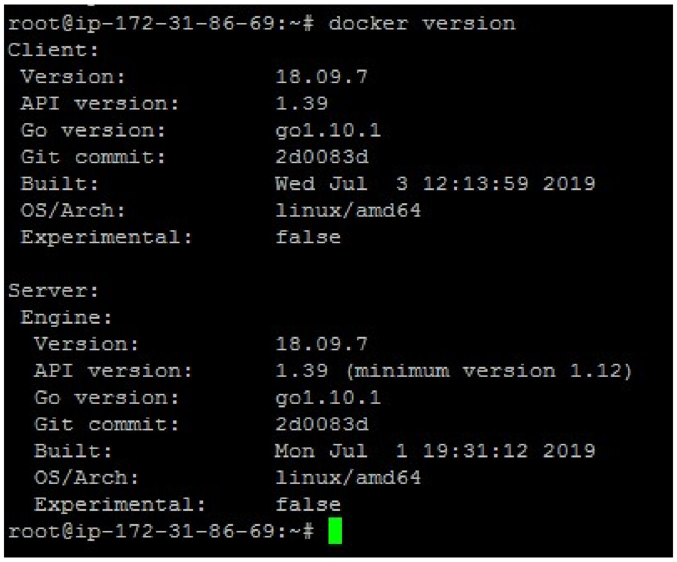
1. Install Kubernetes.

Step 1: Installing prerequisites packages

- Kubernetes is already installed in your practice lab.
- Run the **docker version** command to validate Docker.

docker version

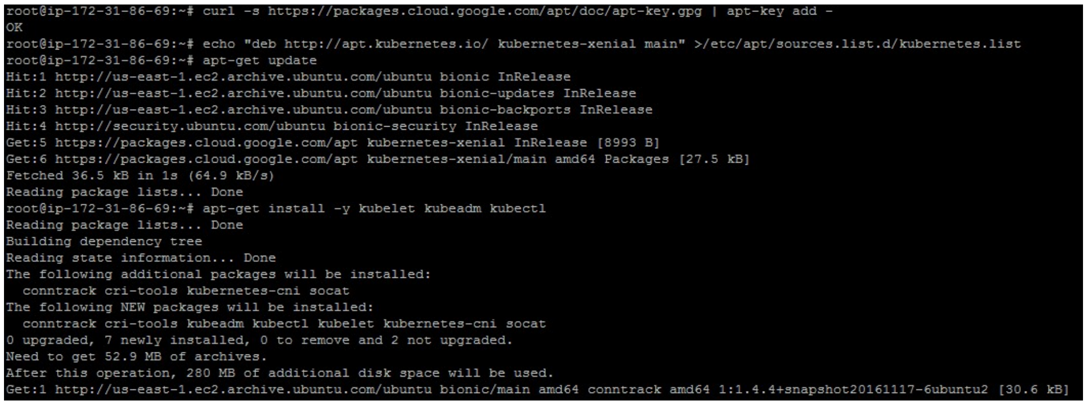


```
root@ip-172-31-86-69:~# docker version
Client:
 Version:           18.09.7
 API version:       1.39
 Go version:        go1.10.1
 Git commit:        2d0083d
 Built:             Wed Jul  3 12:13:59 2019
 OS/Arch:           linux/amd64
 Experimental:      false

Server:
 Engine:
  Version:          18.09.7
  API version:      1.39 (minimum version 1.12)
  Go version:       go1.10.1
  Git commit:       2d0083d
  Built:            Mon Jul  1 19:31:12 2019
  OS/Arch:          linux/amd64
  Experimental:     false
root@ip-172-31-86-69:~#
```

Step 2: Configuring Kubernetes

- Configure Kubernetes using the procedure below.

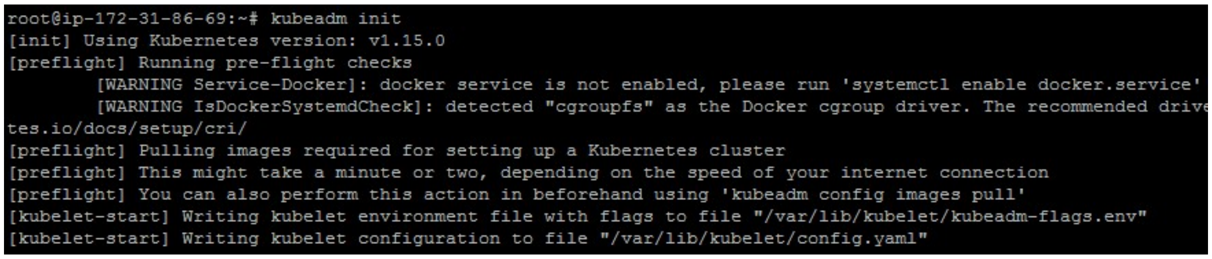
```
curl -s https://packages.cloud.google.com/apt/doc/apt-key.gpg | apt-key add -

echo "deb http://apt.kubernetes.io/ kubernetes-xenial main"
>/etc/apt/sources.list.d/kubernetes.list

apt-get update

apt-get install -y kubelet kubeadm kubectl
```



```
root@ip-172-31-86-69:~# curl -s https://packages.cloud.google.com/apt/doc/apt-key.gpg | apt-key add -
OK
root@ip-172-31-86-69:~# echo "deb http://apt.kubernetes.io/ kubernetes-xenial main" >/etc/apt/sources.list.d/kubernetes.list
root@ip-172-31-86-69:~# apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu bionic-security InRelease
Get:5 https://packages.cloud.google.com/apt kubernetes-xenial InRelease [8993 B]
Get:6 https://packages.cloud.google.com/apt kubernetes-xenial/main amd64 Packages [27.5 kB]
Fetched 36.5 kB in 1s (64.9 kB/s)
Reading package lists... Done
root@ip-172-31-86-69:~# apt-get install -y kubelet kubeadm kubectl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni socat
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubectl kubelet kubernetes-cni socat
0 upgraded, 7 newly installed, 0 to remove and 2 not upgraded.
Need to get 52.9 MB of archives.
After this operation, 280 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/main amd64 conntrack amd64 1:1.4.4+snapshot20161117-6ubuntu2 [30.6 kB]
```

- Initialize Kubernetes to deploy containers using Kubernetes CLI.

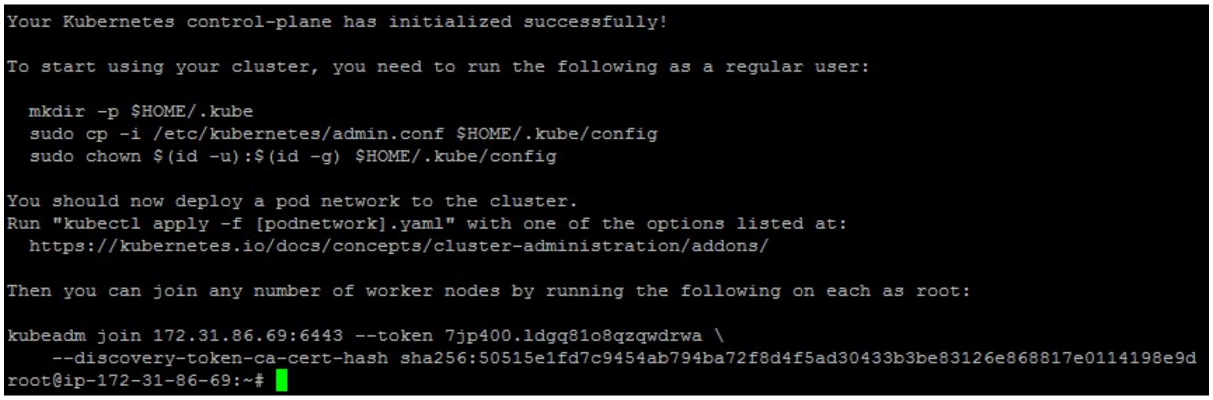
  kubeadm init



```
root@ip-172-31-86-69:~# kubeadm init
[init] Using Kubernetes version: v1.15.0
[preflight] Running pre-flight checks
        [WARNING Service-Docker]: docker service is not enabled, please run 'systemctl enable docker.service'
        [WARNING IsDockerSystemdCheck]: detected "cgroupfs" as the Docker cgroup driver. The recommended drive
tes.io/docs/setup/cri/
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your internet connection
[preflight] You can also perform this action in beforehand using 'kubeadm config images pull'
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
```

- Once Kubernetes is initialized, configure Kubernetes to start using the Kubernetes cluster.

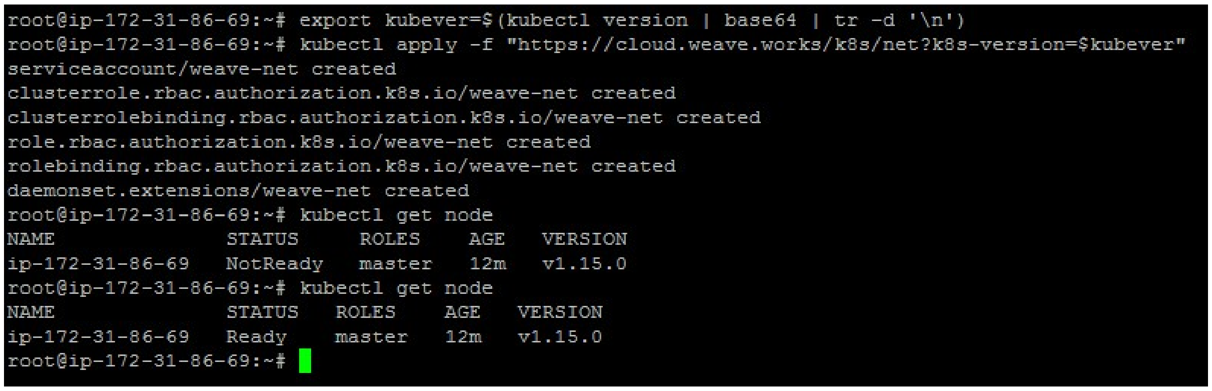
```
mkdir -p $HOME/.kube

sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config

sudo chown $(id -u):$(id -g) $HOME/.kube/config
```



```
Your Kubernetes control-plane has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

  mkdir -p $HOME/.kube
  sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
  sudo chown $(id -u):$(id -g) $HOME/.kube/config

You should now deploy a pod network to the cluster.
Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:
  https://kubernetes.io/docs/concepts/cluster-administration/addons/

Then you can join any number of worker nodes by running the following on each as root:

kubeadm join 172.31.86.69:6443 --token 7jp400.1dgq81o8qzqwdrwa \
    --discovery-token-ca-cert-hash sha256:50515e1fd7c9454ab794ba72f8d4f5ad30433b3be83126e868817e0114198e9d
root@ip-172-31-86-69:~#
```

- After the cluster gets started, deploy a weave network to the cluster.

