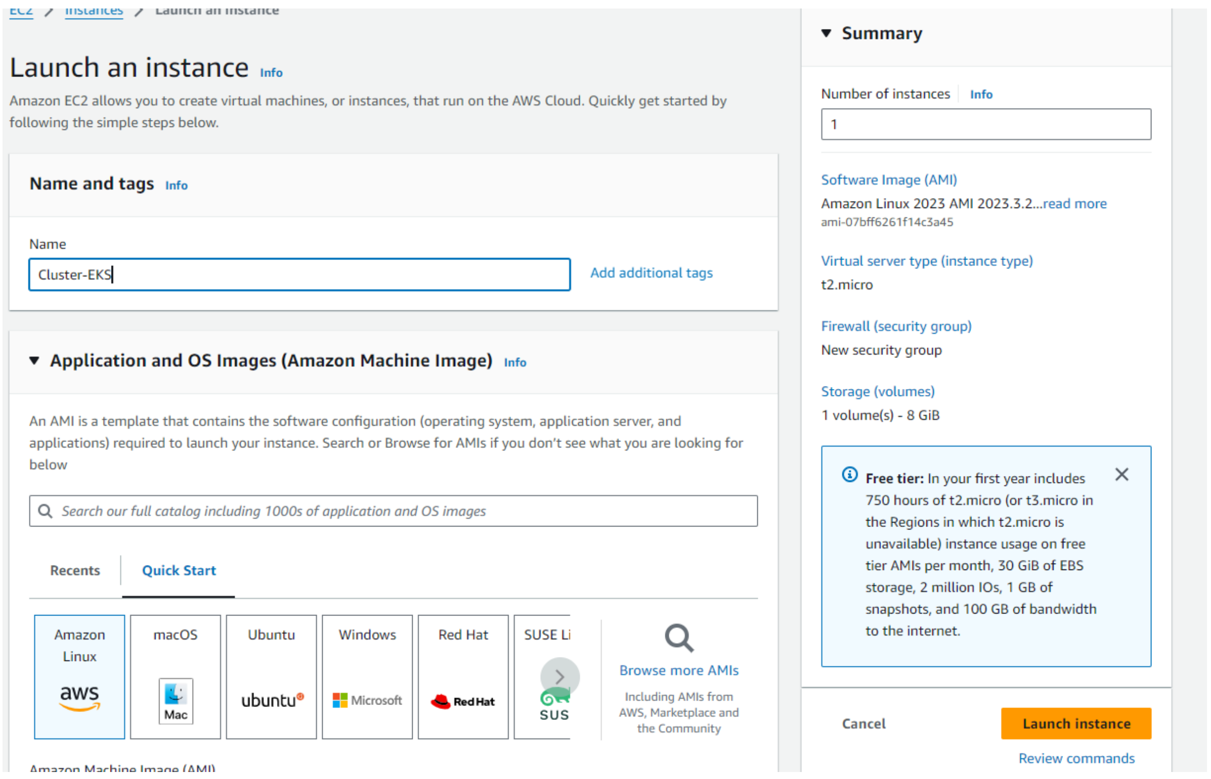
HOW TO DEPLOY ONE SAMPLE STATIC APPLICATION ON TOP OF K8S CLUSTER By USING EC2.

- ➔ First, we have to create Securiry group for static application.

  SSH---------22-------MY-IP-----This for admin Purpose
  ALL-TCP------- 0-65535---------anywhere (0.0.0.0) -----This for End-user purpose
- ➔ First, we have to login to the console ------Click to EC2 Dashboard -----Click on Create instance ----After that we can pass name of an instance, AMI and Storage.



EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name: Cluster-EKS

Add additional tags

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents | Quick Start

Amazon Linux | macOS | Ubuntu | Windows | Red Hat | SUSE Li

Browse more AMIs — Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Summary

Number of instances Info: 1

Software Image (AMI): Amazon Linux 2023 AMI 2023.3.2...read more
ami-07bff6261f14c3a45

Virtual server type (instance type): t2.micro

Firewall (security group): New security group

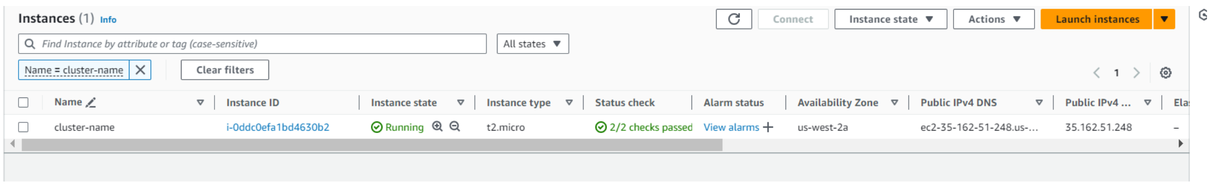
Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel | Launch instance | Review commands

- ➔ After we Click on Existing Key-pair and ----Click on Existing Security_Group.

- ➔ After That Click on Create instance -----The instance is Created .



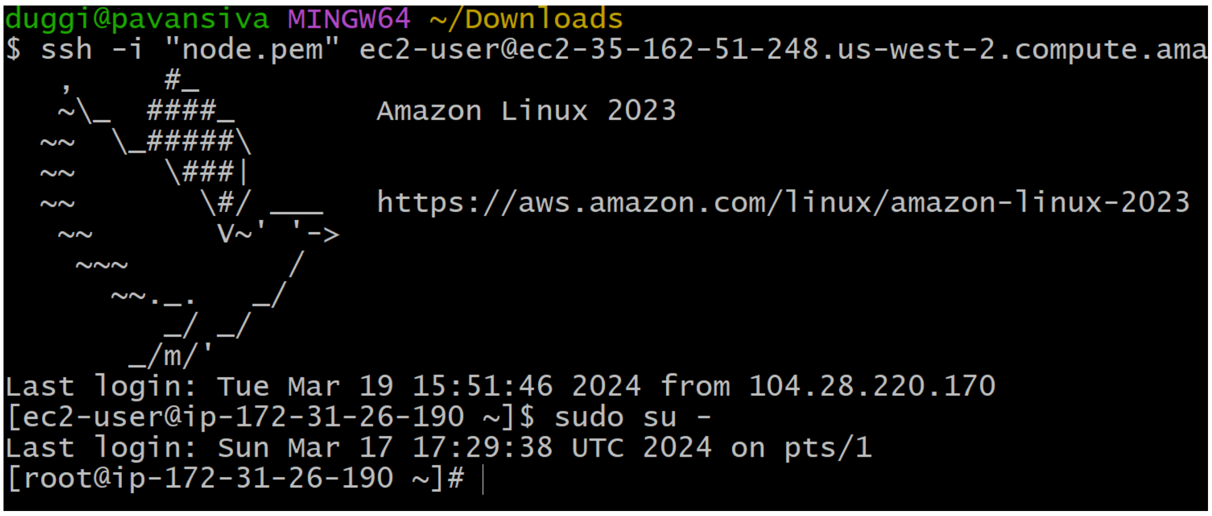
Instances (1) Info — Connect | Instance state | Actions | Launch instances

