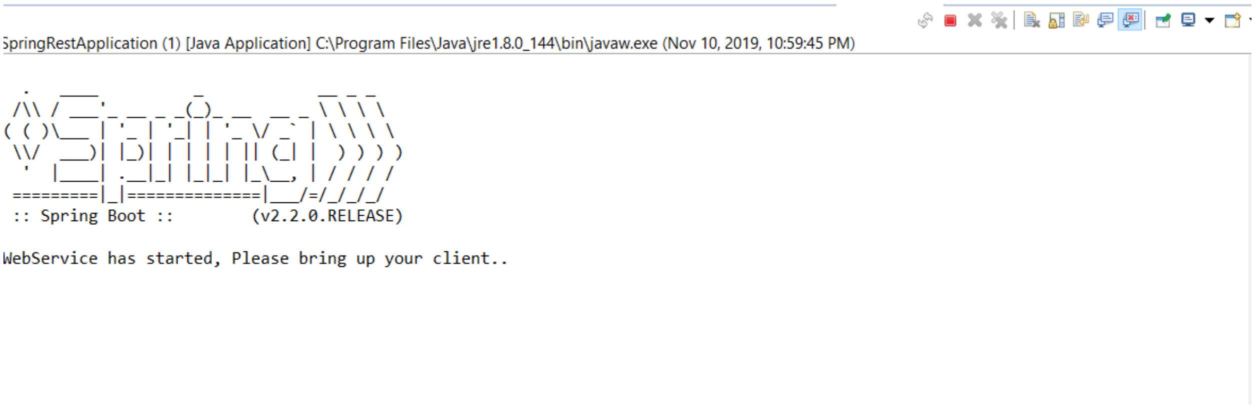
Deploy on AMS
Adding Lambada and API Gateway

Screen Shot of excution, that calling to microservice and back with the info as asked.



```
> restful2 [boot] [restful2 master]
  > Spring Elements
  v > src/main/java
      v > com.micro.rest.app
          > AWSCommandLine.java
          > Book.java
          > H2CommandLine.java
          > > SpringRestApplication.java
      > com.micro.rest.config
      > com.micro.rest.controller
      > com.micro.rest.jpa.db.dynamodb
      > com.micro.rest.jpa.db.h2
      > com.micro.rest.model
      > com.micro.rest.model.dynamodb
      > com.micro.rest.model.h2
      > com.micro.rest.model.id
      > com.micro.rest.service
  v > src/main/resources
        static
        templates
      > > application.properties
        log4j.xml
      > > logging.properties
  > src/test/java
  > JRE System Library [JavaSE-1.8]
  > Maven Dependencies
  > JUnit 4
  > > src
  > target
    DB.mv.db
    DB.R2G.mv.db
    DB.trace.db
    HELP.md
    mvnw
    mvnw.cmd
    pom.xml
```