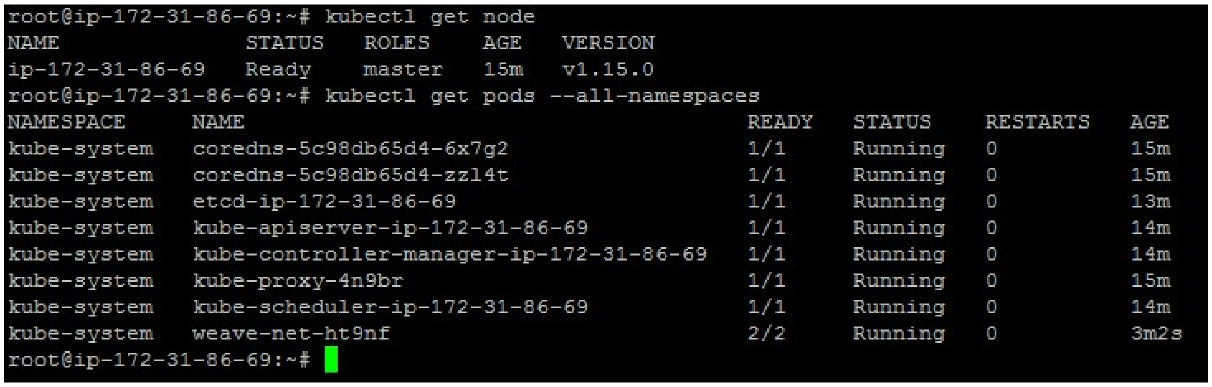
```
export kubever=$(kubectl version | base64 | tr -d '\n')

kubectl apply -f "https://cloud.weave.works/k8s/net?k8s-version=$kubever"
```



```
root@ip-172-31-86-69:~# export kubever=$(kubectl version | base64 | tr -d '\n')
root@ip-172-31-86-69:~# kubectl apply -f "https://cloud.weave.works/k8s/net?k8s-version=$kubever"
serviceaccount/weave-net created
clusterrole.rbac.authorization.k8s.io/weave-net created
clusterrolebinding.rbac.authorization.k8s.io/weave-net created
role.rbac.authorization.k8s.io/weave-net created
rolebinding.rbac.authorization.k8s.io/weave-net created
daemonset.extensions/weave-net created
root@ip-172-31-86-69:~# kubectl get node
NAME               STATUS     ROLES    AGE   VERSION
ip-172-31-86-69    NotReady   master   12m   v1.15.0
root@ip-172-31-86-69:~# kubectl get node
NAME               STATUS   ROLES    AGE   VERSION
ip-172-31-86-69    Ready    master   12m   v1.15.0
root@ip-172-31-86-69:~#
```

- With weave network deployment, validate that the node is up and running. That will help to deploy a Docker container to the Kubernetes cluster.

```
kubectl get node

kubectl get pods --all-namespaces
```



```
root@ip-172-31-86-69:~# kubectl get node
NAME               STATUS   ROLES    AGE   VERSION
ip-172-31-86-69    Ready    master   15m   v1.15.0
root@ip-172-31-86-69:~# kubectl get pods --all-namespaces
NAMESPACE     NAME                                      READY   STATUS    RESTARTS   AGE
kube-system   coredns-5c98db65d4-6x7g2                  1/1     Running   0          15m
kube-system   coredns-5c98db65d4-zzl4t                  1/1     Running   0          15m
kube-system   etcd-ip-172-31-86-69                      1/1     Running   0          13m
kube-system   kube-apiserver-ip-172-31-86-69            1/1     Running   0          14m
kube-system   kube-controller-manager-ip-172-31-86-69   1/1     Running   0          14m
kube-system   kube-proxy-4n9br                          1/1     Running   0          15m
kube-system   kube-scheduler-ip-172-31-86-69            1/1     Running   0          14m
kube-system   weave-net-ht9nf                           2/2     Running   0          3m2s
root@ip-172-31-86-69:~#
```

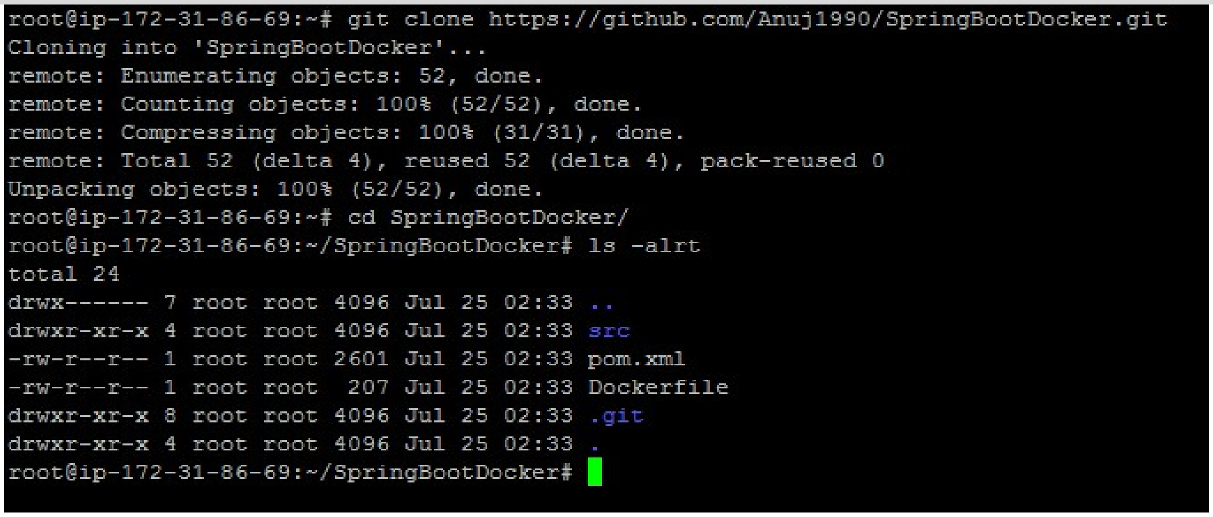
2. Install Kubernetes on Cloud.

Step 1: Creating a custom Docker image

- Follow the set of commands shown below to build a custom Docker image:

git clone https://github.com/Anuj1990/SpringBootDocker.git

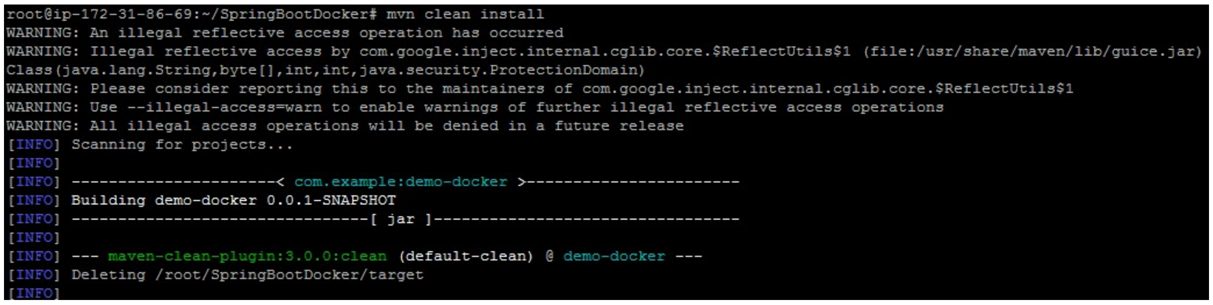
ls -lart



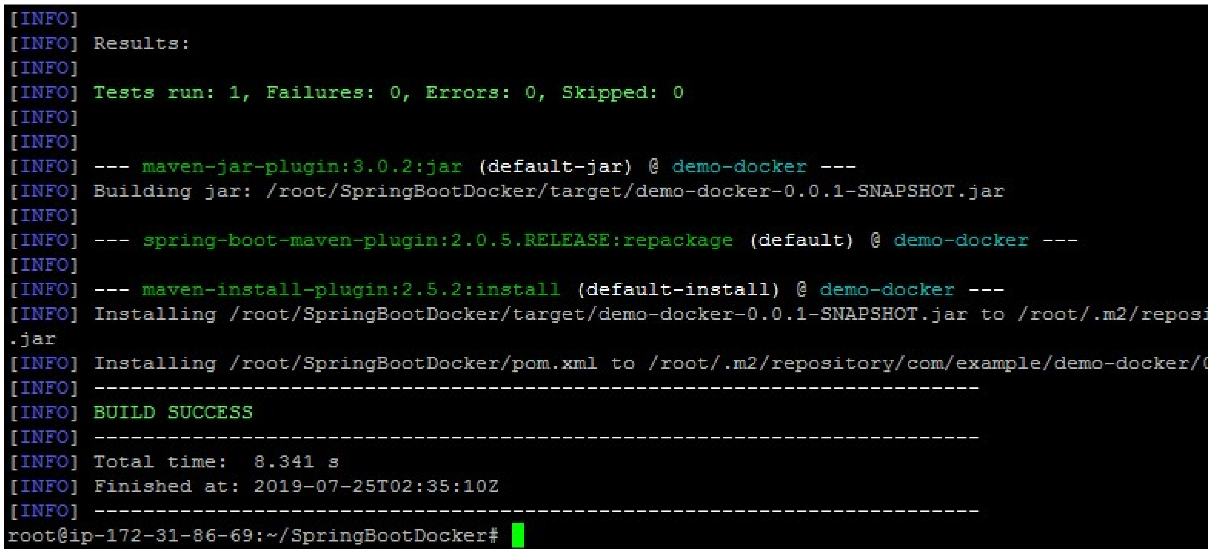
```
root@ip-172-31-86-69:~# git clone https://github.com/Anuj1990/SpringBootDocker.git
Cloning into 'SpringBootDocker'...
remote: Enumerating objects: 52, done.
remote: Counting objects: 100% (52/52), done.
remote: Compressing objects: 100% (31/31), done.
remote: Total 52 (delta 4), reused 52 (delta 4), pack-reused 0
Unpacking objects: 100% (52/52), done.
root@ip-172-31-86-69:~# cd SpringBootDocker/
root@ip-172-31-86-69:~/SpringBootDocker# ls -alrt
total 24
drwx------ 7 root root 4096 Jul 25 02:33 ..
drwxr-xr-x 4 root root 4096 Jul 25 02:33 src
-rw-r--r-- 1 root root 2601 Jul 25 02:33 pom.xml
-rw-r--r-- 1 root root  207 Jul 25 02:33 Dockerfile
drwxr-xr-x 8 root root 4096 Jul 25 02:33 .git
drwxr-xr-x 4 root root 4096 Jul 25 02:33 .
root@ip-172-31-86-69:~/SpringBootDocker# 
```

