

Capstone Project

Team-3

Online Voting System

Team Members

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Problem Statement:-

Deploying sample online voting system using k8s for containerization, container management and automating k8s through helm chart/terraform.

Cloning from Vote branch from github repo

```
git clone -b vote https://github.com/mohanmanoj sakala/votesystem.git
```

```
[root@server ~]# git clone -b vote https://github.com/mohanmanoj sakala/votesystem.git
Cloning into 'votesystem'...
remote: Enumerating objects: 7896, done.
remote: Counting objects: 100% (7896/7896), done.
remote: Compressing objects: 100% (6507/6507), done.
remote: Total 7896 (delta 1207), reused 7880 (delta 1203), pack-reused 0
Receiving objects: 100% (7896/7896), 32.48 MiB | 23.00 MiB/s, done.
Resolving deltas: 100% (1207/1207), done.
```

Installing docker

```
yum update -y
```

```
amazon-linux-extras install docker -y
```

```
systemctl enable --now docker
```

Creating Frontend dockerfile

vi php.df

```
FROM centos:7
MAINTAINER "Team 3"
LABEL "App"="Development"
RUN yum install httpd -y
```

```

RUN yum install https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm -y
RUN yum install http://rpms.remirepo.net/enterprise/remi-release-7.rpm -y
RUN yum install yum-utils -y
RUN yum-config-manager --enable remi-php72 -y
RUN yum install php php-mcrypt php-cli php-gd php-curl php-mysql php-ldap php-zip php-fileinfo -y
EXPOSE 80
ADD votesystem /var/www/html
RUN systemctl enable httpd
CMD ["httpd", "-D", "FOREGROUND"]

```

Creating backend dockerfile

vi backend.df

```

FROM mysql
ENV MYSQL_DATABASE votesystem
COPY ./votesystem.sql /docker-entrypoint-initdb.d/
COPY ./alter.sql /docker-entrypoint-initdb.d/

```

vi alter.sql

```

alter user 'root'@'localhost' identified with mysql_native_password by '123';
alter user 'root'@'%' identified with mysql_native_password by '123';

```

Building frontend image

```
docker build . -f php.df -t sandeep9583/vote:frontend
```

```

[root@server sandeep]# docker build . -f php.df -t sandeep9583/vote:frontend
Sending build context to Docker daemon 676.8MB
Step 1/13 : FROM centos:7
--> eeb6ee3f44bd
Step 2/13 : MAINTAINER "Team 3"
--> Using cache
--> 110550ebe77d
Step 3/13 : LABEL "App"="Development"
--> Using cache
--> f51685340610
Step 4/13 : RUN yum install httpd -y
--> Using cache
--> 9dfd03d7f2ad
Step 5/13 : RUN yum install https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm -y
--> Using cache
--> f8d9b03780da
Step 6/13 : RUN yum install http://rpms.remirepo.net/enterprise/remi-release-7.rpm -y
--> Using cache
--> d5678902362d
Step 7/13 : RUN yum install yum-utils -y
--> Using cache
--> c6b008c150f7
Step 8/13 : RUN yum-config-manager --enable remi-php72 -y
--> Using cache
--> 53f0de9a8999
Step 9/13 : RUN yum install php php-mcrypt php-cli php-gd php-curl php-mysql php-ldap php-zip php-fileinfo -y
--> Using cache
--> 668a0f833c33
Step 10/13 : EXPOSE 80
--> Using cache
--> 306922e745da
Step 11/13 : ADD votesystem /var/www/html
--> Using cache
--> c37e1b2fc91b
Step 12/13 : RUN systemctl enable httpd
--> Using cache
--> 4ab60b185a7d
Step 13/13 : CMD ["httpd", "-D", "FOREGROUND"]
--> Using cache
--> 36da87dfb032
Successfully built 36da87dfb032
Successfully tagged sandeep9583/vote:frontend

```

Building backend image

```
docker build . -f backend.df -t sandeep9583/vote:backend
```

```
[root@server sandeep]# docker build . -f backend.df -t sandeep9583/vote:backend
Sending build context to Docker daemon 676.8MB
Step 1/4 : FROM mysql
--> 96d0eae5ed60
Step 2/4 : ENV MYSQL_DATABASE votesystem
--> Using cache
--> 809513b3ff5b
Step 3/4 : COPY ./votesystem.sql /docker-entrypoint-initdb.d/
--> Using cache
--> 6bd0cec65d0c
Step 4/4 : COPY ./alter.sql /docker-entrypoint-initdb.d/
--> Using cache
--> 793034a84142
Successfully built 793034a84142
Successfully tagged sandeep9583/vote:backend
```