Find Instance by attribute or tag (case-sensitive) — All states

Name = cluster-name — Clear filters

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Ela
cluster-name	i-0ddc0efa1bd4630b2	Running	t2.micro	2/2 checks passed	View alarms +	us-west-2a	ec2-35-162-51-248.us-...	35.162.51.248	–

- ➔ After We Connect to the Application we Install pre-request Commands.
  Ssh -I <pem.file> user_name@public_ip



```
duggi@pavansiva MINGW64 ~/Downloads
$ ssh -i "node.pem" ec2-user@ec2-35-162-51-248.us-west-2.compute.ama
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Tue Mar 19 15:51:46 2024 from 104.28.220.170
[ec2-user@ip-172-31-26-190 ~]$ sudo su -
Last login: Sun Mar 17 17:29:38 UTC 2024 on pts/1
[root@ip-172-31-26-190 ~]#
```

1. GIT Installation Commands
   yum Install git -y
2. Terraform Installation Commands
   wget https://releases.hashicorp.com/terraform/1.3.7/terraform_1.3.7_linux_amd64.zip
   ls
   unzip terraform_1.3.7_linux_amd64.zip
   mv terraform /usr/local/bin
   terraform -v
3. Kubectl Installation Commands

```
curl -LO https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl

sudo install -o root -g root -m 0755 kubectl /usr/local/bin/kubectl
```

```
chmod +x kubectl
mkdir -p ~/.local/bin
mv ./kubectl ~/.local/bin/kubectl
```

```
kubectl version
```

4. IAM ROLE

   Policy you given Eks full access after we attached to the role this ec2 machine.
   Select Ec2-Machine-------Click It Action -----Security-----Modify IAM Role---Attached That iam role.

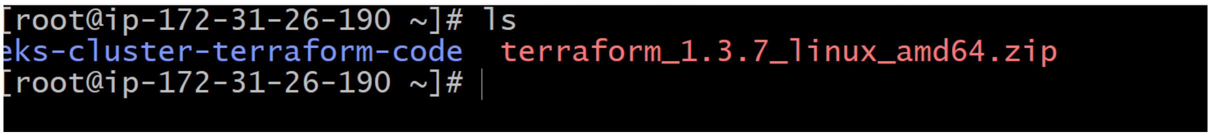
5. Docker Installation Commands
   yum install docker -y
   systemctl start docker
   systemctl enable docker.

➔ For Cluster Created By using terraform. For that I am Passing Github url in the below.

https://github.com/sivaram2662/eks-cluster-terraform-code.git

➔ After That we clone Github url on top of Ec2 machine BY using below command.

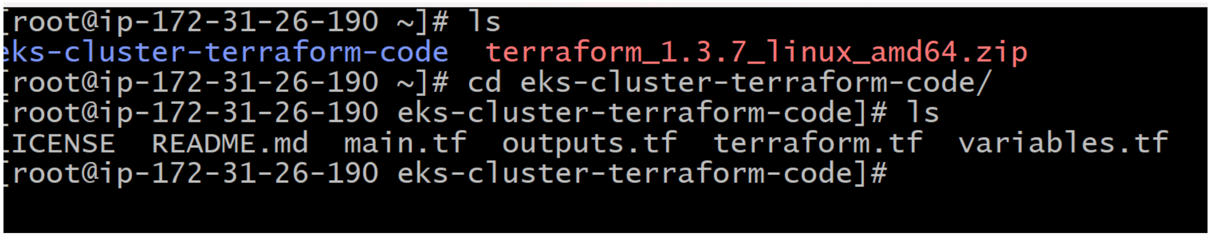
Git clone https://github.com/sivaram2662/eks-cluster-terraform-code.git



```
[root@ip-172-31-26-190 ~]# ls
eks-cluster-terraform-code  terraform_1.3.7_linux_amd64.zip
[root@ip-172-31-26-190 ~]#
```

➔ After we enter to the that folder by using below command

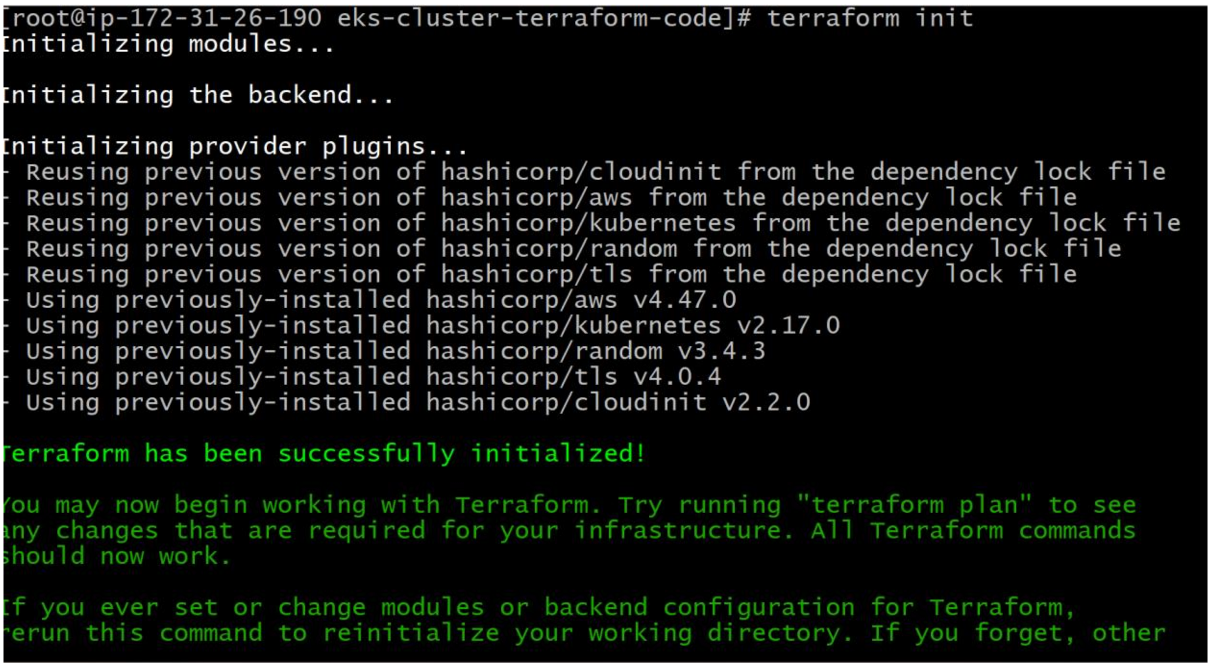
```
Cd eks-cluster-terraform-code
ls
```



```
[root@ip-172-31-26-190 ~]# ls
eks-cluster-terraform-code  terraform_1.3.7_linux_amd64.zip
[root@ip-172-31-26-190 ~]# cd eks-cluster-terraform-code/
[root@ip-172-31-26-190 eks-cluster-terraform-code]# ls
LICENSE  README.md  main.tf  outputs.tf  terraform.tf  variables.tf
[root@ip-172-31-26-190 eks-cluster-terraform-code]#
```