- Build source code to generate artifacts which can be deployed on Docker host.

  mvn clean install



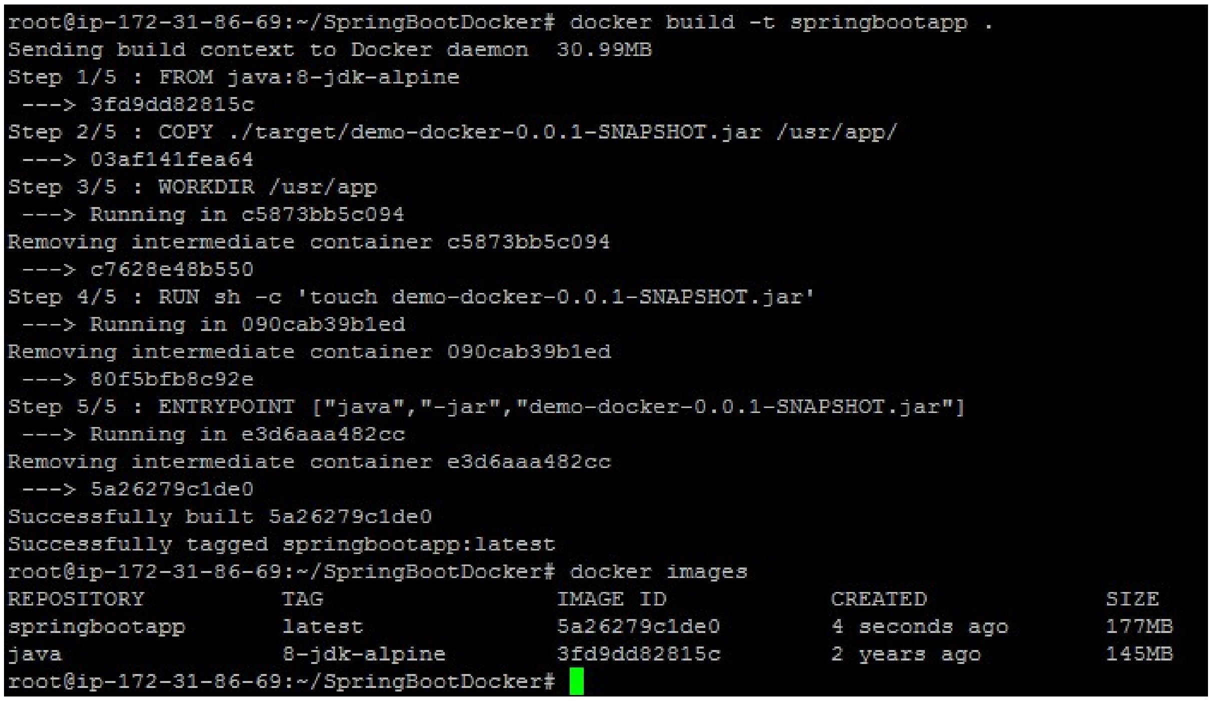
```
root@ip-172-31-86-69:~/SpringBootDocker# mvn clean install
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar)
Class(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$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:demo-docker >----------------------
[INFO] Building demo-docker 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-clean-plugin:3.0.0:clean (default-clean) @ demo-docker ---
[INFO] Deleting /root/SpringBootDocker/target
[INFO]
```



```
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ demo-docker ---
[INFO] Building jar: /root/SpringBootDocker/target/demo-docker-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- spring-boot-maven-plugin:2.0.5.RELEASE:repackage (default) @ demo-docker ---
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ demo-docker ---
[INFO] Installing /root/SpringBootDocker/target/demo-docker-0.0.1-SNAPSHOT.jar to /root/.m2/reposi
.jar
[INFO] Installing /root/SpringBootDocker/pom.xml to /root/.m2/repository/com/example/demo-docker/
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  8.341 s
[INFO] Finished at: 2019-07-25T02:35:10Z
[INFO] ------------------------------------------------------------------------
root@ip-172-31-86-69:~/SpringBootDocker#
```

- Deploy this artifact inside the custom Docker image using **docker build** command line. Follow the steps shown below to create the custom Docker image:

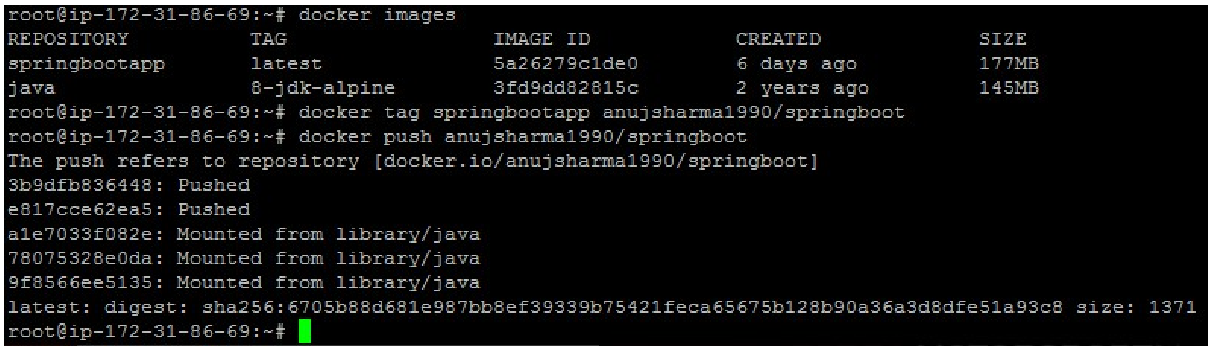
```
docker build -t springbootapp .
```



```
root@ip-172-31-86-69:~/SpringBootDocker# docker build -t springbootapp .
Sending build context to Docker daemon  30.99MB
Step 1/5 : FROM java:8-jdk-alpine
 ---> 3fd9dd82815c
Step 2/5 : COPY ./target/demo-docker-0.0.1-SNAPSHOT.jar /usr/app/
 ---> 03af141fea64
Step 3/5 : WORKDIR /usr/app
 ---> Running in c5873bb5c094
Removing intermediate container c5873bb5c094
 ---> c7628e48b550
Step 4/5 : RUN sh -c 'touch demo-docker-0.0.1-SNAPSHOT.jar'
 ---> Running in 090cab39b1ed
Removing intermediate container 090cab39b1ed
 ---> 80f5bfb8c92e
Step 5/5 : ENTRYPOINT ["java","-jar","demo-docker-0.0.1-SNAPSHOT.jar"]
 ---> Running in e3d6aaa482cc
Removing intermediate container e3d6aaa482cc
 ---> 5a26279c1de0
Successfully built 5a26279c1de0
Successfully tagged springbootapp:latest
root@ip-172-31-86-69:~/SpringBootDocker# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
springbootapp       latest              5a26279c1de0        4 seconds ago       177MB
java                8-jdk-alpine        3fd9dd82815c        2 years ago         145MB
root@ip-172-31-86-69:~/SpringBootDocker#
```

- Push this image to Docker Hub. Follow the command below to do so.

```
docker images

docker tag springbootapp anujsharma1990/springboot

docker push anujsharma1990/springboot
```

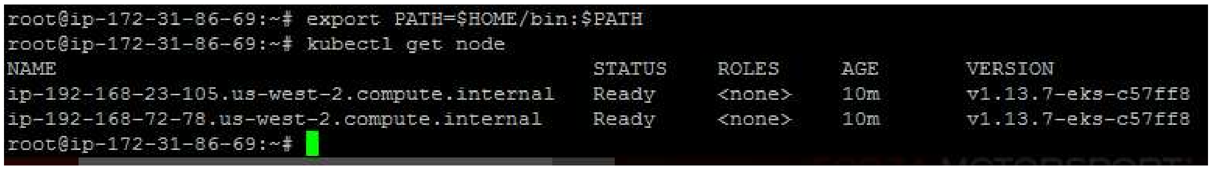


```
root@ip-172-31-86-69:~# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
springbootapp       latest              5a26279c1de0        6 days ago          177MB
java                8-jdk-alpine        3fd9dd82815c        2 years ago         145MB
root@ip-172-31-86-69:~# docker tag springbootapp anujsharma1990/springboot
root@ip-172-31-86-69:~# docker push anujsharma1990/springboot
The push refers to repository [docker.io/anujsharma1990/springboot]
3b9dfb836448: Pushed
e817cce62ea5: Pushed
a1e7033f082e: Mounted from library/java
78075328e0da: Mounted from library/java
9f8566ee5135: Mounted from library/java
latest: digest: sha256:6705b88d681e987bb8ef39339b75421feca65675b128b90a36a3d8dfe51a93c8 size: 1371
root@ip-172-31-86-69:~#
```

Step 2: Deploying a Spring Boot application to AWS EKS

- Configure **kubectl command line** and deploy containers to AWS EKS.