Start Server



SpringRestApplication (1) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Nov 10, 2019, 10:59:45 PM)

```
  .   ____          _            __ _ _
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  '  |____| .__|_| |_|_| |_\__, | / / / /
 =========|_|==============|___/=/_/_/_/
 :: Spring Boot ::        (v2.2.0.RELEASE)

WebService has started, Please bring up your client..
```
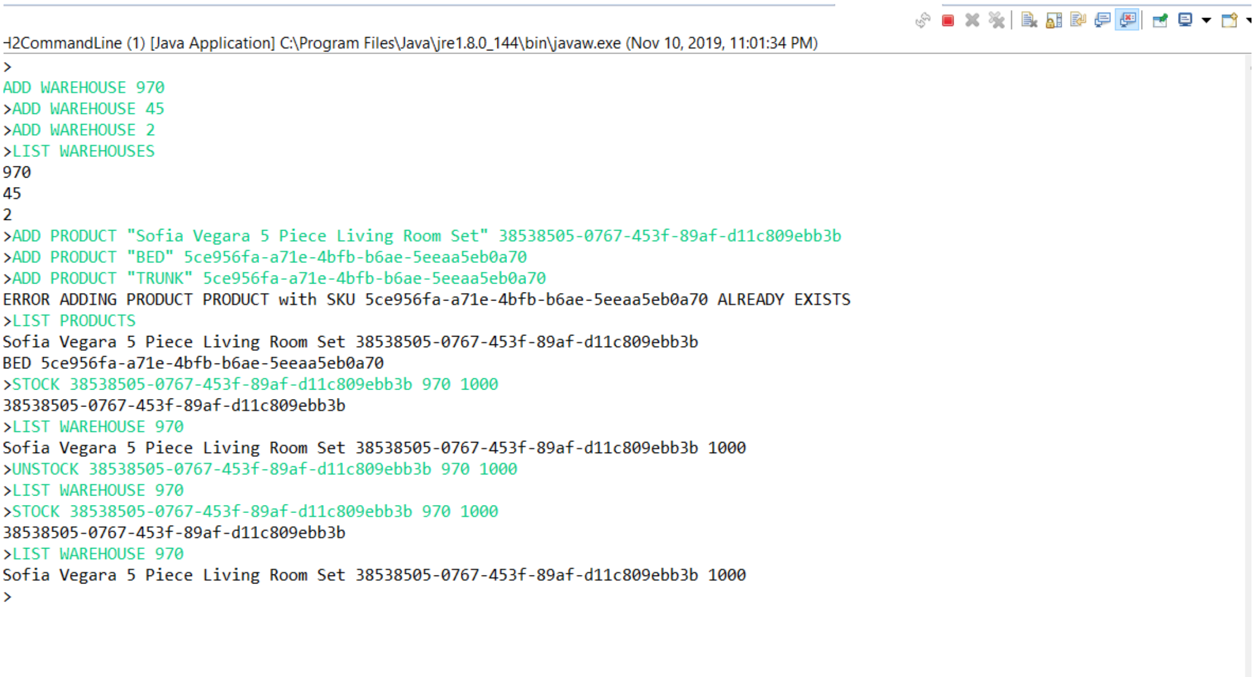
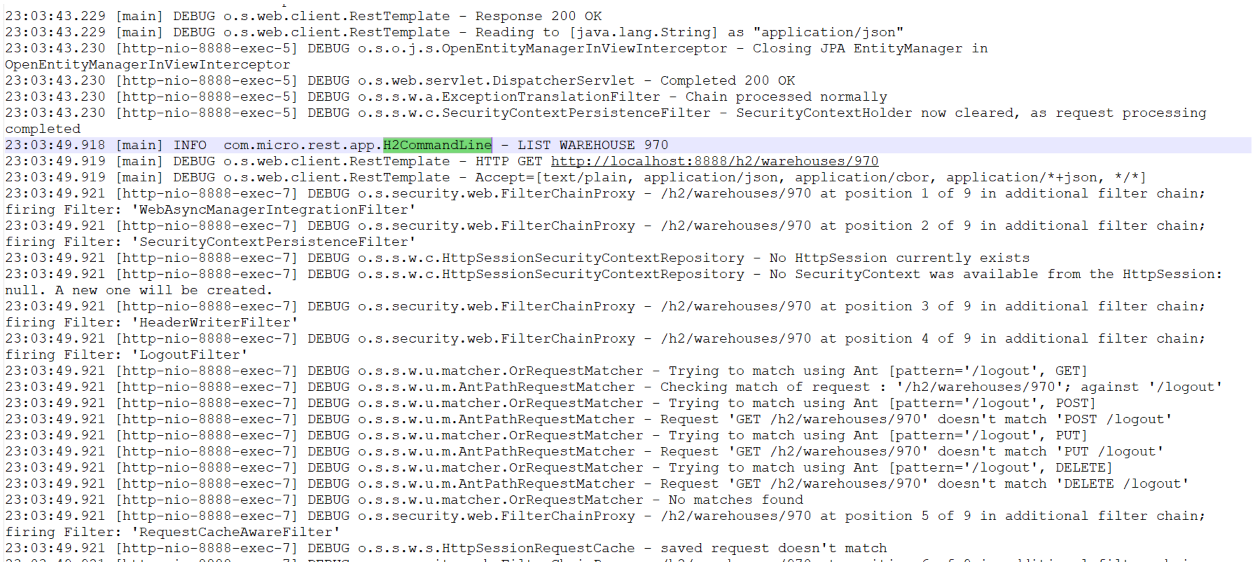