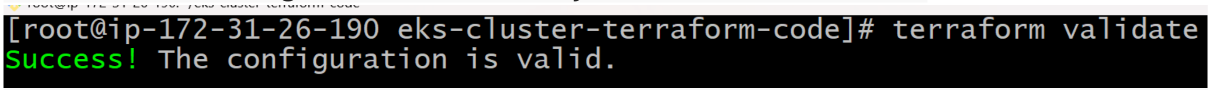
➔ After that we will Follow steps

1. Terraform init
   Scan the *tf files and finds provider and download provider plugin From hashicrop website . After Terraform init we will get File like terraform.lock.hcl



```
[root@ip-172-31-26-190 eks-cluster-terraform-code]# terraform init
Initializing modules...

Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/cloudinit from the dependency lock file
- Reusing previous version of hashicorp/aws from the dependency lock file
- Reusing previous version of hashicorp/kubernetes from the dependency lock file
- Reusing previous version of hashicorp/random from the dependency lock file
- Reusing previous version of hashicorp/tls from the dependency lock file
- Using previously-installed hashicorp/aws v4.47.0
- Using previously-installed hashicorp/kubernetes v2.17.0
- Using previously-installed hashicorp/random v3.4.3
- Using previously-installed hashicorp/tls v4.0.4
- Using previously-installed hashicorp/cloudinit v2.2.0

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
```

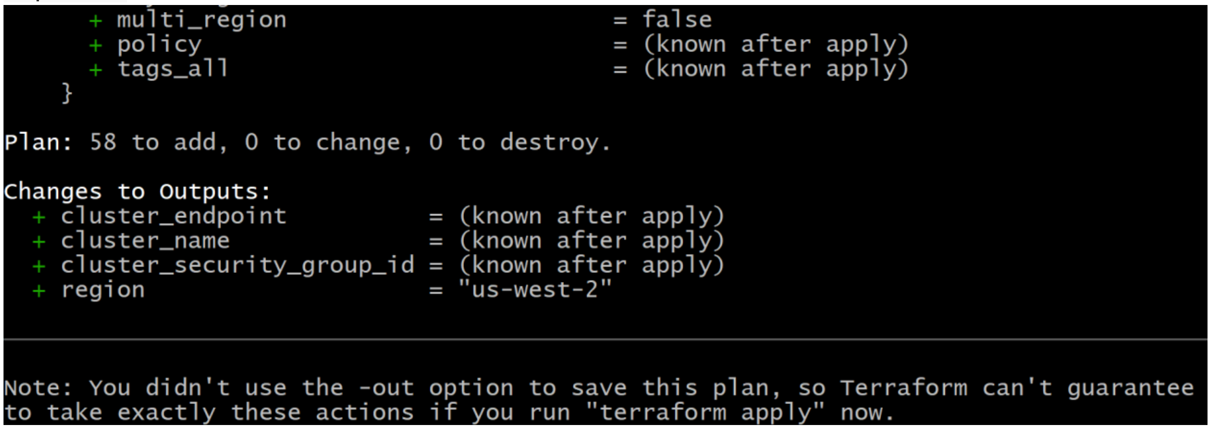
2. Terraform validate
   It will be checking the weather the syntax is correct or not



```
[root@ip-172-31-26-190 eks-cluster-terraform-code]# terraform validate
Success! The configuration is valid.
```

3. Terraform fmt
   It will be checking weather alignment is correct or not i.e proper alignment of the code.

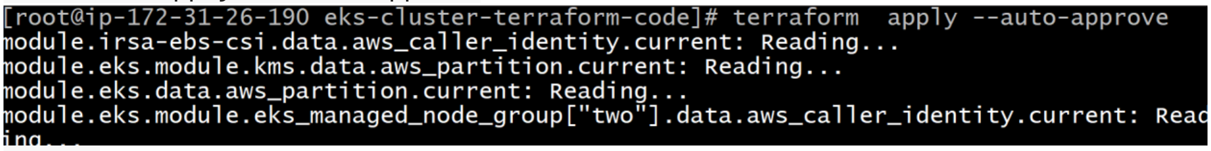
4. Terraform plan
   Its dry-run before creating resources validate what resources are getting created terraform plan.
   +Created
   -deleted
   ~updated