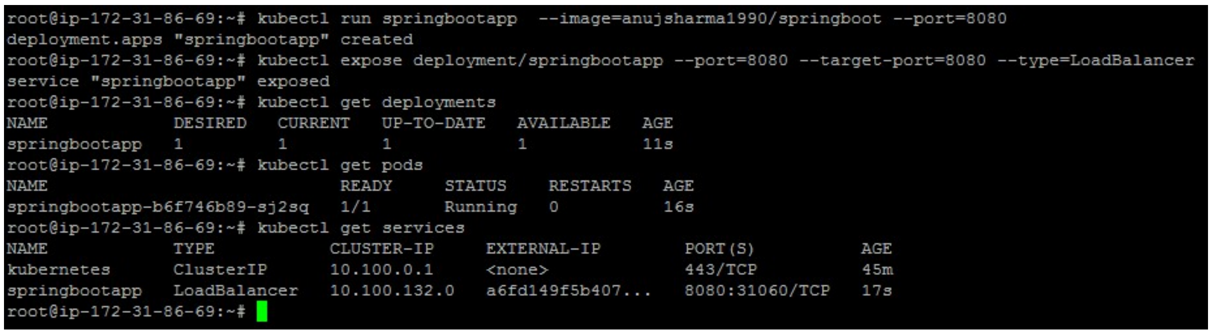
```
export PATH=$HOME/bin:$PATH

kubectl get node
```



```
root@ip-172-31-86-69:~# export PATH=$HOME/bin:$PATH
root@ip-172-31-86-69:~# kubectl get node
NAME                                          STATUS    ROLES     AGE       VERSION
ip-192-168-23-105.us-west-2.compute.internal  Ready     <none>    10m       v1.13.7-eks-c57ff8
ip-192-168-72-78.us-west-2.compute.internal   Ready     <none>    10m       v1.13.7-eks-c57ff8
root@ip-172-31-86-69:~#
```

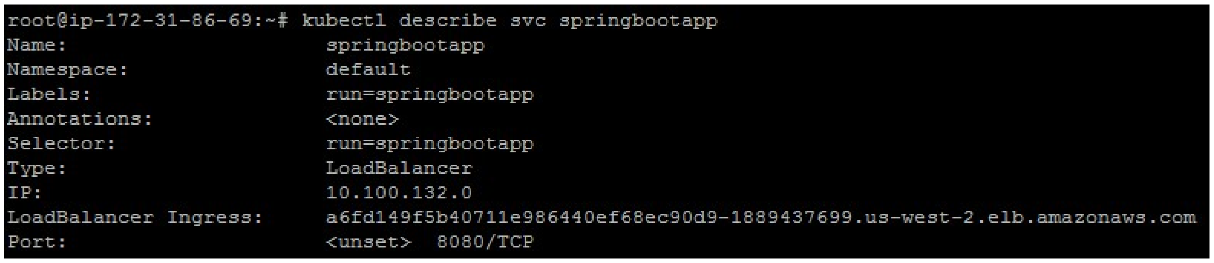
- Create Kubernetes deployment and service using the set of commands given below:

```
kubectl run springbootapp--image=anujsharma1990/springboot --port=8080

kubectl expose deployment/springbootapp --port=8080 --target-port=8080 --
type=LoadBalancer
```

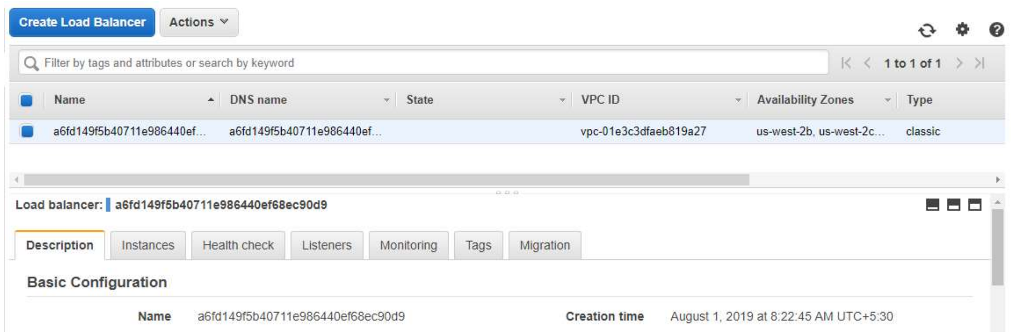


```
root@ip-172-31-86-69:~# kubectl run springbootapp  --image=anujsharma1990/springboot --port=8080
deployment.apps "springbootapp" created
root@ip-172-31-86-69:~# kubectl expose deployment/springbootapp --port=8080 --target-port=8080 --type=LoadBalancer
service "springbootapp" exposed
root@ip-172-31-86-69:~# kubectl get deployments
NAME            DESIRED   CURRENT   UP-TO-DATE   AVAILABLE   AGE
springbootapp   1         1         1            1           11s
root@ip-172-31-86-69:~# kubectl get pods
NAME                           READY     STATUS    RESTARTS   AGE
springbootapp-b6f746b89-sj2sq  1/1       Running   0          16s
root@ip-172-31-86-69:~# kubectl get services
NAME            TYPE           CLUSTER-IP     EXTERNAL-IP        PORT(S)          AGE
kubernetes      ClusterIP      10.100.0.1     <none>             443/TCP          45m
springbootapp   LoadBalancer   10.100.132.0   a6fd149f5b407...   8080:31060/TCP   17s
root@ip-172-31-86-69:~#
```

Please Note: Once the pod is deployed, we can get the Load Balancer URL from springbootapp EKS Service. EKS will automatically configure the Load Balancer in AWS.



```
root@ip-172-31-86-69:~# kubectl describe svc springbootapp
Name:                     springbootapp
Namespace:                default
Labels:                   run=springbootapp
Annotations:              <none>
Selector:                 run=springbootapp
Type:                     LoadBalancer
IP:                       10.100.132.0
LoadBalancer Ingress:     a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com
Port:                     <unset>  8080/TCP
```



Name	DNS name	State	VPC ID	Availability Zones	Type
a6fd149f5b40711e986440ef...	a6fd149f5b40711e986440ef...		vpc-01e3c3dfaeb819a27	us-west-2b, us-west-2c...	classic

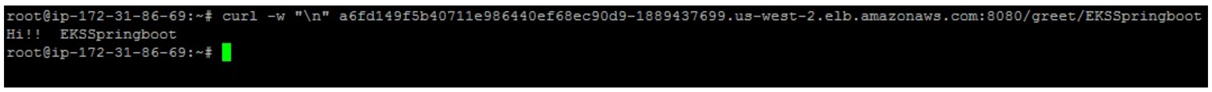
Load balancer: a6fd149f5b40711e986440ef68ec90d9

Basic Configuration

Name a6fd149f5b40711e986440ef68ec90d9 Creation time August 1, 2019 at 8:22:45 AM UTC+5:30

- To access the Spring Boot application, use the **Load Balancer URL** as shown below.

curl -w "\n" a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com:8080/greet/EKSSpringboot



```
root@ip-172-31-86-69:~# curl -w "\n" a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com:8080/greet/EKSSpringboot
Hi!!  EKSSpringboot
root@ip-172-31-86-69:~#
```

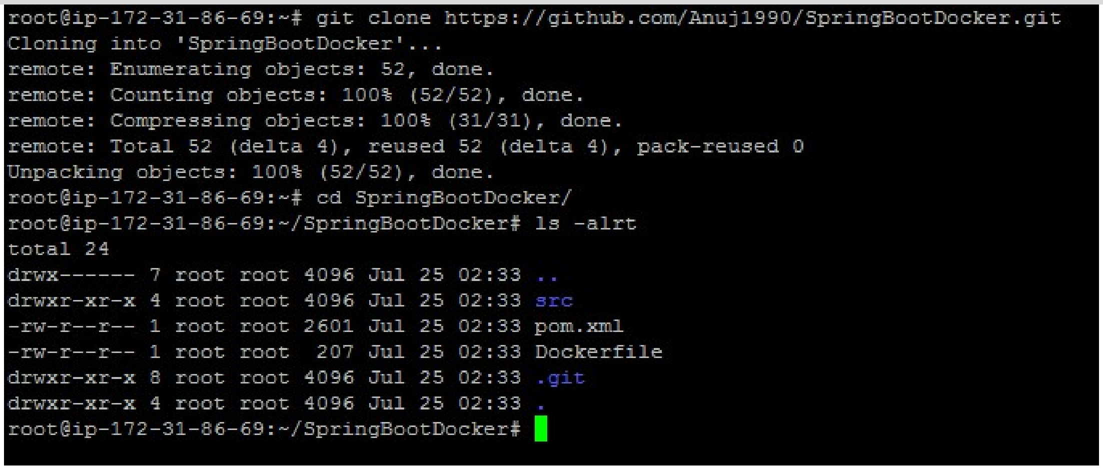
3. Web Hosting.

Step 1: Creating a custom Docker image

- Follow the set of commands shown below to build a custom Docker image:

git clone https://github.com/Anuj1990/SpringBootDocker.git

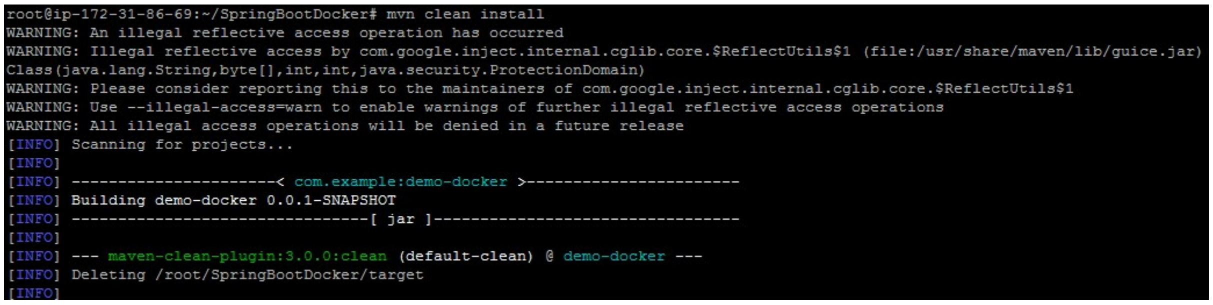
ls -lart



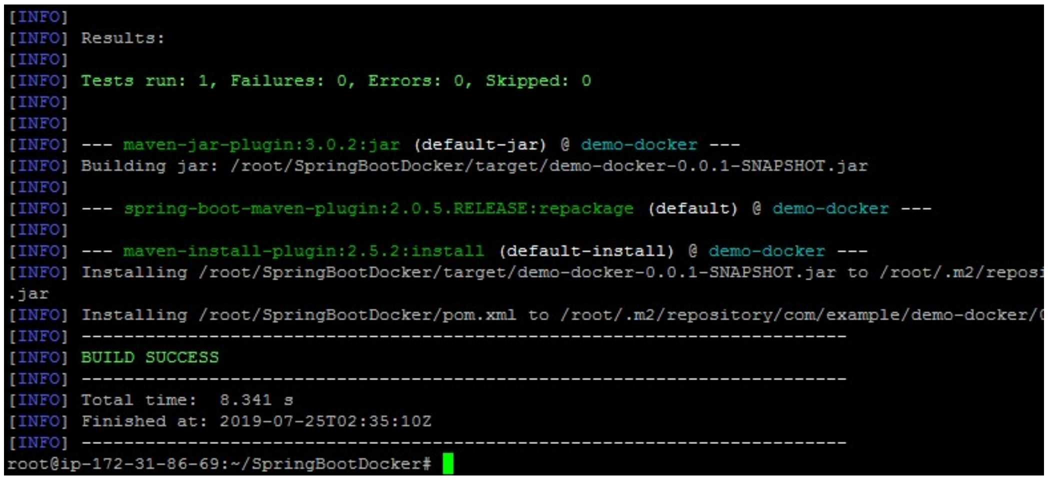
```
root@ip-172-31-86-69:~# git clone https://github.com/Anuj1990/SpringBootDocker.git
Cloning into 'SpringBootDocker'...
remote: Enumerating objects: 52, done.
remote: Counting objects: 100% (52/52), done.
remote: Compressing objects: 100% (31/31), done.
remote: Total 52 (delta 4), reused 52 (delta 4), pack-reused 0
Unpacking objects: 100% (52/52), done.
root@ip-172-31-86-69:~# cd SpringBootDocker/
root@ip-172-31-86-69:~/SpringBootDocker# ls -alrt
total 24
drwx------ 7 root root 4096 Jul 25 02:33 ..
drwxr-xr-x 4 root root 4096 Jul 25 02:33 src
-rw-r--r-- 1 root root 2601 Jul 25 02:33 pom.xml
-rw-r--r-- 1 root root  207 Jul 25 02:33 Dockerfile
drwxr-xr-x 8 root root 4096 Jul 25 02:33 .git
drwxr-xr-x 4 root root 4096 Jul 25 02:33 .
root@ip-172-31-86-69:~/SpringBootDocker#
```