docker images

```
[root@ip-172-31-32-228 sandeep]# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
sandeep9583/vote     frontend            36da87dfb032       35 seconds ago     1.09GB
sandeep              frontend            193f722b85a7       45 minutes ago     1.09GB
sandeep              backend             41de6c11546b       41 hours ago       524MB
sandeep              backend1            41de6c11546b       41 hours ago       524MB
sandeep9583/vote     backend             41de6c11546b       41 hours ago       524MB
mysql                latest              96d0eae5ed60       6 days ago         524MB
centos               7                   eeb6ee3f44bd       7 months ago       204MB
xampp/app            latest              c56ad7aalf60       9 months ago       1.3GB
[root@ip-172-31-32-228 sandeep]# docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: sandeep9583
Password:
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
```

```
docker login
```


```
docker push sandeep9583/vote:frontend
```


```
docker push sandeep9583/vote:backend
```

```
[root@ip-172-31-32-228 sandeep]# docker push sandeep9583/vote:frontend
The push refers to repository [docker.io/sandeep9583/vote]
dfd204b221b2: Pushed
139a87a234af: Pushed
10781841e3dc: Pushed
a3860b2f01e3: Pushed
1e45b7b2c7a0: Pushed
de876c64be32: Pushed
9a2f0e5b0546: Pushed
e4c1359694ed: Pushed
174f56854903: Mounted from library/centos
frontend: digest: sha256:c56440b42603b6a955974851aac75alac9cb8707209a3d2d5077afbf42170356 size: 2217
[root@ip-172-31-32-228 sandeep]# docker push sandeep9583/vote:backend
The push refers to repository [docker.io/sandeep9583/vote]
84ad3fbc0325: Pushed
f68a89e9b3d8: Mounted from library/mysql
458caal343e4: Mounted from library/mysql
886f608259be: Mounted from library/mysql
ba140a646f7a: Mounted from library/mysql
ba40c8d6faf8: Mounted from library/mysql
1b09b37f4930: Mounted from library/mysql
765a4b7dea37: Mounted from library/mysql
b4dac6cae747: Mounted from library/mysql
96759eccc124: Mounted from library/mysql
e9303ab783fe: Mounted from library/mysql
894a6e83a96f: Mounted from library/mysql
0ad3ddf4a4ce: Mounted from library/mysql
backend: digest: sha256:b4239fcb35d0dea404b99f0e8e7d725ebdd8228b58b70f7f57e41532ad201d22 size: 3036
[root@ip-172-31-32-228 sandeep]#
```




sandeep9583 / vote





this is votesystem application 

 Last pushed: a minute ago

Tags and Scans

 VULNERABILITY SCANNING - DISABLED [Enable](#)

This repository contains 2 tag(s).

TAG	OS	PULLED	PUSHED
 backend		---	a minute ago
 frontend		---	a minute ago

[See all](#)

Creating frontend container

```
docker run -d --name=frontend -p 8081:80 sandeep9583/vote:frontend
```

Creating Backend container

```
docker run -d --name=mohanbackend -e MYSQL_ROOT_PASSWORD=123 -p 3310:3306 sandeep9583/vote:backend
```

```
[root@server sandeep]# docker run -d --name=frontend -p 8081:80 sandeep9583/vote:frontend
91f2f6cf303d9bd166e0493bd1fb226232a6599accb4edd9bed12c1e01a36d30
[root@server sandeep]# docker run -d --name=mohanbackend -e MYSQL_ROOT_PASSWORD=123 -p 3310:3306 sandeep9583/vote:backend
53815418509ada1f87636aa0b74970c5da14d2bc16a17e66defda1d0a69b1a2e
```

Listing out running containers

```
docker ps
```

```
[root@server sandeep]# docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
53815418509a   sandeep9583/vote:backend            "docker-entrypoint.s..." 46 seconds ago Up 45 seconds 33060/tcp, 0.0.0.0:3310->3306/tcp, :::3310->3306/tcp
91f2f6cf303d   mohanbackend                        "mysql -u root -p123..." 46 seconds ago Up 45 seconds 3306/tcp
91f2f6cf303d   sandeep9583/vote:frontend           "httpd -D FOREGROUND"      About a minute ago Up 59 seconds 0.0.0.0:8081->80/tcp, :::8081->80/tcp
```

Knowing about backend container IPAddress

```
docker inspect 53815418509a | grep -i ipadd
```

```
[root@server sandeep]# docker inspect 53815418509a | grep -i ipadd
    "SecondaryIPAddresses": null,
    "IPAddress": "172.17.0.3",
    "IPAddress": "172.17.0.3",
[root@server sandeep]#
```

Login in frontend container

```
docker exec -it frontend bash
```

```
cd /var/www/html
```

```
cd includes
```