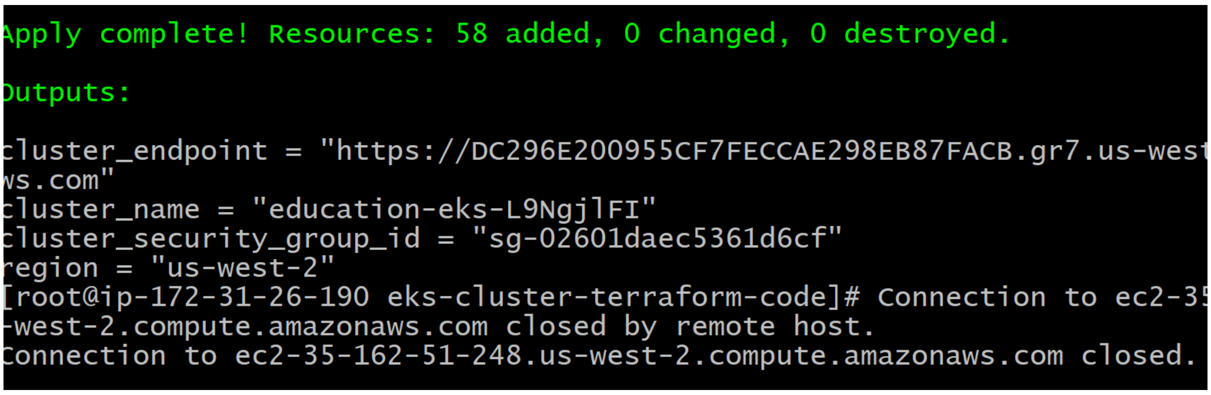
```
      + multi_region                           = false
      + policy                                 = (known after apply)
      + tags_all                               = (known after apply)
    }

Plan: 58 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + cluster_endpoint          = (known after apply)
  + cluster_name              = (known after apply)
  + cluster_security_group_id = (known after apply)
  + region                    = "us-west-2"

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee
to take exactly these actions if you run "terraform apply" now.
```

5. Terraform apply
   It will be Create resource
   (or)
   With out asking “yes” during the terraform apply , instead of the we are using below command.

   terraform apply – auto -approve

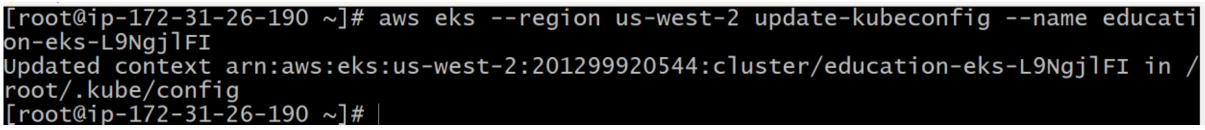


```
[root@ip-172-31-26-190 eks-cluster-terraform-code]# terraform  apply --auto-approve
module.irsa-ebs-csi.data.aws_caller_identity.current: Reading...
module.eks.module.kms.data.aws_partition.current: Reading...
module.eks.data.aws_partition.current: Reading...
module.eks.module.eks_managed_node_group["two"].data.aws_caller_identity.current: Read
ing...
```



```
Apply complete! Resources: 58 added, 0 changed, 0 destroyed.

Outputs:

cluster_endpoint = "https://DC296E200955CF7FECCAE298EB87FACB.gr7.us-west
ws.com"
cluster_name = "education-eks-L9NgjlFI"
cluster_security_group_id = "sg-02601daec5361d6cf"
region = "us-west-2"
[root@ip-172-31-26-190 eks-cluster-terraform-code]# Connection to ec2-35
-west-2.compute.amazonaws.com closed by remote host.
Connection to ec2-35-162-51-248.us-west-2.compute.amazonaws.com closed.
```

➔ After Create The Cluster we run to below Command.
aws eks –region <region name> update-kubeconfig –name <cluster name>



```
[root@ip-172-31-26-190 ~]# aws eks --region us-west-2 update-kubeconfig --name educati
on-eks-L9NgjlFI
Updated context arn:aws:eks:us-west-2:201299920544:cluster/education-eks-L9NgjlFI in /
root/.kube/config
[root@ip-172-31-26-190 ~]#
```

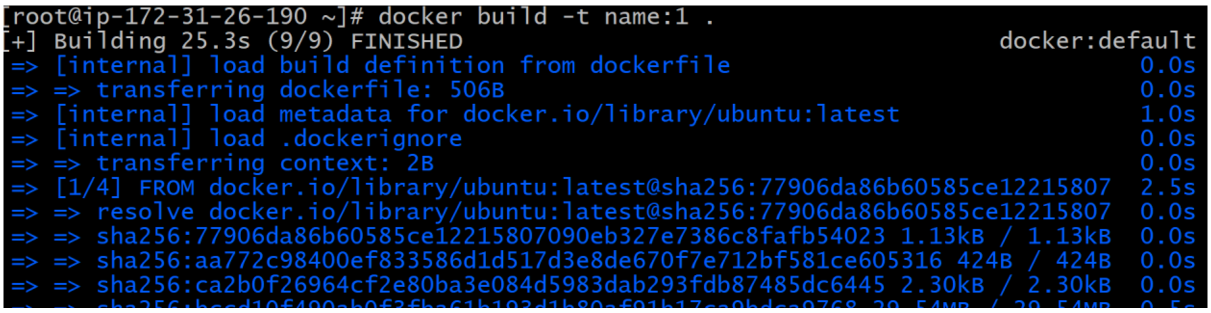
➔ First we write One sample Docker file on top Ec2 machine by using below Commands.

```
vi dockerfile

ARG TAG=latest
FROM ubuntu: ${TAG}
RUN apt update \
   && apt install -y apache2 zip \
   && apt install -y apache2-utils \
   && apt clean
ADD https://www.free-css.com/assets/files/free-css-
templates/download/page292/grandcoffee.zip /tmp/
RUN cd /tmp \
    && unzip /tmp/grandcoffee.zip \
    && cp -r /tmp/html/* /var/www/html/
# COPY grandcoffee.zip /tmp/
EXPOSE 80
CMD ["apache2ctl", "-D", "FOREGROUND"]
```

➔ After we save the File, we run to the below Commands.

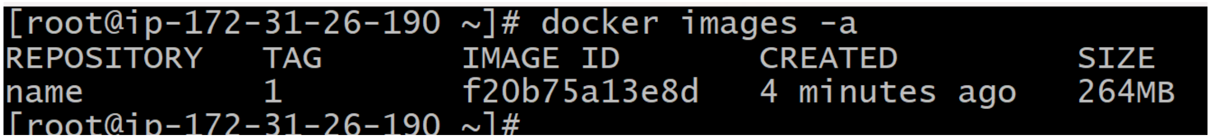
To build to the images below Command.