- Build source code to generate artifacts which can be deployed on Docker host.

  mvn clean install



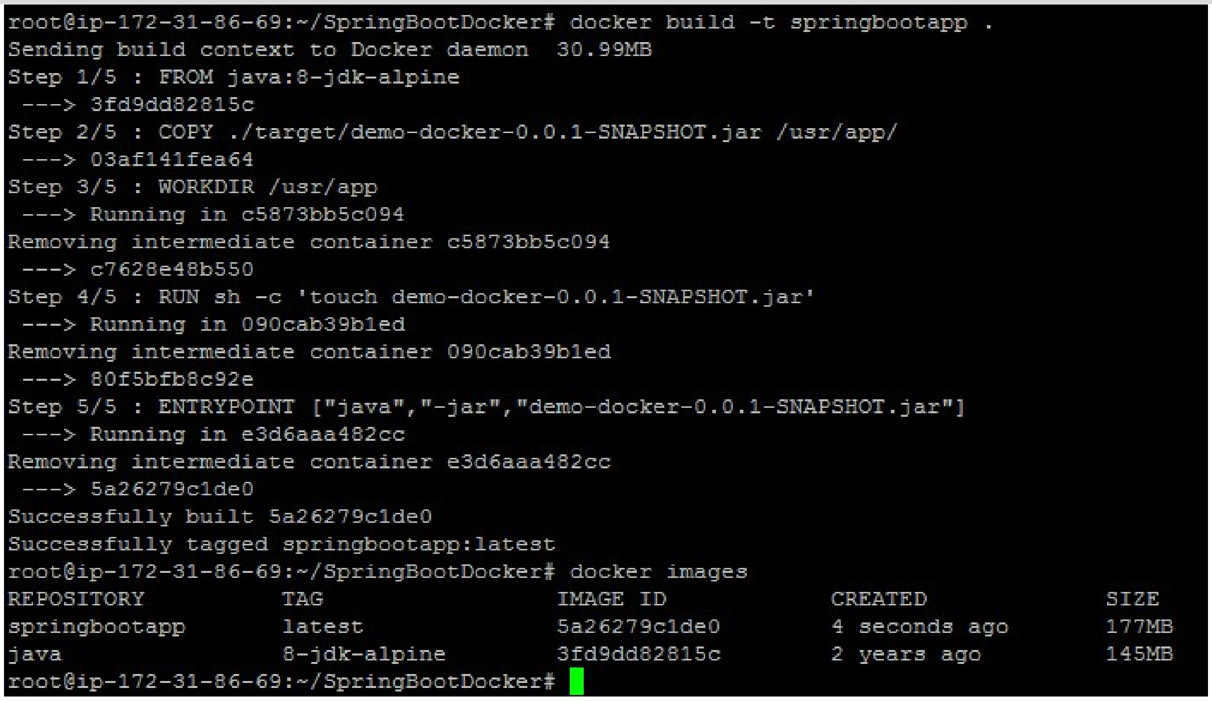
```
root@ip-172-31-86-69:~/SpringBootDocker# mvn clean install
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar)
Class(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$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:demo-docker >-----------------------
[INFO] Building demo-docker 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-clean-plugin:3.0.0:clean (default-clean) @ demo-docker ---
[INFO] Deleting /root/SpringBootDocker/target
[INFO]
```



```
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ demo-docker ---
[INFO] Building jar: /root/SpringBootDocker/target/demo-docker-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- spring-boot-maven-plugin:2.0.5.RELEASE:repackage (default) @ demo-docker ---
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ demo-docker ---
[INFO] Installing /root/SpringBootDocker/target/demo-docker-0.0.1-SNAPSHOT.jar to /root/.m2/reposi
.jar
[INFO] Installing /root/SpringBootDocker/pom.xml to /root/.m2/repository/com/example/demo-docker/0
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  8.341 s
[INFO] Finished at: 2019-07-25T02:35:10Z
[INFO] ------------------------------------------------------------------------
root@ip-172-31-86-69:~/SpringBootDocker#
```

- Deploy this artifact inside the custom Docker image using **docker build** command line. Follow the steps shown below to create the custom Docker image:

```
docker build -t springbootapp .
```

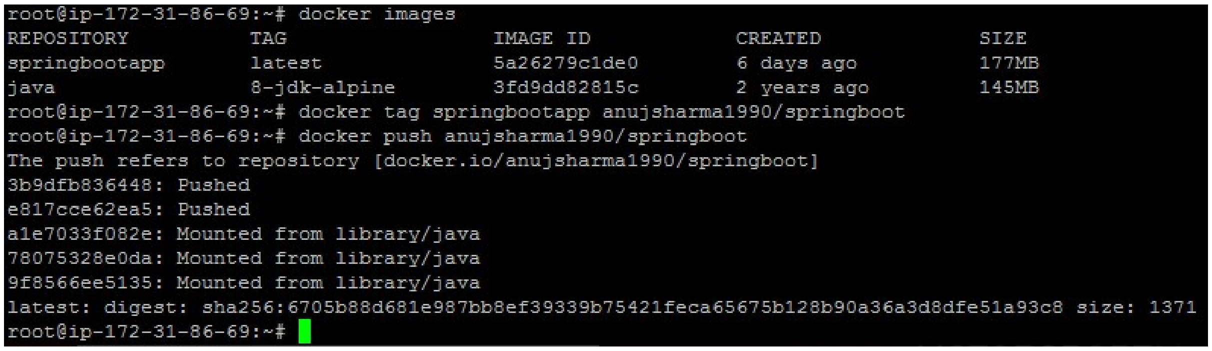


```
root@ip-172-31-86-69:~/SpringBootDocker# docker build -t springbootapp .
Sending build context to Docker daemon  30.99MB
Step 1/5 : FROM java:8-jdk-alpine
 ---> 3fd9dd82815c
Step 2/5 : COPY ./target/demo-docker-0.0.1-SNAPSHOT.jar /usr/app/
 ---> 03af141fea64
Step 3/5 : WORKDIR /usr/app
 ---> Running in c5873bb5c094
Removing intermediate container c5873bb5c094
 ---> c7628e48b550
Step 4/5 : RUN sh -c 'touch demo-docker-0.0.1-SNAPSHOT.jar'
 ---> Running in 090cab39b1ed
Removing intermediate container 090cab39b1ed
 ---> 80f5bfb8c92e
Step 5/5 : ENTRYPOINT ["java","-jar","demo-docker-0.0.1-SNAPSHOT.jar"]
 ---> Running in e3d6aaa482cc
Removing intermediate container e3d6aaa482cc
 ---> 5a26279c1de0
Successfully built 5a26279c1de0
Successfully tagged springbootapp:latest
root@ip-172-31-86-69:~/SpringBootDocker# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
springbootapp       latest              5a26279c1de0        4 seconds ago       177MB
java                8-jdk-alpine        3fd9dd82815c        2 years ago         145MB
root@ip-172-31-86-69:~/SpringBootDocker#
```

- Push this image to Docker Hub. Follow the command below to do so.

```
docker images

docker tag springbootapp anujsharma1990/springboot
```

docker push anujsharma1990/springboot



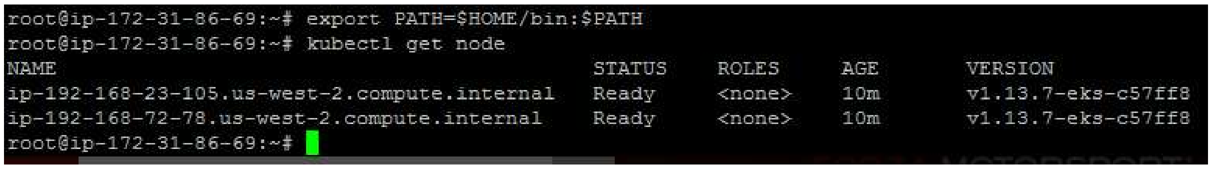
```
root@ip-172-31-86-69:~# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
springbootapp       latest              5a26279c1de0        6 days ago          177MB
java                8-jdk-alpine        3fd9dd82815c        2 years ago         145MB
root@ip-172-31-86-69:~# docker tag springbootapp anujsharma1990/springboot
root@ip-172-31-86-69:~# docker push anujsharma1990/springboot
The push refers to repository [docker.io/anujsharma1990/springboot]
3b9dfb836448: Pushed
e817cce62ea5: Pushed
a1e7033f082e: Mounted from library/java
78075328e0da: Mounted from library/java
9f8566ee5135: Mounted from library/java
latest: digest: sha256:6705b88d681e987bb8ef39339b75421feca65675b128b90a36a3d8dfe51a93c8 size: 1371
root@ip-172-31-86-69:~#
```

Step 2: Deploying a Spring Boot application to AWS EKS

- Configure **kubectl command line** and deploy containers to AWS EKS.