Place backend ip address

```
vi conn.php
```

```
<?php

$servername = "172.17.0.3";
$username = "root";
$password = "123";
$dbname = "votesystem";
// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);

if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}

?>
```

```
cd ..
```

```
cd /admin/includes
```

place backend ip address

```
vi conn.php
```

```
<?php

$servername = "172.17.0.3";
$username = "root";
$password = "123";
$dbname = "votesystem";
// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);

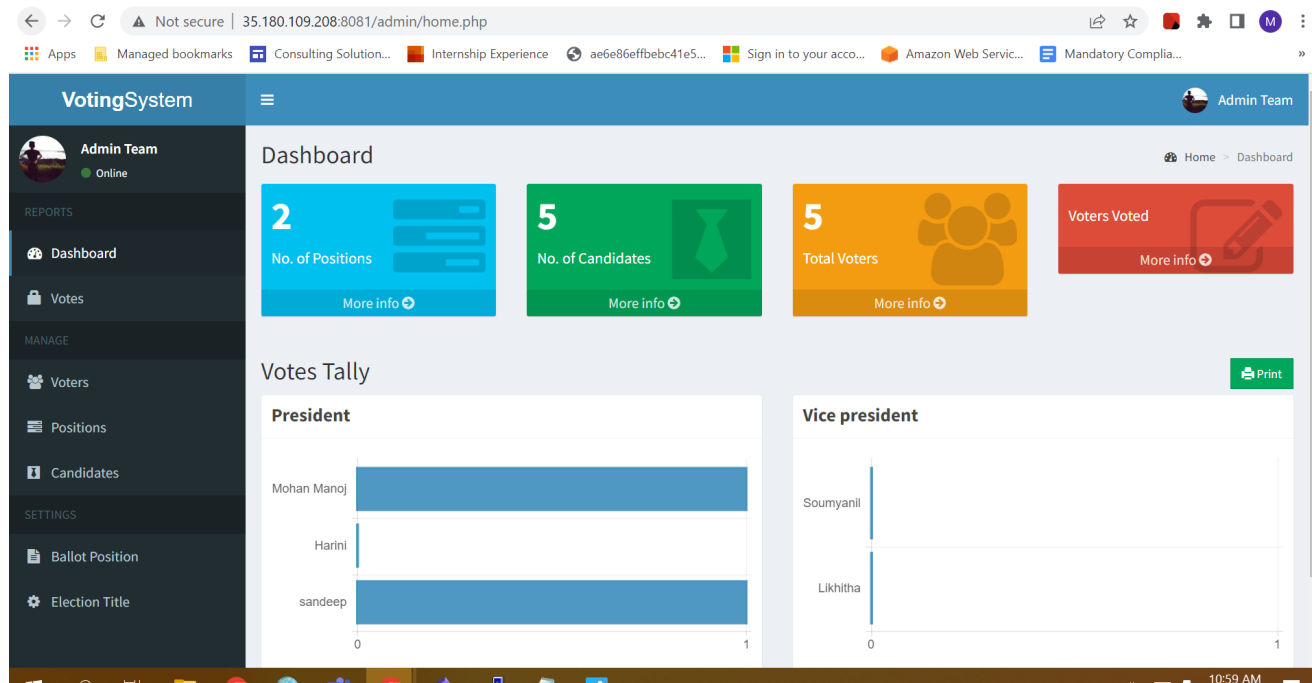
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}

?>
```

```
[root@server sandeep]# docker exec -it frontend bash
[root@91f2f6cf303d /]# cd /var/www/html
[root@91f2f6cf303d html]# ls
Download More Source Code and Scripts.html  bower_components  dist  images  index.php  logout.php  preview.php  submit_ballot.php
admin                                         db                home.php  includes  login.php  plugins    readme.txt  tcpdf
[root@91f2f6cf303d html]# cd includes
[root@91f2f6cf303d includes]# ls
ballot_modal.php  conn.php  footer.php  header.php  index.php  navbar.php  scripts.php  session.php  slugify.php
[root@91f2f6cf303d includes]# vi conn.php
[root@91f2f6cf303d html]# cd /admin/includes
bash: cd: /admin/includes: No such file or directory
[root@91f2f6cf303d html]# ls
Download More Source Code and Scripts.html  bower_components  dist  images  index.php  logout.php  preview.php  submit_ballot.php
admin                                         db                home.php  includes  login.php  plugins    readme.txt  tcpdf
[root@91f2f6cf303d html]# cd admin
[root@91f2f6cf303d admin]# ls
ballot.php          candidates_add.php  config.ini          index.php           positions_delete.php  voters.php          voters_row.php
ballot_down.php     candidates_delete.php  config_save.php    login.php           positions_edit.php   voters_add.php      votes.php
ballot_fetch.php    candidates_edit.php  conn.php           logout.php          positions_row.php    voters_delete.php   votes_reset.php
ballot_up.php       candidates_photo.php  home.php           positions.php       print.php            voters_edit.php
candidates.php       candidates_row.php    includes           positions_add.php   profile_update.php   voters_photo.php
[root@91f2f6cf303d admin]# cd includes
[root@91f2f6cf303d includes]# ls
ballot_modal.php    config_modal.php    footer.php          menubar.php         positions_modal.php  scripts.php         slugify.php        votes_modal.php
candidates_modal.php  conn.php            header.php          navbar.php           profile_modal.php    session.php         voters_modal.php
[root@91f2f6cf303d includes]# vi conn.php
```