1. Docker build -t name:1.



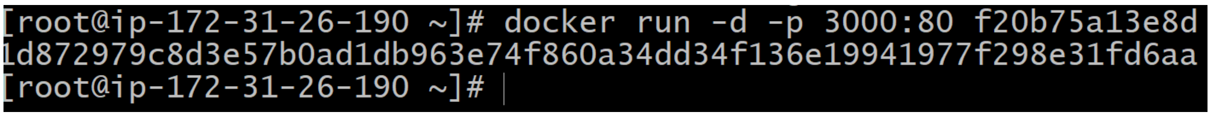
```
[root@ip-172-31-26-190 ~]# docker build -t name:1 .
[+] Building 25.3s (9/9) FINISHED                                       docker:default
 => [internal] load build definition from dockerfile                              0.0s
 => => transferring dockerfile: 506B                                              0.0s
 => [internal] load metadata for docker.io/library/ubuntu:latest                  1.0s
 => [internal] load .dockerignore                                                 0.0s
 => => transferring context: 2B                                                   0.0s
 => [1/4] FROM docker.io/library/ubuntu:latest@sha256:77906da86b60585ce12215807  2.5s
 => => resolve docker.io/library/ubuntu:latest@sha256:77906da86b60585ce12215807  0.0s
 => => sha256:77906da86b60585ce12215807090eb327e7386c8fafb54023 1.13kB / 1.13kB  0.0s
 => => sha256:aa772c98400ef833586d1d517d3e8de670f7e712bf581ce605316 424B / 424B  0.0s
 => => sha256:ca2b0f26964cf2e80ba3e084d5983dab293fdb87485dc6445 2.30kB / 2.30kB  0.0s
```

2. `docker images -a`



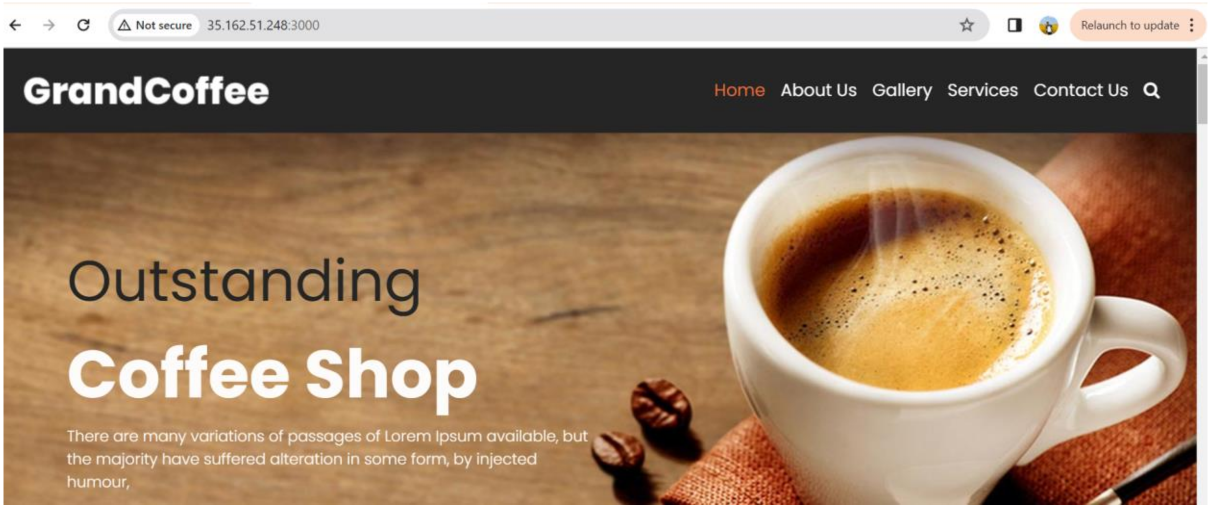
```
[root@ip-172-31-26-190 ~]# docker images -a
REPOSITORY    TAG       IMAGE ID       CREATED         SIZE
name          1         f20b75a13e8d   4 minutes ago   264MB
[root@ip-172-31-26-190 ~]#
```

3. Docker run -d -p host port: container port <image_id>



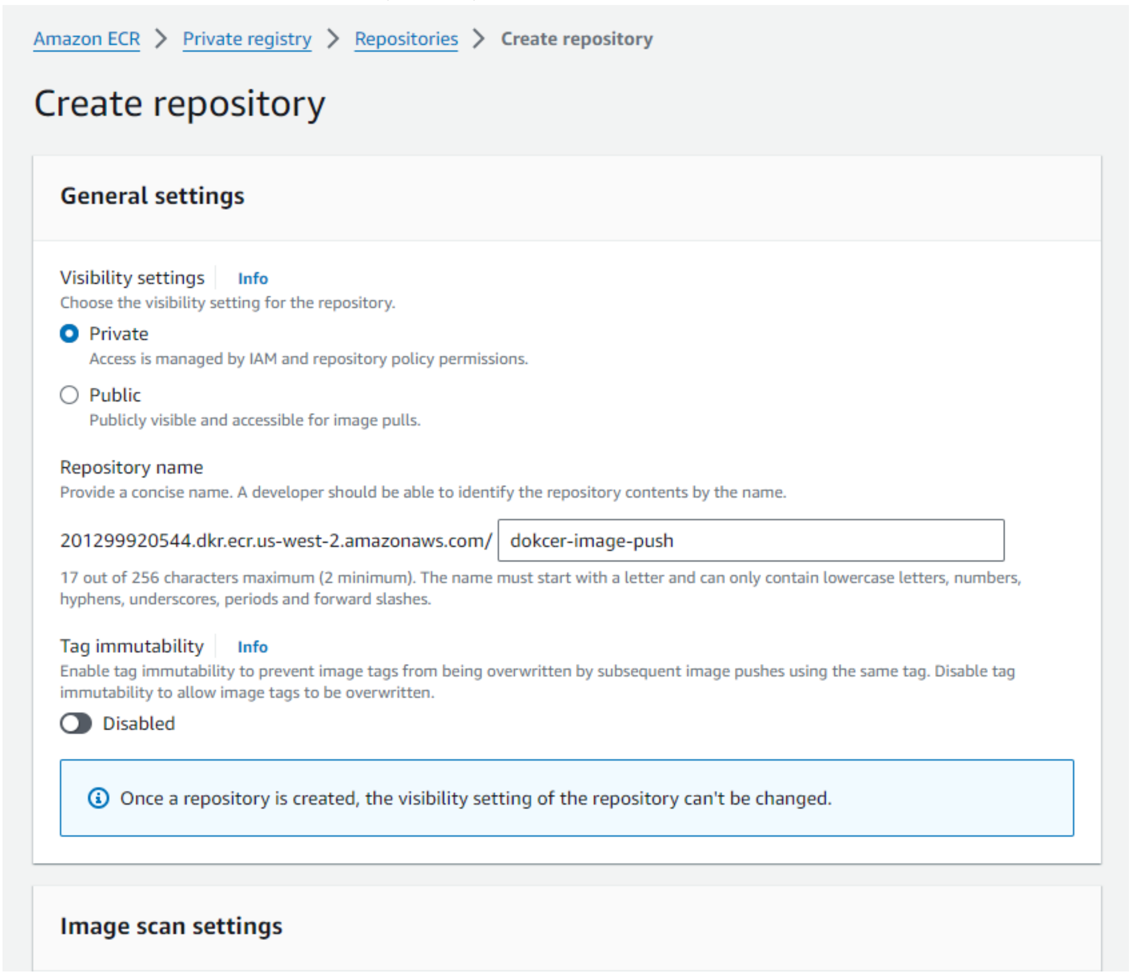
```
[root@ip-172-31-26-190 ~]# docker run -d -p 3000:80 f20b75a13e8d
1d872979c8d3e57b0ad1db963e74f860a34dd34f136e19941977f298e31fd6aa
[root@ip-172-31-26-190 ~]#
```