export PATH=$HOME/bin:$PATH

kubectl get node

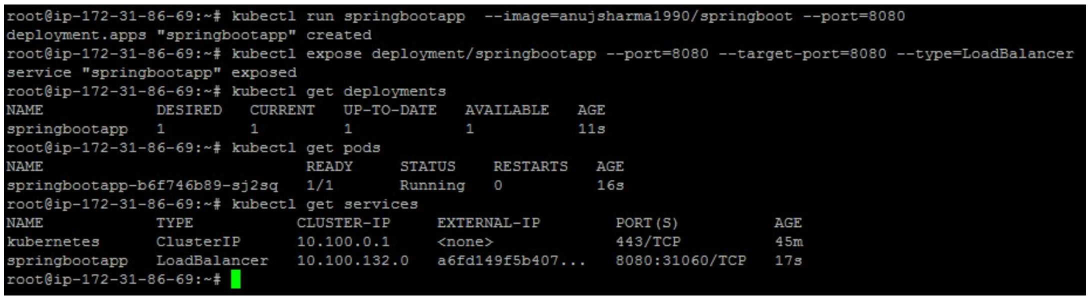


```
root@ip-172-31-86-69:~# export PATH=$HOME/bin:$PATH
root@ip-172-31-86-69:~# kubectl get node
NAME                                            STATUS    ROLES     AGE       VERSION
ip-192-168-23-105.us-west-2.compute.internal    Ready     <none>    10m       v1.13.7-eks-c57ff8
ip-192-168-72-78.us-west-2.compute.internal     Ready     <none>    10m       v1.13.7-eks-c57ff8
root@ip-172-31-86-69:~#
```

- Create Kubernetes deployment and service using the set of commands given below:

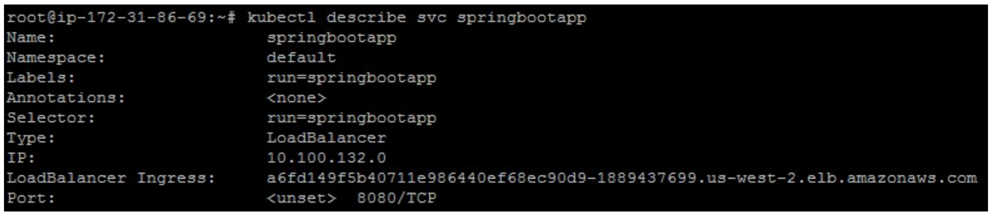
kubectl run springbootapp--image=anujsharma1990/springboot --port=8080

kubectl expose deployment/springbootapp --port=8080 --target-port=8080 --type=LoadBalancer

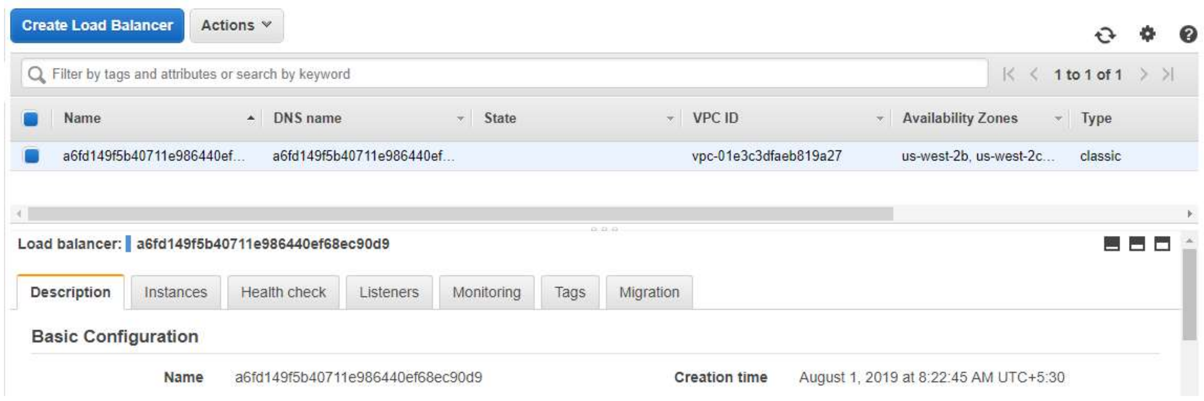


```
root@ip-172-31-86-69:~# kubectl run springbootapp  --image=anujsharma1990/springboot --port=8080
deployment.apps "springbootapp" created
root@ip-172-31-86-69:~# kubectl expose deployment/springbootapp --port=8080 --target-port=8080 --type=LoadBalancer
service "springbootapp" exposed
root@ip-172-31-86-69:~# kubectl get deployments
NAME           DESIRED   CURRENT   UP-TO-DATE   AVAILABLE   AGE
springbootapp   1         1         1            1           11s
root@ip-172-31-86-69:~# kubectl get pods
NAME                           READY     STATUS    RESTARTS   AGE
springbootapp-b6f746b89-sj2sq   1/1       Running   0          16s
root@ip-172-31-86-69:~# kubectl get services
NAME           TYPE           CLUSTER-IP     EXTERNAL-IP        PORT(S)          AGE
kubernetes     ClusterIP      10.100.0.1     <none>             443/TCP          45m
springbootapp   LoadBalancer   10.100.132.0   a6fd149f5b407...   8080:31060/TCP   17s
root@ip-172-31-86-69:~#
```

Please Note: Once the pod is deployed, we can get the Load Balancer URL from springbootapp EKS Service. EKS will automatically configure the Load Balancer in AWS.



```
root@ip-172-31-86-69:~# kubectl describe svc springbootapp
Name:                     springbootapp
Namespace:                default
Labels:                   run=springbootapp
Annotations:              <none>
Selector:                 run=springbootapp
Type:                     LoadBalancer
IP:                       10.100.132.0
LoadBalancer Ingress:     a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com
Port:                     <unset>  8080/TCP
```



Name	DNS name	State	VPC ID	Availability Zones	Type
a6fd149f5b40711e986440ef...	a6fd149f5b40711e986440ef...		vpc-01e3c3dfaeb819a27	us-west-2b, us-west-2c...	classic

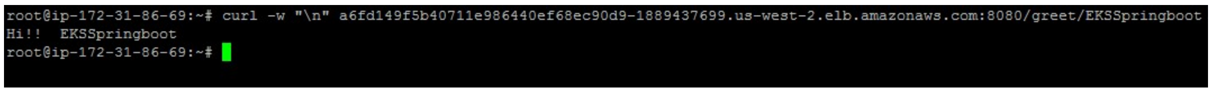
Load balancer: a6fd149f5b40711e986440ef68ec90d9

Basic Configuration

Name a6fd149f5b40711e986440ef68ec90d9 Creation time August 1, 2019 at 8:22:45 AM UTC+5:30

- To access the Spring Boot application, use the **Load Balancer URL** as shown below.

curl -w "\n" a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com:8080/greet/EKSSpringboot



```
root@ip-172-31-86-69:~# curl -w "\n" a6fd149f5b40711e986440ef68ec90d9-1889437699.us-west-2.elb.amazonaws.com:8080/greet/EKSSpringboot
Hi!!  EKSSpringboot
root@ip-172-31-86-69:~#
```

4. Deploying Your Application.

Step 1: Setting up EKS CTL command line and dependencies

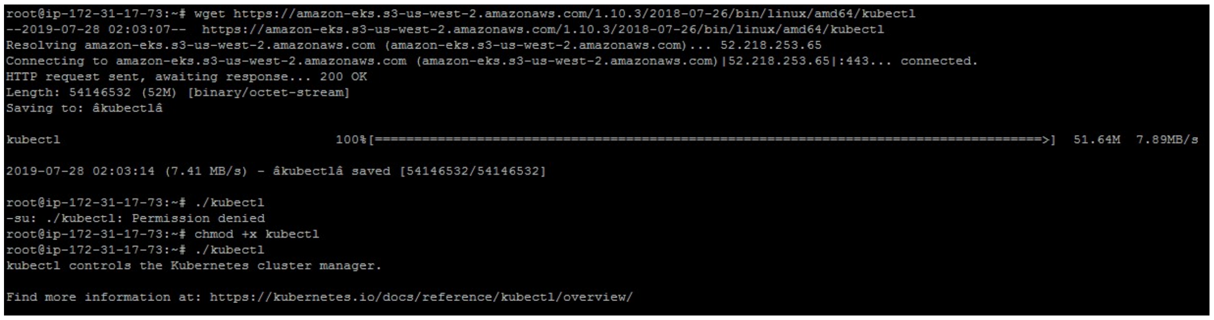
Please Note: Amazon EKS clusters require **kubectl**, **kubelet** binaries, and AWS IAM Authenticator for Kubernetes to allow IAM authentication for Kubernetes cluster.

- Download the Amazon EKS-vended kubectl binary from Amazon S3:

Linux: https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/kubectl

- Follow the steps shown below in the screenshot.

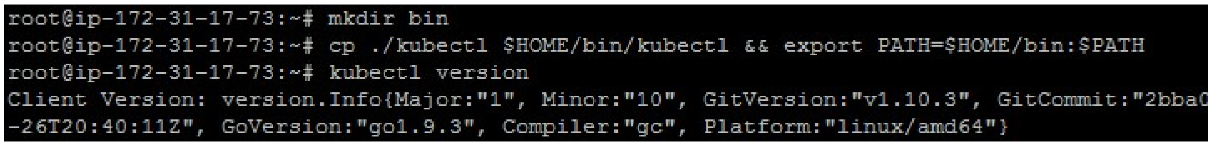
```
wget https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/kubectl

chmod +x kubectl

./kubectl
```



```
root@ip-172-31-17-73:~# wget https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/kubectl
--2019-07-28 02:03:07--  https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/kubectl
Resolving amazon-eks.s3-us-west-2.amazonaws.com (amazon-eks.s3-us-west-2.amazonaws.com)... 52.218.253.65
Connecting to amazon-eks.s3-us-west-2.amazonaws.com (amazon-eks.s3-us-west-2.amazonaws.com)|52.218.253.65|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 54146532 (52M) [binary/octet-stream]
Saving to: âkubectlâ

kubectl                            100%[====================================================================================>]  51.64M  7.89MB/s

2019-07-28 02:03:14 (7.41 MB/s) - âkubectlâ saved [54146532/54146532]

root@ip-172-31-17-73:~# ./kubectl
-su: ./kubectl: Permission denied
root@ip-172-31-17-73:~# chmod +x kubectl
root@ip-172-31-17-73:~# ./kubectl
kubectl controls the Kubernetes cluster manager.

Find more information at: https://kubernetes.io/docs/reference/kubectl/overview/
```

