

Kubernetes 201

Project Case Study

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K8S-201

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1. Creating a Kubernetes Cluster on AWS

Pre-requisites:

- AWS Account with active subscription
- A Driver VM to run scripts and commands
- eksctl installed in a VM
- awscli installed in the VM

Code:

```
$ eksctl create cluster --name $clustername --nodes=$nodes --ssh-access --ssh-public-key=$key --region=$region --node-type=$nодетип
```

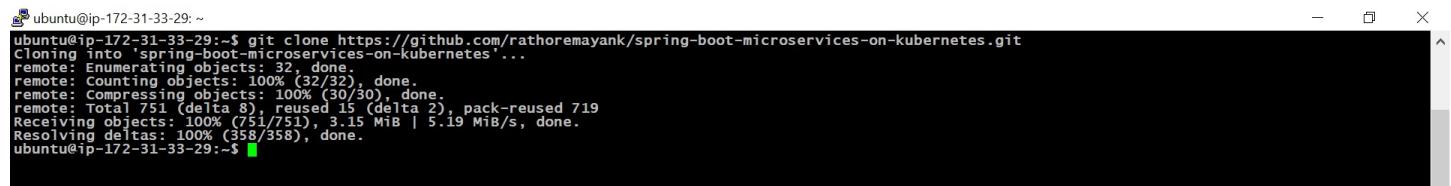
The screenshot shows a terminal window on an Ubuntu system (version 17.10) with a black background and white text. The terminal window title is "ubuntu@ip-172-31-33-29: ~". The command entered was "eksctl create cluster --name \$clustername --nodes=\$nodes --ssh-access --ssh-public-key=\$key --region=\$region --node-type=\$nодетип". The output of the command is displayed in the terminal window, showing the process of creating an EKS cluster named "k8s201" in the "eu-central-1" region. It details the creation of CloudFormation stacks for the cluster control plane and nodegroups, the deployment of the cluster stack, and the creation of a Kubernetes cluster resource. The output ends with the message "EKS cluster 'k8s201' in 'eu-central-1' region is ready". The terminal window also shows the standard Windows taskbar at the bottom.

```
ubuntu@ip-172-31-33-29:~$ ls
aws-iam-authenticator bin eks-setup.sh sp spring-boot-microservices-on-kubernetes
ubuntu@ip-172-31-33-29:~$ sh eks-setup.sh
S T A R T I N G   O P E R A T I O N
-----
[ ]----- Installing EKS-CTL -----
Enter cluster-name: k8s201
Enter region: eu-central-1
Enter no. of nodes: 2
Enter node-type: t2.small
Enter exiting aws-key-name: svr-key
[!] using region eu-central-1
[!] setting availability zones to [eu-central-1b eu-central-1a eu-central-1c]
[!] subnets for eu-central-1b - public:192.168.0.0/19 private:192.168.96.0/19
[!] subnets for eu-central-1a - public:192.168.32.0/19 private:192.168.128.0/19
[!] subnets for eu-central-1c - public:192.168.64.0/19 private:192.168.160.0/19
[!] nodegroup "ng-f28a621c" will use "ami-0d741ed58ca5b342e" [AmazonLinux2/1.12]
[!] using EC2 key pair "svr-key"
[!] creating EKS cluster "k8s201" in "eu-central-1" region
[!] will create 2 separate CloudFormation stacks for cluster itself and the initial nodegroup
[!] if you encounter any issues, check CloudFormation console or try 'eksctl utils describe-stacks --region=eu-central-1 --name=k8s201'
[!] 2 sequential tasks: { create cluster control plane "k8s201", create nodegroup "ng-f28a621c" }
[!] building cluster stack "eksctl-k8s201-cluster"
[!] deploying stack "eksctl-k8s201-cluster"
[!] building nodegroup stack "eksctl-k8s201-nodegroup-ng-f28a621c"
[!] --nodes-min=2 was set automatically for nodegroup ng-f28a621c
[!] --nodes-max=2 was set automatically for nodegroup ng-f28a621c
[!] deploying stack "eksctl-k8s201-nodegroup-ng-f28a621c"
[!] all EKS cluster resource for "k8s201" had been created
[!] saved kubeconfig as "/home/ubuntu/.kube/config"
[!] adding role "arn:aws:iam::052578464564:role/eksctl-k8s201-nodegroup-ng-f28a62-NodeInstanceRole-WHNXI6LXE7NG" to auth ConfigMap
[!] nodegroup "ng-f28a621c" has 0 node(s)
[!] waiting for at least 2 node(s) to become ready in "ng-f28a621c"
[!] nodegroup "ng-f28a621c" has 2 node(s)
[!] node "ip-192-168-35-206.eu-central-1.compute.internal" is ready
[!] node "ip-192-168-86-128.eu-central-1.compute.internal" is ready
[!] kubectl command should work with "/home/ubuntu/.kube/config", try 'kubectl get nodes'.
[!] EKS cluster "k8s201" in "eu-central-1" region is ready
----- Ended Cluster Creation -----
----- E N D I N G   O P E R A T I O N -----
ubuntu@ip-172-31-33-29:~$
```