Machine ip address:Port no

```
http://35.180.109.208:8081/admin
```



Installing cluster using terraform

```
git clone https://github.com/hashicorp/learn-terraform-provision-eks-cluster  
http://35.180.92.150/
```

```
[root@ip-172-31-32-228 git]# git clone https://github.com/hashicorp/learn-terraform-provision-eks-cluster  
Cloning into 'learn-terraform-provision-eks-cluster'...  
remote: Enumerating objects: 139, done.  
remote: Counting objects: 100% (72/72), done.  
remote: Compressing objects: 100% (25/25), done.  
remote: Total 139 (delta 59), reused 47 (delta 47), pack-reused 67  
Receiving objects: 100% (139/139), 55.21 KiB | 5.52 MiB/s, done.  
Resolving deltas: 100% (71/71), done.  
[root@ip-172-31-32-228 git]# ls  
learn-terraform-provision-eks-cluster  
[root@ip-172-31-32-228 git]# cd learn-terraform-provision-eks-cluster/  
[root@ip-172-31-32-228 learn-terraform-provision-eks-cluster]# ls  
eks-cluster.tf  kubernetes-dashboard-admin.rbac.yaml  kubernetes.tf  outputs.tf  README.md  security-groups.tf  versions.tf  vpc.tf
```

```
vi vpc.tf
```

Make changes of clustername,region,vpcname,CIDR

```
variable "region" {  
    default      = "eu-west-3"  
    description = "AWS region"  
}  
  
provider "aws" {  
    region = var.region  
}  
  
data "aws_availability_zones" "available" {}  
  
locals {  
    cluster_name = "sandeep-team3-eks-${random_string.suffix.result}"  
}  
  
resource "random_string" "suffix" {  
    length = 8  
}
```

```
special = false
}

module "vpc" {
  source  = "terraform-aws-modules/vpc/aws"
  version = "3.2.0"

  name            = "sandeep-team3-vpc"
  cidr            = "20.20.0.0/16"
  azs             = data.aws_availability_zones.available.names
  private_subnets = ["20.20.1.0/24", "20.20.2.0/24", "20.20.3.0/24"]
  public_subnets  = ["20.20.4.0/24", "20.20.5.0/24", "20.20.6.0/24"]
  enable_nat_gateway = true
  single_nat_gateway = true
  enable_dns_hostnames = true

  tags = {
    "kubernetes.io/cluster/${local.cluster_name}" = "shared"
  }

  public_subnet_tags = {
    "kubernetes.io/cluster/${local.cluster_name}" = "shared"
    "kubernetes.io/role/elb"                      = "1"
  }

  private_subnet_tags = {
    "kubernetes.io/cluster/${local.cluster_name}" = "shared"
    "kubernetes.io/role/internal-elb"             = "1"
  }
}
```

```
terraform init
```

```
terraform plan
```

```
terraform apply
```



```

    name: eks_sandeep-team3-eks-kXgOGLDe

contexts:
- context:
    cluster: eks_sandeep-team3-eks-kXgOGLDe
    user: eks_sandeep-team3-eks-kXgOGLDe
    name: eks_sandeep-team3-eks-kXgOGLDe

current-context: eks_sandeep-team3-eks-kXgOGLDe

users:
- name: eks_sandeep-team3-eks-kXgOGLDe
  user:
    exec:
      apiVersion: client.authentication.k8s.io/v1alpha1
      command: aws-iam-authenticator
      args:
        - "token"
        - "-i"
        - "sandeep-team3-eks-kXgOGLDe"

EOT
region = "eu-west-3"

```

```
terraform output -raw region
```

```
terraform output -raw cluster_name
```

Kubernetes installaton

```

cat <<EOF > /etc/docker/daemon.json
{
  "exec-opts": ["native.cgroupdriver=systemd"],
  "log-driver": "json-file",
  "log-opts": {
    "max-size": "100m"
  },
  "storage-driver": "overlay2",
  "storage-opts": [
    "overlay2.override_kernel_check=true"
  ]
}
EOF