- Configure **kubectl** in PATH variable to call **kubectl** command globally. Follow the set of commands given below to configure PATH variable:

```
mkdir bin

cp ./kubectl $HOME/bin/kubectl && export PATH=$HOME/bin:$PATH

kubectl version

kubectl version --short --client
```

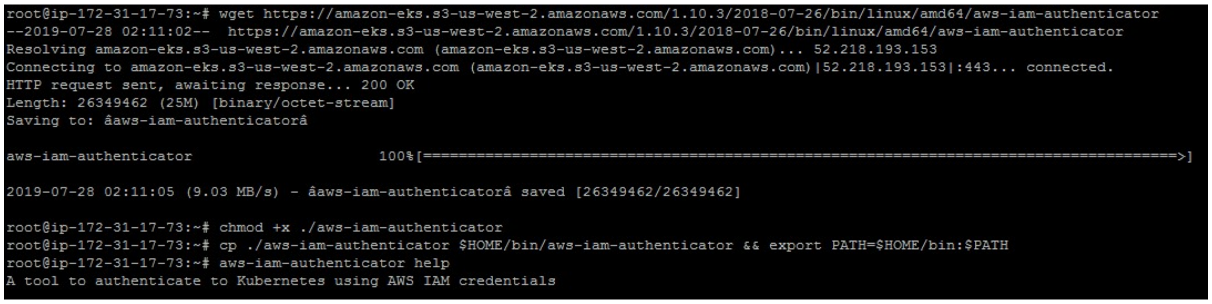


```
root@ip-172-31-17-73:~# mkdir bin
root@ip-172-31-17-73:~# cp ./kubectl $HOME/bin/kubectl && export PATH=$HOME/bin:$PATH
root@ip-172-31-17-73:~# kubectl version
Client Version: version.Info{Major:"1", Minor:"10", GitVersion:"v1.10.3", GitCommit:"2bba0
-26T20:40:11Z", GoVersion:"go1.9.3", Compiler:"gc", Platform:"linux/amd64"}
```

- Configure AWS CLI and aws-iam-authenticator. Follow the set of commands given below to install these command lines. Download the Amazon EKS-vended aws-iam-authenticator binary from Amazon S3:

Linux: https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/aws-iam-authenticator

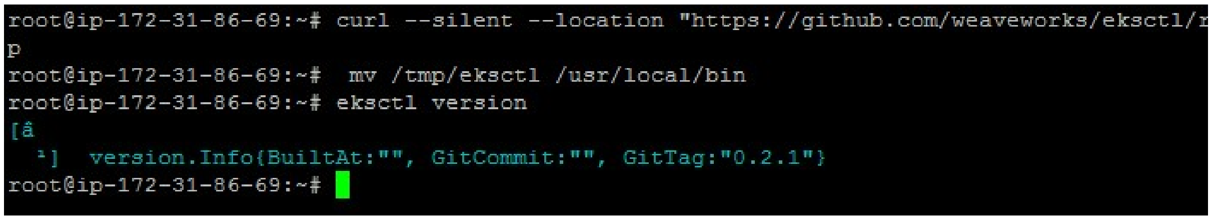
```
wget https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/aws-iam-authenticator

chmod +x ./aws-iam-authenticator

cp ./aws-iam-authenticator $HOME/bin/aws-iam-authenticator && export PATH=$HOME/bin:$PATH

aws-iam-authenticator help
```



```
root@ip-172-31-17-73:~# wget https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/aws-iam-authenticator
--2019-07-28 02:11:02--  https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/linux/amd64/aws-iam-authenticator
Resolving amazon-eks.s3-us-west-2.amazonaws.com (amazon-eks.s3-us-west-2.amazonaws.com)... 52.218.193.153
Connecting to amazon-eks.s3-us-west-2.amazonaws.com (amazon-eks.s3-us-west-2.amazonaws.com)|52.218.193.153|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 26349462 (25M) [binary/octet-stream]
Saving to: âaws-iam-authenticatorâ

aws-iam-authenticator                    100%[=====================================================================================>]

2019-07-28 02:11:05 (9.03 MB/s) - âaws-iam-authenticatorâ saved [26349462/26349462]

root@ip-172-31-17-73:~# chmod +x ./aws-iam-authenticator
root@ip-172-31-17-73:~# cp ./aws-iam-authenticator $HOME/bin/aws-iam-authenticator && export PATH=$HOME/bin:$PATH
root@ip-172-31-17-73:~# aws-iam-authenticator help
A tool to authenticate to Kubernetes using AWS IAM credentials
```

- Install **EKS CTL command line** to create an EKS cluster.

```
curl --silent --location "https://github.com/weaveworks/eksctl/releases/download/latest_release/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /tmp

mv /tmp/eksctl /usr/local/bin

eksctl version
```

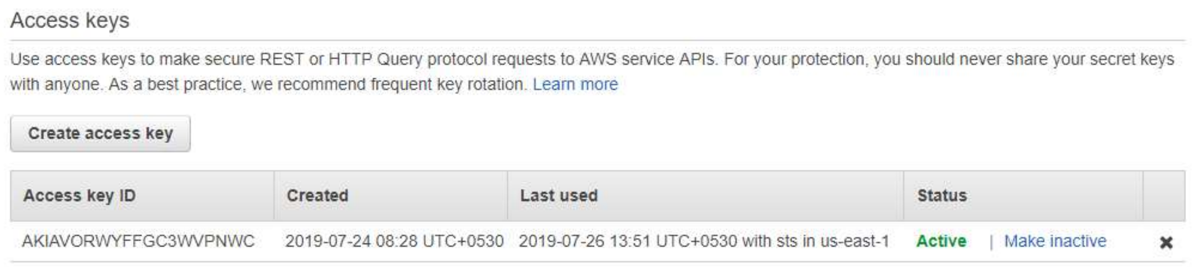


```
root@ip-172-31-86-69:~# curl --silent --location "https://github.com/weaveworks/eksctl/r
p
root@ip-172-31-86-69:~#  mv /tmp/eksctl /usr/local/bin
root@ip-172-31-86-69:~# eksctl version
[â
  ¹]  version.Info{BuiltAt:"", GitCommit:"", GitTag:"0.2.1"}
root@ip-172-31-86-69:~# 
```

- Install AWS CLI using the sequence of commands given below.

```
apt install python-pip

pip install awscli

aws --version
```

- Configure AWS CLI. We need to create **Access Keys** in AWS IAM Console.

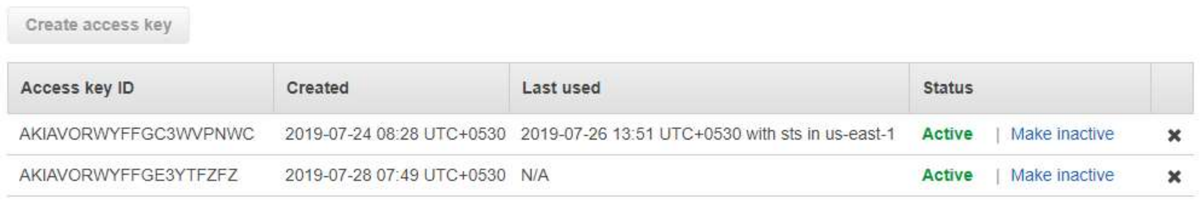


Access keys

Use access keys to make secure REST or HTTP Query protocol requests to AWS service APIs. For your protection, you should never share your secret keys with anyone. As a best practice, we recommend frequent key rotation. Learn more

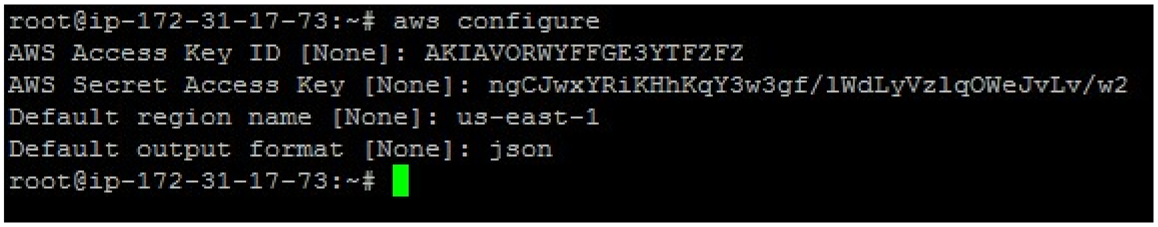
Access key ID	Created	Last used	Status	
AKIAVORWYFFGC3WVPNWC	2019-07-24 08:28 UTC+0530	2019-07-26 13:51 UTC+0530 with sts in us-east-1	Active | Make inactive	✖

- Click on **Create Access key** and keep the keys safe with you.



Access key ID	Created	Last used	Status	
AKIAVORWYFFGC3WVPNWC	2019-07-24 08:28 UTC+0530	2019-07-26 13:51 UTC+0530 with sts in us-east-1	Active | Make inactive	✖
AKIAVORWYFFGE3YTFZFZ	2019-07-28 07:49 UTC+0530	N/A	Active | Make inactive	✖

- Configure AWS CLI and provide **Access Keys and Secret Access Keys** while configuring AWS CLI.

