CMPE 281 - LAB #3 - Docker Grails & MySQL

In this Lab, you will be deploying the Grails Gumball Application to AWS using two EC2 instances.

Lab Files:

- https://github.com/paulnguyen/cmpe281/tree/master/labs/lab3
- ***NOTE: You should keep your Docker Host and MySQL Instances (which is Free Tier Eligible) for future Labs.***

Pre-Req: Install Jumpbox and Dockerhost

- https://github.com/paulnguyen/cmpe281/blob/master/jumpbox/aws-jumpbox.md
- https://github.com/paulnguyen/cmpe281/blob/master/aws/dockerhost/dockerhost.md
- Install Docker Toolbox:
  - https://www.docker.com/products/docker-toolbox
  - https://www.docker.com/docker-mac
  - https://www.docker.com/docker-windows
  - https://www.docker.com/docker-ubuntu
- NOTE: This lab works best on Mac or Linux. If you are using a Windows Machine, it is best to use the Docker Toolbox Option to run Docker in a Linux VM.
- Register for Docker Hub Account:
  - https://hub.docker.com/

Installing MySQL on a Private DB Instance

```
 Step 1:     Launch EC2 Free-Tier Instance

            AMI: Amazon Linux AMI
            Type: t2.micro
            VPC: cmpe281
            Subnet: Private
            Create new SG: db-mysql
            Open Ports: 3306
            Key Pair: your key pair (i.e. cmpe281-us-west-2 or cmpe281-us-east-1)

Step 2:     SSH into EC2 Instance via Public IP (of Jumpbox Instance)
            And then via Private IP of MySQL Instance from Jumpbox Instance.

Step 3:     Install MySQL

            NOTE: For the Private Instance to Reach Internet.  Associate Nat Gateway's
            Security Group with MySQL Instance.

            REF:  http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/install-LAMP.html
            NOTE: Only Install MySQL from Instructions Above.

            sudo yum install -y mysql56-server

            sudo service mysqld start
            sudo service mysqld stop
            sudo chkconfig mysqld on

            sudo mysql_secure_installation

                Default root password = none (hit enter)
                Set root passwrd = ***** (choose your own)
                Remove Anonymous Users = Y
                Disallow root Remote Logins = Y
                Remove Test Databases = Y
                Reload privilege tables now? = Y

Step 4:     MySQL Command Line

            REF: https://dev.mysql.com/doc/refman/5.6/en/mysql.html

            mysql --user=root --password
            password: ***** (enter your password)

            mysql> create database cmpe281 ;
            mysql> use cmpe281;
            mysql> show tables ;

            mysql> create user cmpe281;
            mysql> grant all on cmpe281.* to 'cmpe281'@'%' identified by '*****';
            mysql> flush privileges ;

            mysql --user=cmpe281 --password=**** cmpe281
```

Connect to MySQL from your Jumpbox & Install Gumball DB Tables

```
Step 1:     MySQL Command Line

            REF: https://dev.mysql.com/doc/refman/5.6/en/mysql.html

            mysql --user=cmpe281 --password=*** cmpe281 --host <host ip>

Step 2:     MySQL Commands to Install Tables

CREATE TABLE gumball (
  id bigint(20) NOT NULL AUTO_INCREMENT,
  version bigint(20) NOT NULL,
  count_gumballs int(11) NOT NULL,
  model_number varchar(255) NOT NULL,
  serial_number varchar(255) NOT NULL,
  PRIMARY KEY (id),
  UNIQUE KEY serial_number (serial_number)
) ;

insert into gumball ( id, version, count_gumballs, model_number, serial_number )
values ( 1, 0, 1000, 'M102988', '1234998871109' ) ;

select * from gumball ;
```

Install SDK MAN

Follow Instructions Here: http://sdkman.io/

Install Groovy & Grails Locally (on your Labtop/Desktop)

Note: assuming you already have Java JDK 7 or 8 Installed

```
sdk ls grails
sdk install grails 4.0.0
sdk current

grails --version

   | Grails Version: 4.0.0
   | JVM Version: 1.8.0_181
```

Config Grails Database Connection for Production

```
Update Grails Project:  gumball-v1
Update Database Config: grails-app/conf/application.yml
```

To Connector to your AWS MySQL DB.

Generate Application WAR file

In your Grails Project Root Folder, Run Command:

```
grails war
```

Confirm the Generated WAR file in:

```
build/libs/gumball-v1-1.0.war
```

Build and Push Docker Image to your Docker Hub Account

Use Script: docker.sh

```
============================================
          D O C K E R   M E N U
============================================
> grails-gumball - /grails-gumball:v1.0

[1] login      - Login to Docker
[2] images     - Show Docker Images
[3] build      - Build Container Image
[4] run        - Run Container
[5] pull       - Pull Container Image
[6] push       - Push Build to Docker Hub
[7] ps         - Show Running Containers
[8] rmi        - Remove Container Image
[9] release    - Release to Docker Hub

[+] More Options
[X] Exit Menu

Selection:
```

Deploy Docker Image on your Docker Host

```
  docker run --restart always --name grails-gumball-v1 -td -p 8080:8080 <your docker account>/
grails-gumball:v1.0

   docker ps
```

Deployment to two Docker Hosts in Private Network with a Network ELB

- Create an AMI from your Docker Host and terminate the EC2 Instance
- Launch two new Docker Host Instances in a Private Network

- Deploy Gumball (V1) Grails App into two Docker EC2 Instances (connecting to the same EC2 MySQL Instance).
  NOTE: This does not have to be "Auto Scale".

- Deploy Gumball (V2) Grails App into a two Docker EC2 Instances (connecting to the same EC2 MySQL Instance).
  NOTE: This does not have to be "Auto Scale".

- Configure a Load Balancer (Network ELB) in front of your two Docker Host Instances running Gumball V1 and/or V2.

  NOTE: Due to Free-Tier Memory Constraints, you might not be able to run both V1 and V2 at the same time.

- Did the Grails Gumball V1 App work as expected under load balancing?

- Did the Grails Gumball V2 App work as expected under load balancing?

(Optional) Using MySQL RDS instead of Local MySQL Instance

AWS RDS Dev/Test (Free Tier)

DB Instance Class:	db.t2.micro
Multi-AZ?:	No
Storage:	SSD / 5GB
DB Instance ID:	CMPE281
Master User Name:	admin
Master Password:	*********
VPC:	cmpe281
Subnet:	New DB Subnet
Public Access:	Yes
AZ:	us-west-1a
Security Group:	New Sec Group
DB Name:	CMPE281
Auto Backups:	Off (Zero Days Retention)

```
mysql --user=admin --password --host=<RDS MySQL Host>
```

Observations:

- Did the Grails Gumball V1 and V2 App work as expected under load balancing?
- Try this Lab with a ***Classic ELB***. What happens when you turn on Sticky Sessions? (***Optional***)