2. Cloning the git-repo

Code:

```
$ git clone https://github.com/rathoremayank/spring-boot-microservices-on-kubernetes.git
```



```
ubuntu@ip-172-31-33-29: ~
ubuntu@ip-172-31-33-29:~$ git clone https://github.com/rathoremayank/spring-boot-microservices-on-kubernetes.git
Cloning into 'spring-boot-microservices-on-kubernetes'...
remote: Enumerating objects: 32, done.
remote: Counting objects: 100% (32/32), done.
remote: Compressing objects: 100% (30/30), done.
remote: Total 751 (delta 8), reused 15 (delta 2), pack-reused 719
Receiving objects: 100% (751/751), 3.15 MiB | 5.19 MiB/s, done.
Resolving deltas: 100% (358/358), done.
ubuntu@ip-172-31-33-29:~$
```

3. Creating Services and Deployments on the Kubernetes Cluster

3.1. Creating the database service

```
$ kubectl create -f account-database.yaml
```

3.2. Providing secrets

```
$ kubectl apply -f secrets.yaml
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl create -f account-database.yaml
service/account-database created
deployment.extensions/account-database created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl apply -f secrets.yaml
secret/demo-credentials created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$
```

3.3. Creating Spring Boot Micro-services

3.3.1. Building projects using maven

Pre-requisites:

- Apache Maven installed in the VM

Commands:

```
Go to containers/compute-interest-api
```

```
$ mvn package
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ cd containers/compute-interest-api/
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ mvn package
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$ReflectUtils$1
WARNING: Use -illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO] 
[INFO] < officespace:spring-boot-mysql-springdatajpa-hibernate >-----
[INFO] Building spring-boot-mysql-springdatajpa-hibernate 0.0.1-SNAPSHOT
[INFO]   [ jar ] -----
[INFO] 
[INFO] --- maven-resources-plugin:3.0.1:resources (default-resources) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 1 resource
[INFO] Copying 0 resource
[INFO] 
[INFO] --- maven-compiler-plugin:3.7.0:compile (default-compile) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 5 source files to /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/compute-interest-api/target/classes
[INFO] 
[INFO] --- maven-resources-plugin:3.0.1:testResources (default-testResources) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/compute-interest-api/src/test/resources
[INFO] 
[INFO] --- maven-compiler-plugin:3.7.0:testCompile (default-testCompile) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] No sources to compile
[INFO] 
[INFO] --- maven-surefire-plugin:2.21.0:test (default-test) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] No tests to run.
[INFO] 
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] Building jar: /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/compute-interest-api/target/spring-boot-mysql-springdatajpa-hibernate-0.0.1-SNAPSHOT.jar
[INFO] 
[INFO] --- spring-boot-maven-plugin:2.0.3.RELEASE:repackage (default) @ spring-boot-mysql-springdatajpa-hibernate ---
[INFO] 
[INFO] BUILD SUCCESS
[INFO] 
[INFO] Total time: 7.255 s
[INFO] Finished at: 2019-06-19T08:09:36Z
[INFO]
```

```
Go to containers/send-notification
```

```
$ mvn package
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ cd containers/send-notification/
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ mvn package
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$ReflectUtils$1
WARNING: Use -illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO] ------------------------------------------------------------------------
[INFO] <!-- com.example:email-office-space -->
[INFO] Building email-office-space 0.0.1-SNAPSHOT
[INFO] [ jar ] -----
[INFO] --- maven-resources-plugin:3.0.1:resources (default-resources) @ email-office-space ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 1 resource
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.7.0:compile (default-compile) @ email-office-space ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 2 source files to /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/send-notification/target/classes
[INFO] --- maven-resources-plugin:3.0.1:testResources (default-testResources) @ email-office-space ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/send-notification/src/test/resources
[INFO] --- maven-compiler-plugin:3.7.0:testCompile (default-testCompile) @ email-office-space ---
[INFO] No sources to compile
[INFO] --- maven-surefire-plugin:2.21.0:test (default-test) @ email-office-space ---
[INFO] No tests to run.
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ email-office-space ---
[INFO] Building jar: /home/ubuntu/spring-boot-microservices-on-kubernetes/containers/send-notification/target/email-office-space-0.0.1-SNAPSHOT.jar
[INFO] --- spring-boot-maven-plugin:2.0.3.RELEASE:repackage (default) @ email-office-space ---
[INFO] 
[INFO] BUILD SUCCESS
[INFO] 
[INFO] Total time: 6.546 s
[INFO] Finished at: 2019-06-19T08:10:55Z
[INFO]
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$
```

3.3.2. Building docker images for Spring Boot Services

Pre-requisites:

- Docker installation on VM
- Dockerhub account

Commands:

```
$ docker build -t <your-dockerhub-username>/compute-interest-api .
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ ls
Dockerfile custom-entrypoint.sh initialize_db.sql pom.xml src target wait-for-it.sh
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ sudo docker build -t octopent/compute-interest-api .
Step 1/6 : FROM maven:3.3.9-jdk-8-alpine
--> dd9d4e1cd9db
Step 2/6 : COPY ./app
--> 5043bbaace28
Step 3/6 : WORKDIR /app
--> Running in 4d8031cf9444
Removing intermediate container 4d8031cf9444
--> 2bc4a407eb21
Step 4/6 : RUN apk update && apk add mysql mysql-client
--> Running in 81aff921bd19
fetch http://dl-cdn.alpinelinux.org/alpine/v3.5/main/x86_64/APKINDEX.tar.gz
fetch http://dl-cdn.alpinelinux.org/alpine/v3.5/community/x86_64/APKINDEX.tar.gz
v3.5.3-40-g389d0b359a [http://dl-cdn.alpinelinux.org/alpine/v3.5/main]
v3.5.3-40-g389d0b359a [http://dl-cdn.alpinelinux.org/alpine/v3.5/community]
OK: 7984 distinct packages available
(1/6) Installing mariadb-common (10.1.32-r0)
(2/6) Installing libaio (0.3.110-r0)
(3/6) Installing mariadb (10.1.32-r0)
Executing mariadb-10.1.32-r0.pre-install
(4/6) Installing mysql (10.1.32-r0)
(5/6) Installing mariadb-client (10.1.32-r0)
(6/6) Installing mysql-client (10.1.32-r0)
Executing busybox-1.25.1-r0.trigger
OK: 292 MiB in 65 packages
Removing intermediate container 81aff921bd19
--> ee50a1329175
Step 5/6 : ENTRYPOINT ["./app/custom-entrypoint.sh"]
--> Running in 3513402fb74a
Removing intermediate container 3513402fb74a
--> 70e94fa0545b
Step 6/6 : CMD java -jar target/*.jar
--> Running in b6198fea2c41
Removing intermediate container b6198fea2c41
--> 3262ad6f9fd2
Successfully built 3262ad6f9fd2
Successfully tagged octopent/compute-interest-api:latest
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$
```

```
$ docker push <your-dockerhub-username>/compute-interest-api
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$ sudo docker push octopent/compute-interest-api
The push refers to repository [docker.io/octopent/compute-interest-api]
2ed2414cfdda: Pushed
d99d4bc38e8e: Pushed
b3364fb45ee6: Pushed
b9987b824b55: Pushed
5d78cfa459c6: Mounted from library/maven
6ba3falea99a: Mounted from library/maven
9f90af1b6dd3: Mounted from library/maven
27f36920af49: Pushed
23b9c7b43573: Mounted from library/maven
latest: digest: sha256:6aaef36f10f59c7b0efc38e3f226b2d8511aa09866cfdb979ea60cc767487524 size: 2207
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/compute-interest-api$
```

```
$ docker build -t <your-dockerhub-username>/send-notification .
```

```
$ docker push <your-dockerhub-username>/send-notification
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ ls
Dockerfile pom.xml src target
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ sudo docker build -t octopent/send-notification .
Sending build context to Docker daemon 17.08MB
Step 1/4 : FROM maven:3.3.9-jdk-8-alpine
--> dd9d4e1cd9db
Step 2/4 : COPY ./app
--> e928b3b60817
Step 3/4 : WORKDIR /app
--> Running in 2f3b7cd75d92
Removing intermediate container 2f3b7cd75d92
--> 12e85d4be799
Step 4/4 : CMD java -jar target/*.jar
--> Running in eb25b3407722
Removing intermediate container eb25b3407722
--> 74ff25878965
Successfully built 74ff25878965
Successfully tagged octopent/send-notification:latest
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$ sudo docker push octopent/send-notification
The push refers to repository [docker.io/octopent/send-notification]
fc87d06d4b2: Pushed
b3364fb45ee6: Mounted from octopent/compute-interest-api
b9987b824b55: Mounted from octopent/compute-interest-api
5d78cfa459c6: Mounted from octopent/compute-interest-api
6ba3falea99a: Mounted from octopent/compute-interest-api
9f90af1b6dd3: Mounted from octopent/compute-interest-api
27f36920af49: Mounted from octopent/compute-interest-api
23b9c7b43573: Mounted from octopent/compute-interest-api
latest: digest: sha256:9843b1e59cb5f561c8f08fd5e810f7a7dc07c7da7ace7fa97baae88e885da29 size: 1995
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes/containers/send-notification$
```

The screenshot shows a browser window with several tabs open. The active tab is 'rathoremayank/spring-boot'. The page displays the Docker Hub interface for the 'octopent' organization. A search bar at the top has 'octopent' selected. Below it, a table lists two repositories:

REPOSITORY	DESCRIPTION	LAST MODIFIED
octopent / send-notification	This repository does not have a description...	⌚ a minute ago
octopent / compute-interest-api	This repository does not have a description...	⌚ 3 minutes ago

3.3.3. Deploying the micro-services to the Kubernetes Cluster

Pre-requisites:

- kubectl installation on the VM
- Healthy running cluster with kubectl configured