4. To Expose to the application on container.
   To copy to the publicip: hostport
   http://35.162.51.248:3000/


Not secure
35.162.51.248:3000
Relaunch to update
GrandCoffee
Home
About Us
Gallery
Services
Contact Us
Outstanding
Coffee Shop
There are many variations of passages of Lorem Ipsum available, but the majority have suffered alteration in some form, by injected humour,

➔ After we create image to send to the ECR Repository.

1. First we have Create one ECR Repository



Amazon ECR > Private registry > Repositories > Create repository

Create repository

General settings

Visibility settings Info

Choose the visibility setting for the repository.

- [✓ Private] Access is managed by IAM and repository policy permissions.
- Public Publicly visible and accessible for image pulls.

Repository name

Provide a concise name. A developer should be able to identify the repository contents by the name.

201299920544.dkr.ecr.us-west-2.amazonaws.com/ dokcer-image-push

17 out of 256 characters maximum (2 minimum). The name must start with a letter and can only contain lowercase letters, numbers, hyphens, underscores, periods and forward slashes.

Tag immutability Info

Enable tag immutability to prevent image tags from being overwritten by subsequent image pushes using the same tag. Disable tag immutability to allow image tags to be overwritten.

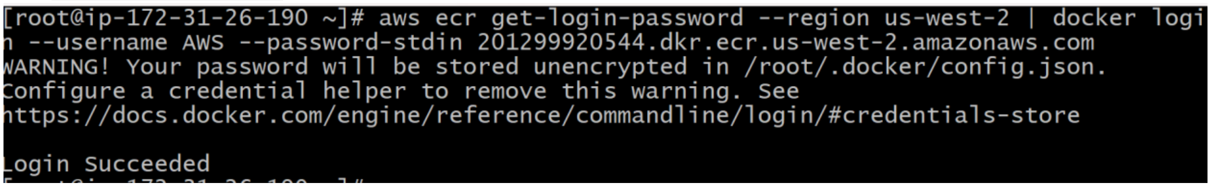
Disabled

Once a repository is created, the visibility setting of the repository can't be changed.

Image scan settings

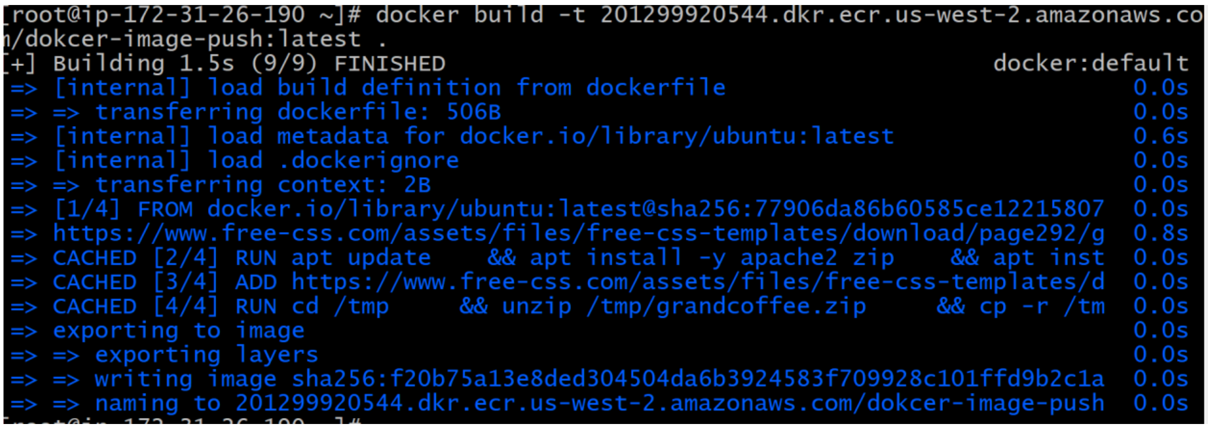
➔ After Create ECR we select the-------View Push Commands ----we run to the below command

1. `aws ecr get-login-password --region us-west-2 | docker login --username AWS --password-stdin 201299920544.dkr.ecr.us-west-2.amazonaws.com`



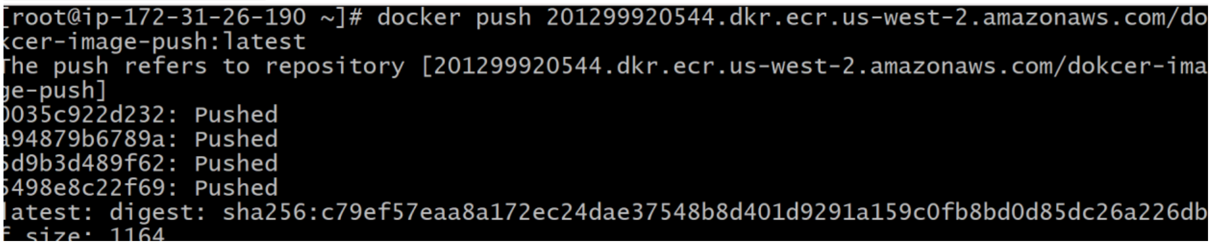
```
[root@ip-172-31-26-190 ~]# aws ecr get-login-password --region us-west-2 | docker logi
n --username AWS --password-stdin 201299920544.dkr.ecr.us-west-2.amazonaws.com
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
```