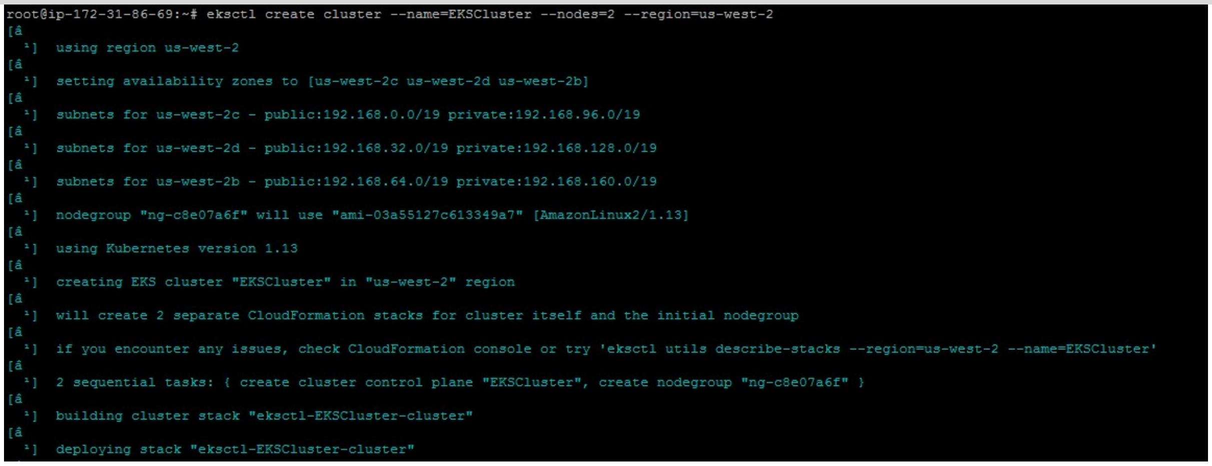


```
root@ip-172-31-17-73:~# aws configure
AWS Access Key ID [None]: AKIAVORWYFFGE3YTFZFZ
AWS Secret Access Key [None]: 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
Default region name [None]: us-east-1
Default output format [None]: json
root@ip-172-31-17-73:~# 
```

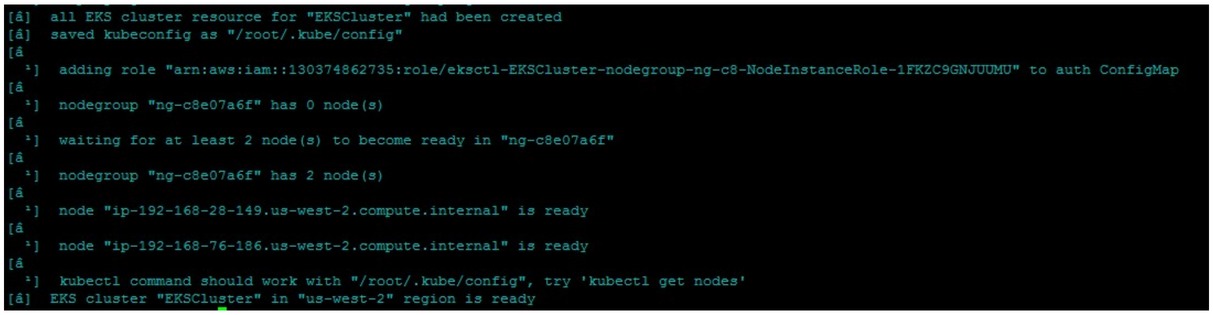
Step 2: Creating an EKS cluster using eksctl command line

- Create an EKS Cluster using the command below:

```
eksctl create cluster --name=EKSCluster --nodes=2 --region=us-west-2
```

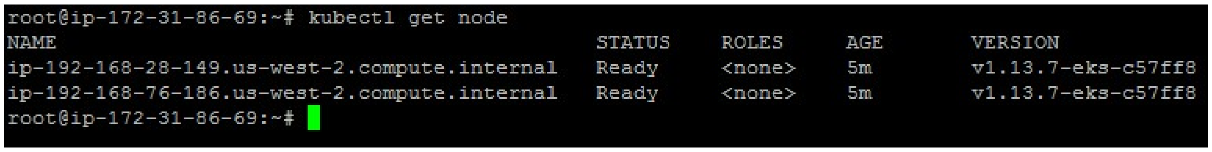


```
root@ip-172-31-86-69:~# eksctl create cluster --name=EKSCluster --nodes=2 --region=us-west-2
[â
  ¹]  using region us-west-2
[â
  ¹]  setting availability zones to [us-west-2c us-west-2d us-west-2b]
[â
  ¹]  subnets for us-west-2c - public:192.168.0.0/19 private:192.168.96.0/19
[â
  ¹]  subnets for us-west-2d - public:192.168.32.0/19 private:192.168.128.0/19
[â
  ¹]  subnets for us-west-2b - public:192.168.64.0/19 private:192.168.160.0/19
[â
  ¹]  nodegroup "ng-c8e07a6f" will use "ami-03a55127c613349a7" [AmazonLinux2/1.13]
[â
  ¹]  using Kubernetes version 1.13
[â
  ¹]  creating EKS cluster "EKSCluster" in "us-west-2" region
[â
  ¹]  will create 2 separate CloudFormation stacks for cluster itself and the initial nodegroup
[â
  ¹]  if you encounter any issues, check CloudFormation console or try 'eksctl utils describe-stacks --region=us-west-2 --name=EKSCluster'
[â
  ¹]  2 sequential tasks: { create cluster control plane "EKSCluster", create nodegroup "ng-c8e07a6f" }
[â
  ¹]  building cluster stack "eksctl-EKSCluster-cluster"
[â
  ¹]  deploying stack "eksctl-EKSCluster-cluster"
```

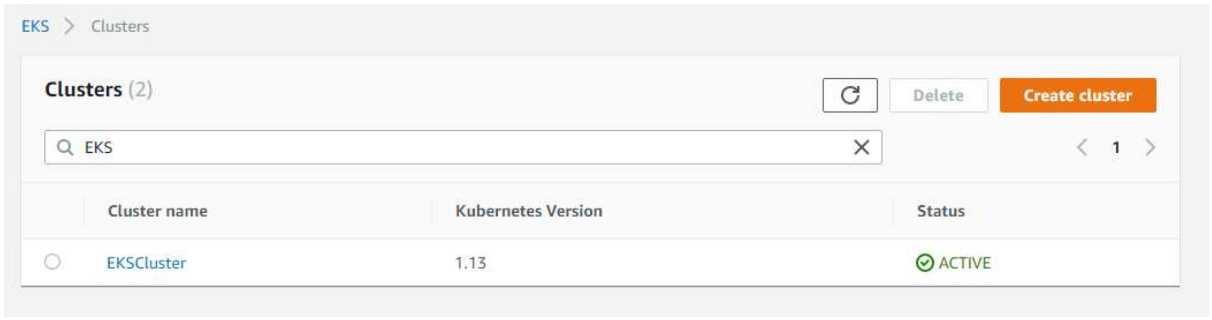


```
[â]  all EKS cluster resource for "EKSCluster" had been created
[â]  saved kubeconfig as "/root/.kube/config"
[â
  ¹]  adding role "arn:aws:iam::130374862735:role/eksctl-EKSCluster-nodegroup-ng-c8-NodeInstanceRole-1FKZC9GNJUUMU" to auth ConfigMap
[â
  ¹]  nodegroup "ng-c8e07a6f" has 0 node(s)
[â
  ¹]  waiting for at least 2 node(s) to become ready in "ng-c8e07a6f"
[â
  ¹]  nodegroup "ng-c8e07a6f" has 2 node(s)
[â
  ¹]  node "ip-192-168-28-149.us-west-2.compute.internal" is ready
[â
  ¹]  node "ip-192-168-76-186.us-west-2.compute.internal" is ready
[â
  ¹]  kubectl command should work with "/root/.kube/config", try 'kubectl get nodes'
[â]  EKS cluster "EKSCluster" in "us-west-2" region is ready
```

- Validate the cluster using **kubectl get node** command through AWS Console.



```
root@ip-172-31-86-69:~# kubectl get node
NAME                                         STATUS   ROLES    AGE     VERSION
ip-192-168-28-149.us-west-2.compute.internal   Ready    <none>   5m      v1.13.7-eks-c57ff8
ip-192-168-76-186.us-west-2.compute.internal   Ready    <none>   5m      v1.13.7-eks-c57ff8
root@ip-172-31-86-69:~#
```



EKS > Clusters

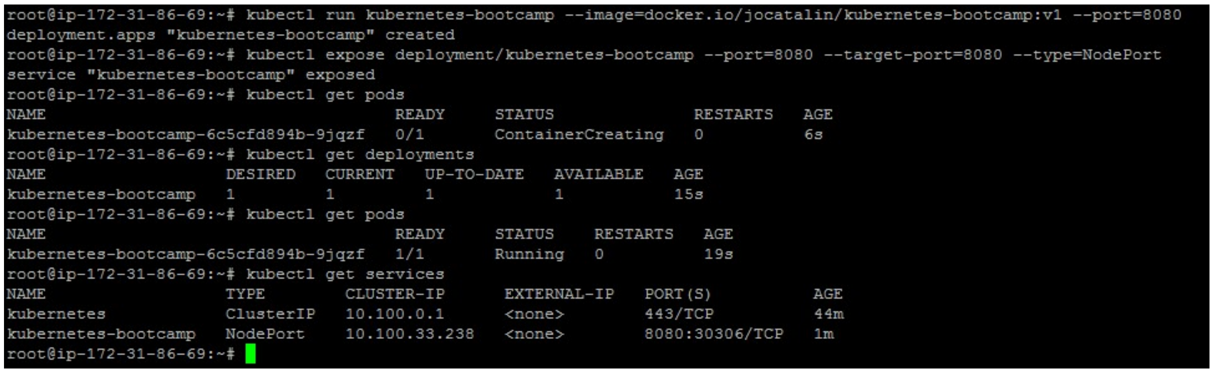
Clusters (2)

Cluster name	Kubernetes Version	Status
EKSCluster	1.13	ACTIVE

Step 3: Deploying an application to AWS EKS cluster

- Create Kubernetes deployment and service using the set of commands mentioned below:

```
kubectl run kubernetes-bootcamp --image=docker.io/jocatalin/kubernetes-bootcamp:v1 --port=8080

kubectl expose deployment/kubernetes-bootcamp --port=8080 --target-port=8080 --type=NodePort
```



```
root@ip-172-31-86-69:~# kubectl run kubernetes-bootcamp --image=docker.io/jocatalin/kubernetes-bootcamp:v1 --port=8080
deployment.apps "kubernetes-bootcamp" created
root@ip-172-31-86-69:~# kubectl expose deployment/kubernetes-bootcamp --port=8080 --target-port=8080 --type=NodePort
service "kubernetes-bootcamp" exposed
root@ip-172-31-86-69:~# kubectl get pods
NAME                                   READY     STATUS              RESTARTS   AGE
kubernetes-bootcamp-6c5cfd894b-9jqzf   0/1       ContainerCreating   0          6s
root@ip-172-31-86-69:~# kubectl get deployments
NAME                  DESIRED   CURRENT   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp   1         1         1            1           15s
root@ip-172-31-86-69:~# kubectl get pods
NAME                                   READY     STATUS    RESTARTS   AGE
kubernetes-bootcamp-6c5cfd894b-9jqzf   1/1       Running   0          19s
root@ip-172-31-86-69:~# kubectl get services
NAME                  TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
kubernetes            ClusterIP   10.100.0.1      <none>        443/TCP          44m
kubernetes-bootcamp   NodePort    10.100.33.238   <none>        8080:30306/TCP   1m
root@ip-172-31-86-69:~#
```