Commands:

```
$ kubectl apply -f compute-interest-api.yaml
```

```
$ kubectl apply -f send-notification.yaml
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ ll
total 112
drwxrwxr-x 8 ubuntu ubuntu 4096 Jun 19 08:29 .
drwxrwxr-x 11 ubuntu ubuntu 4096 Jun 19 08:29 ..
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 .bluemix/
drwxrwxr-x 8 ubuntu ubuntu 4096 Jun 19 08:02 .git/
-rw-rw-r-- 1 ubuntu ubuntu 441 Jun 19 08:02 .travis.yml
-rw-rw-r-- 1 ubuntu ubuntu 1018 Jun 19 08:02 .yamlint.yml
-rw-rw-r-- 1 ubuntu ubuntu 69 Jun 19 08:02 CONTRIBUTING.md
-rw-rw-r-- 1 ubuntu ubuntu 11357 Jun 19 08:02 LICENSE
-rw-rw-r-- 1 ubuntu ubuntu 3131 Jun 19 08:02 MAINTAINERS.md
-rw-rw-r-- 1 ubuntu ubuntu 17309 Jun 19 08:02 README.md
-rw-rw-r-- 1 ubuntu ubuntu 922 Jun 19 08:02 account-database.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1385 Jun 19 08:02 account-summary.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1335 Jun 19 08:29 compute-interest-api.yaml
drwxrwxr-x 6 ubuntu ubuntu 4096 Jun 19 08:02 containers/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 images/
drwxrwxr-x 3 ubuntu ubuntu 4096 Jun 19 08:02 scripts/
-rw-rw-r-- 1 ubuntu ubuntu 194 Jun 19 08:02 secrets.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1170 Jun 19 08:02 send-notification.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1568 Jun 19 08:02 sendEmail.js
-rw-rw-r-- 1 ubuntu ubuntu 3209 Jun 19 08:02 sendSlack.js
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 tests/
-rw-rw-r-- 1 ubuntu ubuntu 676 Jun 19 08:02 transaction-generator.yaml
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl apply -f compute-interest-api.yaml
service/compute-interest-api created
deployment.extensions/compute-interest-api created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl apply -f send-notification.yaml
service/send-notification created
deployment.extensions/send-notification created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
```

3.3.4. Deploying the front-end service

Commands:

```
$ kubectl apply -f account-summary.yaml
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ ll
total 112
drwxrwxr-x 8 ubuntu ubuntu 4096 Jun 19 08:29 .
drwxrwxr-x 11 ubuntu ubuntu 4096 Jun 19 08:29 ..
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 .bluemix/
drwxrwxr-x 8 ubuntu ubuntu 4096 Jun 19 08:02 .git/
-rw-rw-r-- 1 ubuntu ubuntu 441 Jun 19 08:02 .travis.yml
-rw-rw-r-- 1 ubuntu ubuntu 1018 Jun 19 08:02 .yamlint.yml
-rw-rw-r-- 1 ubuntu ubuntu 569 Jun 19 08:02 CONTRIBUTING.md
-rw-rw-r-- 1 ubuntu ubuntu 11357 Jun 19 08:02 LICENSE
-rw-rw-r-- 1 ubuntu ubuntu 3131 Jun 19 08:02 MAINTAINERS.md
-rw-rw-r-- 1 ubuntu ubuntu 17309 Jun 19 08:02 README.md
-rw-rw-r-- 1 ubuntu ubuntu 922 Jun 19 08:02 account-database.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1385 Jun 19 08:02 account-summary.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1335 Jun 19 08:22 compute-interest-api.yaml
drwxrwxr-x 6 ubuntu ubuntu 4096 Jun 19 08:02 containers/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 images/
drwxrwxr-x 3 ubuntu ubuntu 4096 Jun 19 08:02 scripts/
-rw-rw-r-- 1 ubuntu ubuntu 194 Jun 19 08:02 secrets.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1170 Jun 19 08:02 send-notification.yaml
-rw-rw-r-- 1 ubuntu ubuntu 1568 Jun 19 08:02 sendEmail.js
-rw-rw-r-- 1 ubuntu ubuntu 3209 Jun 19 08:02 sendSlack.js
drwxrwxr-x 2 ubuntu ubuntu 4096 Jun 19 08:02 tests/
-rw-rw-r-- 1 ubuntu ubuntu 676 Jun 19 08:02 transaction-generator.yaml
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl apply -f account-summary.yaml
service/account-summary created
deployment.extensions/account-summary created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
```

3.3.5. Deploying the Transaction Generator Service

Commands:

```
$ kubectl apply -f transaction-generator.yaml
```

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl apply -f transaction-generator.yaml
service/transaction-generator created
deployment.extensions/transaction-generator created
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ 
```

4. Accessing the Application:

```
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
account-database-758c6cfb46-f6qlb   1/1     Running   0          44m
account-summary-548545c68b-54pwv   1/1     Running   0          11m
compute-interest-api-54c9b9c94-crqlx 1/1     Running   0          14m
send-notification-5899846f9-cdh7k   1/1     Running   0          14m
transaction-generator-98dc8c8b-56m2z 1/1     Running   0          9m11s
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ kubectl get services
NAME            TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
account-database   ClusterIP  10.100.110.96  <none>       3306/TCP   44m
account-summary   NodePort    10.100.203.30  <none>       80:30080/TCP 11m
Compute-interest-api   ClusterIP  10.100.26.126  <none>       8080/TCP   14m
kubernetes        ClusterIP  10.100.0.1    <none>       443/TCP    54m
send-notification   ClusterIP  10.100.35.193  <none>       8080/TCP   14m
transaction-generator   ClusterIP  10.100.157.173 <none>       8080/TCP   9m18s
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$ curl 18.197.228.5:30080
<!DOCTYPE html>
<html ng-app="accountSummary">
  <head>
    <meta charset="utf-8">
    <title>Bank Account Balance</title>
    <base href="/index.html">
    <meta name="viewport" content="width=device-width, initial-scale = 1.0">
    <meta name="keywords" content="docker-compose, docker, stack">
    <meta name="author" content="IBM">
    <link rel="stylesheet" href="/stylesheets/style.css" />
  </head>
  <body ng-controller="accountBalanceCtrl" >
    <div id="accountSummary">
      <div id="accountHeader">
        <span>Account Balance</span>
      </div>
      <div id="balance">
        <span>{{total | currency}}</span>
      </div>
    </div>
    <script src="socket.io.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.4.5/angular.min.js"></script>
    <script src="app.js"></script>
  </body>
</html>
ubuntu@ip-172-31-33-29:~/spring-boot-microservices-on-kubernetes$
```



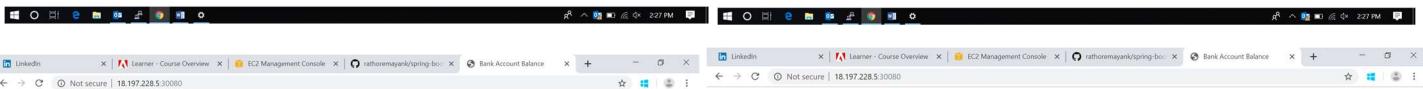
Account Balance
\$535,435.36





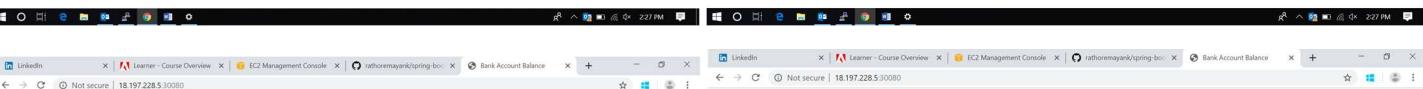
Account Balance
\$535,614.08

Account Balance
\$535,975.92



Account Balance
\$536,175.36

Account Balance
\$536,525.12



Account Balance
\$536,525.12

Account Balance
\$538,187.04



5. Cleanup

Commands:

```
$ eksctl delete cluster --name=<cluster-name> --region=<region>
```

```
ubuntu@ip-172-31-33-29:~$ eksctl delete cluster --name=k8s201 --region=eu-central-1
[!] using region eu-central-1
[!] deleting EKS cluster "k8s201"
[!] kubeconfig has been updated
[!] 2 sequential tasks: { delete nodegroup "ng-f28a621c", delete cluster control plane "k8s201" [async] }
[!] will delete stack "eksctl-k8s201-nodegroup-ng-f28a621c"
[!] waiting for stack "eksctl-k8s201-nodegroup-ng-f28a621c" to get deleted
```