2. `docker build -t 201299920544.dkr.ecr.us-west-2.amazonaws.com/dokcer-image-push:latest .`



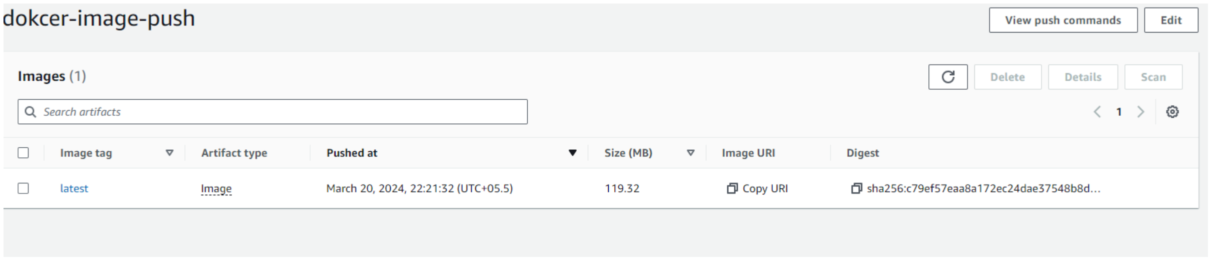
```
[root@ip-172-31-26-190 ~]# docker build -t 201299920544.dkr.ecr.us-west-2.amazonaws.co
n/dokcer-image-push:latest .
[+] Building 1.5s (9/9) FINISHED                                          docker:default
 => [internal] load build definition from dockerfile                                0.0s
 => => transferring dockerfile: 506B                                                0.0s
 => [internal] load metadata for docker.io/library/ubuntu:latest                    0.6s
 => [internal] load .dockerignore                                                   0.0s
 => => transferring context: 2B                                                     0.0s
 => [1/4] FROM docker.io/library/ubuntu:latest@sha256:77906da86b60585ce12215807     0.0s
 => https://www.free-css.com/assets/files/free-css-templates/download/page292/g     0.8s
 => CACHED [2/4] RUN apt update     && apt install -y apache2 zip     && apt inst   0.0s
 => CACHED [3/4] ADD https://www.free-css.com/assets/files/free-css-templates/d     0.0s
 => CACHED [4/4] RUN cd /tmp     && unzip /tmp/grandcoffee.zip     && cp -r /tm     0.0s
 => exporting to image                                                              0.0s
 => => exporting layers                                                             0.0s
 => => writing image sha256:f20b75a13e8ded304504da6b3924583f709928c101ffd9b2c1a     0.0s
 => => naming to 201299920544.dkr.ecr.us-west-2.amazonaws.com/dokcer-image-push     0.0s
```

3. `docker push 201299920544.dkr.ecr.us-west-2.amazonaws.com/dokcer-image-push:latest`



```
[root@ip-172-31-26-190 ~]# docker push 201299920544.dkr.ecr.us-west-2.amazonaws.com/do
kcer-image-push:latest
The push refers to repository [201299920544.dkr.ecr.us-west-2.amazonaws.com/dokcer-ima
ge-push]
0035c922d232: Pushed
a94879b6789a: Pushed
5d9b3d489f62: Pushed
5498e8c22f69: Pushed
latest: digest: sha256:c79ef57eaa8a172ec24dae37548b8d401d9291a159c0fb8bd0d85dc26a226db
f size: 1164
```

➔ After we can see ECR Repo image or not .



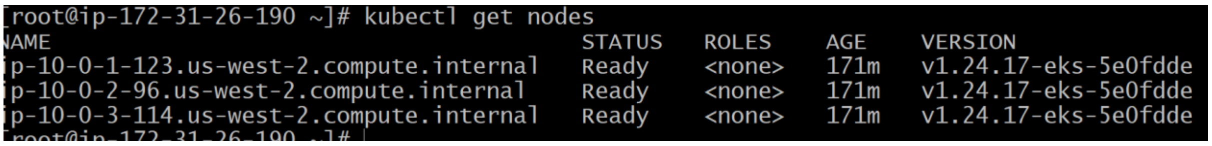
dokcer-image-push

Images (1)

Image tag	Artifact type	Pushed at	Size (MB)	Image URI	Digest
latest	Image	March 20, 2024, 22:21:32 (UTC+05.5)	119.32	Copy URI	sha256:c79ef57eaa8a172ec24dae37548b8d...

➔ After we run to the below commands .

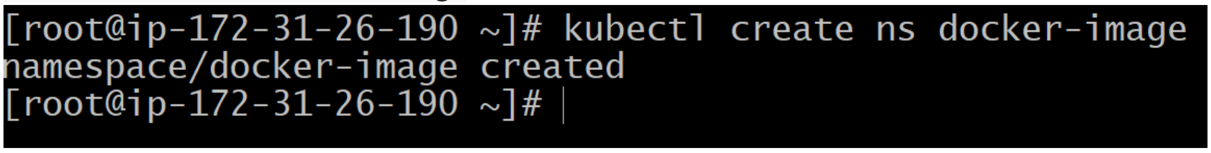
1. `Kubectl get nodes`



```
[root@ip-172-31-26-190 ~]# kubectl get nodes
NAME                                       STATUS   ROLES    AGE    VERSION
ip-10-0-1-123.us-west-2.compute.internal   Ready    <none>   171m   v1.24.17-eks-5e0fdde
ip-10-0-2-96.us-west-2.compute.internal    Ready    <none>   171m   v1.24.17-eks-5e0fdde
ip-10-0-3-114.us-west-2.compute.internal   Ready    <none>   171m   v1.24.17-eks-5e0fdde
```

➔ First, we can create namespace

Kubectl create ns docker-image



```
[root@ip-172-31-26-190 ~]# kubectl create ns docker-image
namespace/docker-image created
[root@ip-172-31-26-190 ~]#
```