```

```

cat <<EOF > /etc/yum.repos.d/kubernetes.repo
[kubernetes]
name=Kubernetes
baseurl=https://packages.cloud.google.com/yum/repos/kubernetes-el7-x86_64
enabled=1
gpgcheck=0
repo_gpgcheck=0
gpgkey=https://packages.cloud.google.com/yum/doc/yum-key.gpg

```

```
https://packages.cloud.google.com/yum/doc/rpm-package-key.gpg
EOF
```

```
systemctl enable --now kubelet
```

```
kubectl get nodes
```

```
[root@server sandeep]# kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
ip-20-20-1-196.eu-west-3.compute.internal	Ready	<none>	24h	v1.20.11-eks-f17b81
ip-20-20-1-6.eu-west-3.compute.internal	Ready	<none>	24h	v1.20.11-eks-f17b81

If you get any error go through this part or else leave it

```
curl -LO https://storage.googleapis.com/kubernetes-  
release/release/v1.23.6/bin/linux/amd64/kubectl
```

```
chmod a+rwx kubectl
```

```
cp kubectl /usr/bin/
```

```
kubectl get nodes
```

To list whether cluster is created or not

```
aws eks list-clusters
```

```
[root@server sandeep]# aws eks list-clusters
```

ListClusters		
	clusters	
	barjinder-team--N1DB	
	sandeep-team3-eks-kXgOGLDe	

Connecting EKS cluster

```
aws eks --region $(terraform output -raw region) update-kubeconfig --name  
$(terraform output -raw cluster_name)
```

```
aws eks --region eu-west-3 update-kubeconfig --name sandeep-team3-eks-xrQopZwg
```

```
kubectl get nodes
```

```
[root@server sandeep]# kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
ip-20-20-1-196.eu-west-3.compute.internal	Ready	<none>	24h	v1.20.11-eks-f17b81
ip-20-20-1-6.eu-west-3.compute.internal	Ready	<none>	24h	v1.20.11-eks-f17b81

vi frontend.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: frontend
  name: frontend
  namespace: sandeep
spec:
  replicas: 1
  selector:
    matchLabels:
      app: frontend
  template:
    metadata:
      labels:
        app: frontend
    spec:
      containers:
      - image: sandeep9583/vote:frontend
        name: sandeep
---
apiVersion: v1
kind: Service
metadata:
  labels:
    app: frontend
  name: frontend
  namespace: sandeep
spec:
  ports:
  - port: 80
    protocol: TCP
    targetPort: 80
  selector:
    app: frontend
  type: LoadBalancer
```

vi backend.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: backend
  name: backend
  namespace: sandeep
spec:
  replicas: 1
  selector:
    matchLabels:
      app: backend
  template:
    metadata:
      labels:
```

```

    app: backend
  spec:
    containers:
    - image: sandeep9583/vote:backend
      name: sandeep
      env:
      - name: MYSQL_ROOT_PASSWORD
        value: '123'
---
apiVersion: v1
kind: Service
metadata:
  labels:
    app: backend
    name: backend
    namespace: sandeep
spec:
  ports:
  - port: 3306
    protocol: TCP
    targetPort: 3306
  selector:
    app: backend
  type: ClusterIP