Run the Command Shell



H2CommandLine (1) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Nov 10, 2019, 11:01:34 PM)

```
>
ADD WAREHOUSE 970
>ADD WAREHOUSE 45
>ADD WAREHOUSE 2
>LIST WAREHOUSES
970
45
2
>ADD PRODUCT "Sofia Vegara 5 Piece Living Room Set" 38538505-0767-453f-89af-d11c809ebb3b
>ADD PRODUCT "BED" 5ce956fa-a71e-4bfb-b6ae-5eeaa5eb0a70
>ADD PRODUCT "TRUNK" 5ce956fa-a71e-4bfb-b6ae-5eeaa5eb0a70
ERROR ADDING PRODUCT PRODUCT with SKU 5ce956fa-a71e-4bfb-b6ae-5eeaa5eb0a70 ALREADY EXISTS
>LIST PRODUCTS
Sofia Vegara 5 Piece Living Room Set 38538505-0767-453f-89af-d11c809ebb3b
BED 5ce956fa-a71e-4bfb-b6ae-5eeaa5eb0a70
>STOCK 38538505-0767-453f-89af-d11c809ebb3b 970 1000
38538505-0767-453f-89af-d11c809ebb3b
>LIST WAREHOUSE 970
Sofia Vegara 5 Piece Living Room Set 38538505-0767-453f-89af-d11c809ebb3b 1000
>UNSTOCK 38538505-0767-453f-89af-d11c809ebb3b 970 1000
>LIST WAREHOUSE 970
>STOCK 38538505-0767-453f-89af-d11c809ebb3b 970 1000
38538505-0767-453f-89af-d11c809ebb3b
>LIST WAREHOUSE 970
Sofia Vegara 5 Piece Living Room Set 38538505-0767-453f-89af-d11c809ebb3b 1000
>
```

Log File Recorded in R2GFile.log:



```
23:03:43.229 [main] DEBUG o.s.web.client.RestTemplate - Response 200 OK
23:03:43.229 [main] DEBUG o.s.web.client.RestTemplate - Reading to [java.lang.String] as "application/json"
23:03:43.230 [http-nio-8888-exec-5] DEBUG o.s.o.j.s.OpenEntityManagerInViewInterceptor - Closing JPA EntityManager in
OpenEntityManagerInViewInterceptor
23:03:43.230 [http-nio-8888-exec-5] DEBUG o.s.web.servlet.DispatcherServlet - Completed 200 OK
23:03:43.230 [http-nio-8888-exec-5] DEBUG o.s.s.w.a.ExceptionTranslationFilter - Chain processed normally
23:03:43.230 [http-nio-8888-exec-5] DEBUG o.s.s.w.c.SecurityContextPersistenceFilter - SecurityContextHolder now cleared, as request processing
completed
23:03:49.918 [main] INFO  com.micro.rest.app.H2CommandLine - LIST WAREHOUSE 970
23:03:49.919 [main] DEBUG o.s.web.client.RestTemplate - HTTP GET http://localhost:8888/h2/warehouses/970
23:03:49.919 [main] DEBUG o.s.web.client.RestTemplate - Accept=[text/plain, application/json, application/cbor, application/*+json, */*]
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 1 of 9 in additional filter chain;
firing Filter: 'WebAsyncManagerIntegrationFilter'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 2 of 9 in additional filter chain;
firing Filter: 'SecurityContextPersistenceFilter'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.c.HttpSessionSecurityContextRepository - No HttpSession currently exists
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.c.HttpSessionSecurityContextRepository - No SecurityContext was available from the HttpSession:
null. A new one will be created.
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 3 of 9 in additional filter chain;
firing Filter: 'HeaderWriterFilter'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 4 of 9 in additional filter chain;
firing Filter: 'LogoutFilter'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.matcher.OrRequestMatcher - Trying to match using Ant [pattern='/logout', GET]
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.m.AntPathRequestMatcher - Checking match of request : '/h2/warehouses/970'; against '/logout'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.matcher.OrRequestMatcher - Trying to match using Ant [pattern='/logout', POST]
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.m.AntPathRequestMatcher - Request 'GET /h2/warehouses/970' doesn't match 'POST /logout'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.matcher.OrRequestMatcher - Trying to match using Ant [pattern='/logout', PUT]
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.m.AntPathRequestMatcher - Request 'GET /h2/warehouses/970' doesn't match 'PUT /logout'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.matcher.OrRequestMatcher - Trying to match using Ant [pattern='/logout', DELETE]
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.m.AntPathRequestMatcher - Request 'GET /h2/warehouses/970' doesn't match 'DELETE /logout'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.u.matcher.OrRequestMatcher - No matches found
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 5 of 9 in additional filter chain;
firing Filter: 'RequestCacheAwareFilter'
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.s.w.s.HttpSessionRequestCache - saved request doesn't match
23:03:49.921 [http-nio-8888-exec-7] DEBUG o.s.security.web.FilterChainProxy - /h2/warehouses/970 at position 6 of 9 in additional filter chain;
```