➔ After we can create the yml.files

1. vi deployment.yml

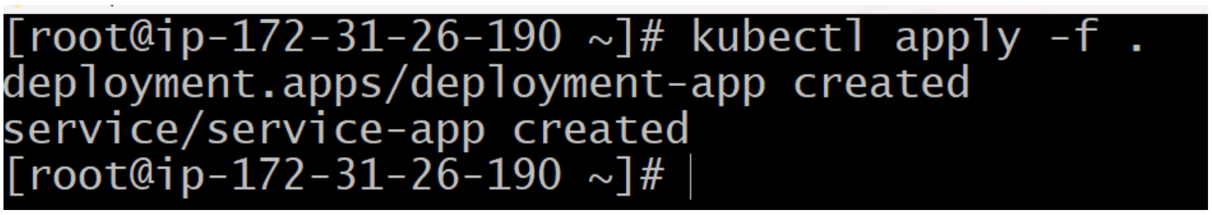
```
apiVersion: apps/v1

kind: Deployment
metadata:
  name:  deployment-app
  namespace: docker-image
  labels:
    app:  docker-app
spec:
  selector:
    matchLabels:
      app: docker-app
  replicas: 1
  template:
    metadata:
      labels:
        app:  docker-app
    spec:
      containers:
      - name:  docker-app
        image: 201299920544.dkr.ecr.us-west-2.amazonaws.com/dokcer-image
push:latest
        ports:
        - containerPort:  80
          name:  docker-app
```

2. vi service.yml

```
apiVersion: v1
kind: Service
metadata:
  name: service-app
  namespace: docker-image
spec:
  selector:
    app: docker-app
  type: LoadBalancer
  ports:
  - name: docker-app
    protocol: TCP
    port: 80
    targetPort: 80
```

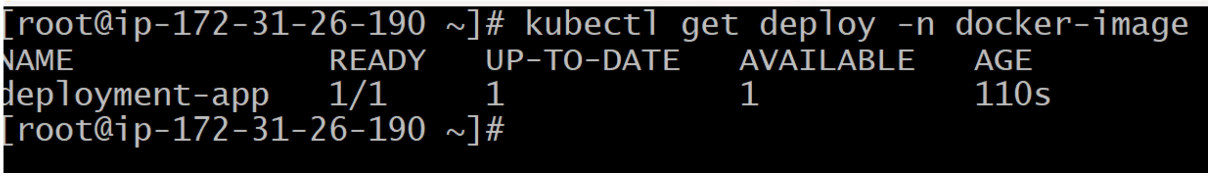
3. After we save the files we run the below commands

1. Kubectl apply -f .



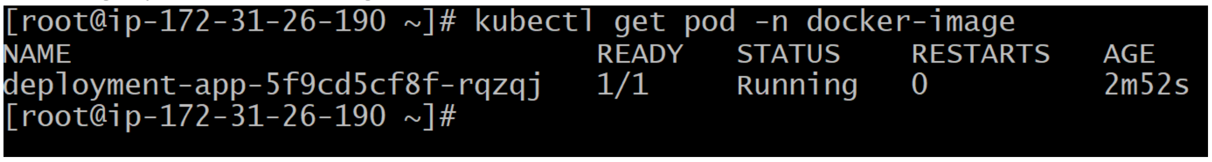
```
[root@ip-172-31-26-190 ~]# kubectl apply -f .
deployment.apps/deployment-app created
service/service-app created
[root@ip-172-31-26-190 ~]#
```

➔ Kubectl get deploy -n docker-image.



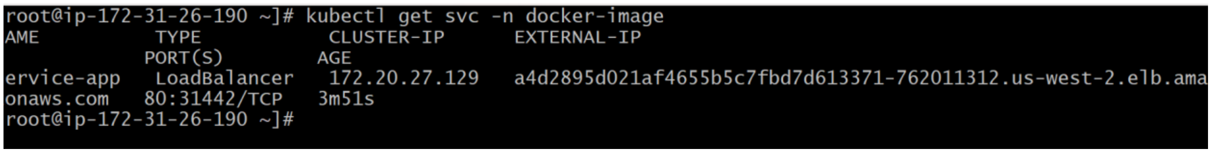
```
[root@ip-172-31-26-190 ~]# kubectl get deploy -n docker-image
NAME             READY   UP-TO-DATE   AVAILABLE   AGE
deployment-app   1/1     1            1           110s
[root@ip-172-31-26-190 ~]#
```

➔ Kubectl get pod -n docker-image



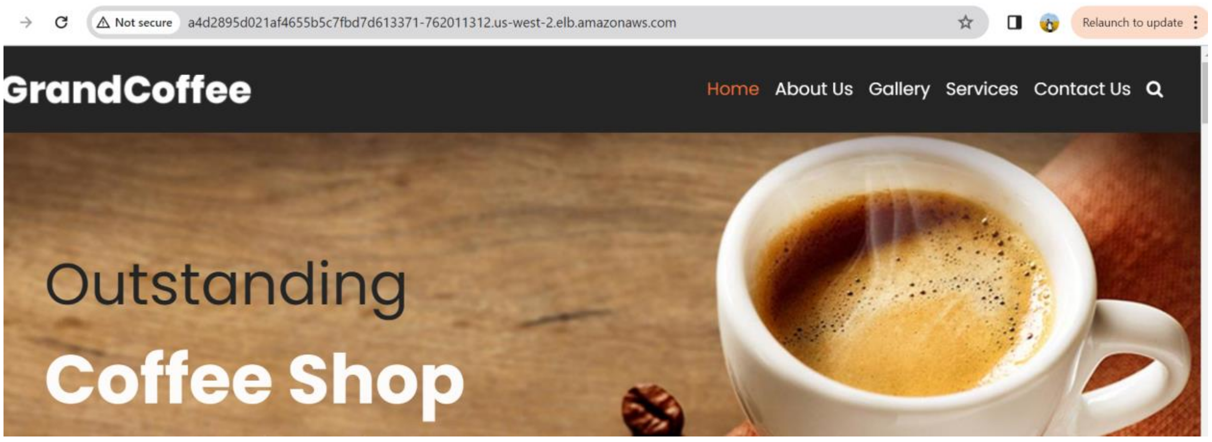
```
[root@ip-172-31-26-190 ~]# kubectl get pod -n docker-image
NAME                              READY   STATUS    RESTARTS   AGE
deployment-app-5f9cd5cf8f-rqzqj   1/1     Running   0          2m52s
[root@ip-172-31-26-190 ~]#
```

➔ Kubectl get svc -n docker-image.



```
root@ip-172-31-26-190 ~]# kubectl get svc -n docker-image
AME           TYPE           CLUSTER-IP      EXTERNAL-IP
             PORT(S)        AGE
ervice-app    LoadBalancer   172.20.27.129   a4d2895d021af4655b5c7fbd7d613371-762011312.us-west-2.elb.ama
onaws.com    80:31442/TCP   3m51s
root@ip-172-31-26-190 ~]#
```

➔ After we can copy to the Load balancer Externa-ip Url an search to thye Browser.



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