```

```
kubectl create ns sandeep
```

```
kubectl create -f frontend.yaml
```

```
kubectl create -f backend.yaml
```

```
kubectl get all -n sandeep
```

```

[root@server kubernetes]# kubectl create ns sandeep
namespace/sandeep created
[root@server kubernetes]# kubectl get ns
NAME      STATUS   AGE
default   Active   24h
kube-node-lease   Active   6m21s
kube-public   Active   24h
kube-system   Active   24h
sandeep      Active   5s
[root@server kubernetes]# kubectl get pods -n sandeep
No resources found in sandeep namespace.
[root@server kubernetes]# ls
backend.yaml  frontend.yaml
[root@server kubernetes]# kubectl apply -f frontend.yaml
deployment.apps/frontend created
service/frontend created
[root@server kubernetes]# kubectl apply -f backend.yaml
deployment.apps/backend created
service/backend created
[root@server kubernetes]# kubectl get all -n sandeep
NAME                                READY   STATUS    RESTARTS   AGE
pod/backend-888dc7c95-ggh6v         1/1     Running   0           11s
pod/frontend-6545df7768-kncc2       1/1     Running   0           39s

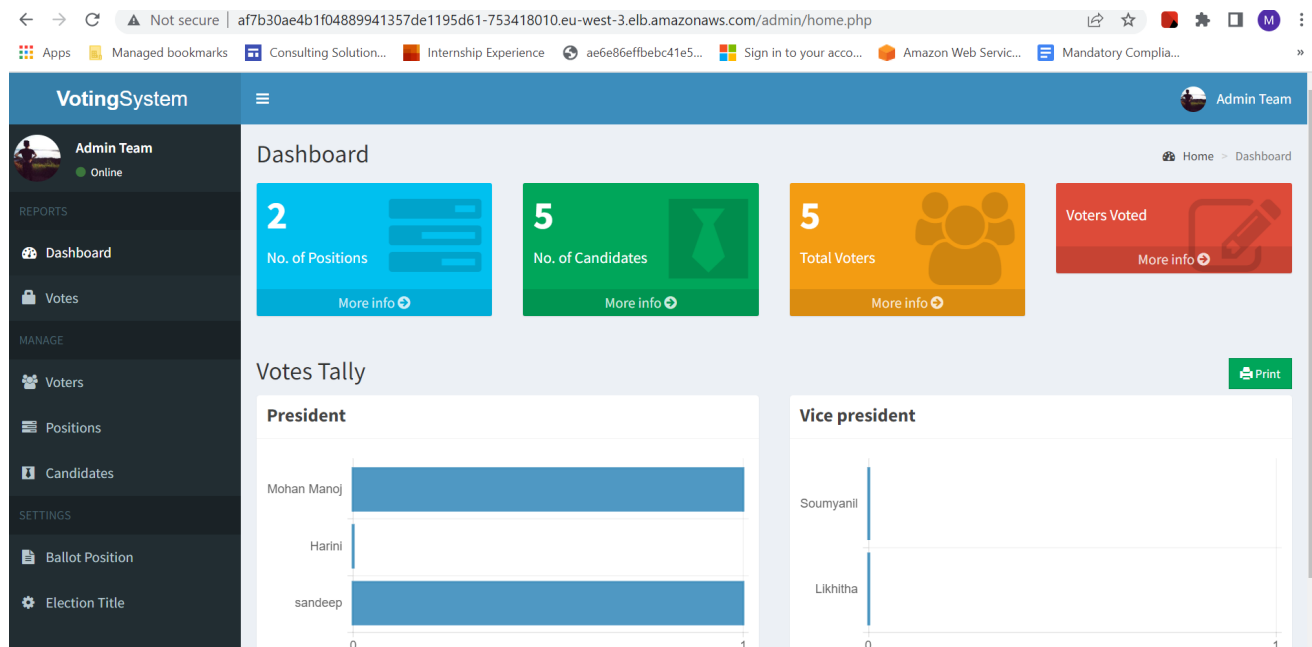
NAME                                TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/backend                     ClusterIP     10.100.252.83    <none>            3306/TCP         11s
service/frontend                    LoadBalancer 10.100.180.133  af7b30ae4b1f04889941357de1195d61-753418010.eu-west-3.elb.amazonaws.com 80:31954/TCP     39s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/backend             1/1     1             1           11s
deployment.apps/frontend           1/1     1             1           39s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/backend-888dc7c95   1         1         1       11s
replicaset.apps/frontend-6545df7768 1         1         1       39s

```

Access Application through LoadBalancer in Browser



Ansible Script for frontend and backend container

Install ansible

```
yum update -y
```

```
amazon-linux-extras install ansible2 -y
```

Ansible setup without Kubernetes

Setting hostname in server

```
hostnamectl set-hostname server
```

Generate SSH key in server

```
ssh-keygen -t rsa
```

```
[root@server harini]# ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
/root/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:BLLLuxsVikYcPpZ4iOfArbaN3wkKiULv+rv9ds/Z2Ms root@server
The key's randomart image is:
+---[RSA 2048]-----+
| .O.. . |
| =.. o . |
| . B O . . |
| o+. + o o |
| +oo.o . S |
| o=o o |
| =o,oo |
| + * +o.. .. * |
| +=B=o.. .. E. |
+---[SHA256]-----+
[root@server harini]# cat /root/.ssh/id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDjy/PD0vtHIVrSF9eg6lv7xPKoSYnmwWVe945L9QhjhY40g1yf3z0lHZe+h891tAYnMlftSGR3y4680vTNYDN3BC2qyyByWVASFKd03cbpue54vHiwVe8UM
auKt+rlWcns9egORKe1f70iRd2tbpFpBDUvNlGmwv81VTduuBQBiHwkkni7+G6R+NCdyglSdJ8rYulgTSN2MYbZw4qjgDmh5iqQAwnr4tfUu0d4ncCc+qBzuc6jLV8Fvp6FalfBmOXEHQy3orl4ERCST2
lus3Vc0iynnbJf7hh8p80xxi/t3bGv1aBnaaW8a5ATuRSK32e+kL09FDpVfbn7wKB root@server
```

Setting hostname in client1

```
hostnamectl set-hostname client1
```

Setting ssh key in client1

```
cd .ssh  
vi authorized_keys
```

```
vi /etc/hosts
```

Paste server,client ip address

```
server private address      server  
client1 private ip address  client1
```

```
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4  
::1         localhost6 localhost6.localdomain  
  
172.31.32.228    server  
1.0.0.226       client1  
~  
~  
~
```

```
ssh root@ private client ip
```

Inventory management

```
cd /etc/ansible/  
ls
```

```
vi /etc/ansible/hosts
```

```
[all]  
client1  
client2  
  
[web]  
client1
```

To check ansible able to ping

```
ansible -m ping all
```

```
mkdir playbook
```

vi d1.yaml

```
---  
- name: install docker  
  hosts: web  
  tasks:
```

```

- name: install docker
  yum:
    name: docker
- name: install pip
  yum:
    name: pip
- name: install docker for python
  pip:
    name: docker-py
- name: start docker
  service:
    name: docker
    enabled: true
    state: started
- name: create backend container
  docker_container:
    name: backend1
    image: harinimellacheruvu/harinim:backend
    state: started
    env:
      MYSQL_ROOT_PASSWORD: "123"
      MYSQL_DATABASE: votesystem
    ports:
      - "3308:3306"

- name: create frontend container
  docker_container:
    name: frontend1
    image: harinimellacheruvu/harinim:frontend
    state: started
    ports:
      - "9096:80"

```

ansible-playbook d1.yaml

```

[root@server ~]# ansible-playbook d1.yaml

PLAY [install docker] *****

TASK [Gathering Facts] *****
[WARNING]: Platform linux on host client1 is using the discovered Python interpreter at /usr/bin/python,
interpreter could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter
ok: [client1]

TASK [install docker] *****
ok: [client1]

TASK [install pip] *****
ok: [client1]

TASK [install coker for python] *****
ok: [client1]

TASK [start docker] *****
ok: [client1]

TASK [create backend container] *****
changed: [client1]

TASK [create frontend container] *****
changed: [client1]

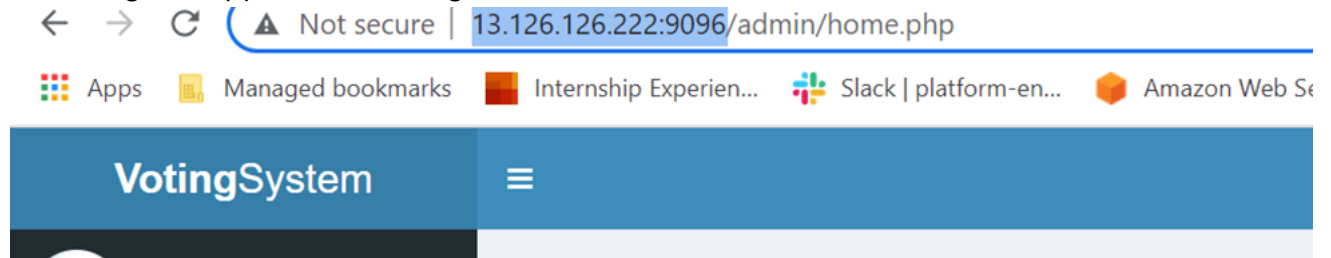
PLAY RECAP *****
client1                : ok=7    changed=2    unreachable=0    failed=0    skipped=0    rescued=0

```

```
ansible web -m command -a "docker ps"
```

CONTAINER ID	IMAGE	COMMAND	CR
EATED	STATUS	PORTS	NAMES
5c21dda5bfb7	harinimellacheruvu/harinim:frontend	"httpd -D FOREGROUND"	10
seconds ago	Up 9 seconds	0.0.0.0:9096->80/tcp	frontend1
add687a4792b	harinimellacheruvu/harinim:backend	"docker-entrypoint.s..."	14
seconds ago	Up 13 seconds	33060/tcp, 0.0.0.0:3308->3306/tcp	backend1
5c21dda5bfb7	harinimellacheruvu/harinim:frontend	"httpd -D FOREGROUND"	10

Accessing the Application through Client1



Ansible with Kubernetes

vi 1.yaml

```
- hosts: localhost

tasks:
  - name: install pip
    yum:
      name: pip
  - name: install docker for python
    pip:
      name: docker-py
  - name: create namespace
    k8s:
      name: sandeep
      api_version: v1
      kind: Namespace
      state: present
  - name: deploy a web server1
    k8s:
      api_version: v1
      namespace: sandeep
      definition:
        kind: Deployment
        metadata:
          labels:
            app: frontend
            name: frontend
        spec:
          replicas: 1
          selector:
            matchLabels:
              app: frontend
          template:
            metadata:
              labels:
```



```

        app: frontend
      spec:
        containers:
          - name: frontend
            image: sandeep9583/vote:frontend
            resources:
              limits:
                cpu: 500m
              requests:
                cpu: 200m

- name: deploy a web server1
  k8s:
    api_version: v1
    namespace: sandeep
    definition:
      kind: Deployment
      metadata:
        labels:
          app: backend
          name: backend
      spec:
        replicas: 1
        selector:
          matchLabels:
            app: backend
        template:
          metadata:
            labels:
              app: backend
          spec:
            containers:
              - name: backend
                image: sandeep9583/vote:backend
                env:
                  - name: MYSQL_ROOT_PASSWORD
                    value: '123'

- name: deploy a web server
  k8s:
    api_version: v1
    namespace: sandeep
    definition:
      kind: Service
      metadata:
        labels:
          app: frontend
          name: frontend
          namespace: sandeep
      spec:
        ports:
          - port: 80
            protocol: TCP
            targetPort: 80
        selector:
          app: frontend
        type: LoadBalancer

```

```
- name: deploy a web server
  k8s:
    api_version: v1
    namespace: sandeep
    definition:
      kind: Service
      metadata:
        labels:
          app: backend
          name: backend
          namespace: sandeep
      spec:
        ports:
          - port: 3306
            protocol: TCP
            targetPort: 3306
        selector:
          app: backend
        type: ClusterIP

- name: Deploy hpa
  k8s:
    api_version: v1
    namespace: sandeep
    definition:
      kind: HorizontalPodAutoscaler
      metadata:
        name: frontend
        namespace: sandeep
      spec:
        scaleTargetRef:
          apiVersion: apps/v1
          kind: Deployment
          name: frontend
        minReplicas: 2
        maxReplicas: 10
        targetCPUUtilizationPercentage: 30
```

To run the yaml script

```
ansible-playbook 1.yaml
```

```
[root@server sandeep]# mkdir playbook
[root@server sandeep]# vi ansible.yaml
[root@server sandeep]# ansible-playbook ansible.yaml

PLAY [localhost] *****

TASK [Gathering Facts] *****
ok: [localhost]

TASK [install pip] *****
ok: [localhost]

TASK [install coker for python] *****
ok: [localhost]

TASK [create namespace] *****
changed: [localhost]

TASK [deploy a web server1] *****
changed: [localhost]

TASK [deploy a web server1] *****
changed: [localhost]

TASK [deploy a web server] *****
changed: [localhost]

TASK [deploy a web server] *****
changed: [localhost]

TASK [Deploy hpa] *****
changed: [localhost]

PLAY RECAP *****
localhost : ok=9  changed=6  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
```

```
kubectl get all -n sandeep
```

```
[root@server sandeep]# kubectl get all -n sandeep
NAME                                READY   STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-szjwd        1/1     Running   0           2m16s
pod/frontend-55f4f9b858-4phw7       1/1     Running   0           2m18s
pod/frontend-55f4f9b858-6ffnh       1/1     Running   0           117s

NAME                                TYPE                      CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/backend                     ClusterIP             10.100.135.8    <none>            3306/TCP          2m14s
service/frontend                    LoadBalancer          10.100.225.33   a527ca7e40ff542eeb59cc1be1a609fb-1188331077.eu-west-3.elb.amazonaws.com  80:31865/TCP      2m15s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/backend             1/1     1             1           2m16s
deployment.apps/frontend            2/2     2             2           2m18s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/backend-594cf8dbcf  1         1         1       2m16s
replicaset.apps/frontend-55f4f9b858  2         2         2       2m18s

NAME                                REFERENCE             TARGETS  MINPODS  MAXPODS  REPLICAS  AGE
horizontalpodautoscaler.autoscaling/frontend  Deployment/frontend    0%/30%   2         10        2          2m13s
```

Accessing Application through LoadBalancer in Browser

← → ↻ Not secure | a527ca7e40ff542eeb59cc1be1a609fb-1188331077.eu-west-3.elb.amazonaws.com/admin/home.php

Apps Managed bookmarks Consulting Solution... Internship Experience ae6e86effbec41e5... Sign in to your acco... Amazon Web Servic... Mandatory Complia...

VotingSystem

Admin Team
Online

REPORTS
Dashboard
Votes
MANAGE
Voters
Positions
Candidates
SETTINGS
Ballot Position
Election Title

Dashboard
Home = Dashboard

2
No. of Positions
More info

5
No. of Candidates
More info

5
Total Voters
More info

Voters Voted
More info

Votes Tally
Print

President
Mohan Manoj
Harini
sandeep

Vice president
Soumyanil
Likhitha

Getting Frontend ipaddress of pod

```
kubectl get pods -o wide -n sandeep
```

Installation of metric server for auto scaling

```
kubectl apply -f https://github.com/kubernetes-sigs/metrics-server/releases/latest/download/components.yaml
```

Checking whether installed or not

```
kubectl get deployment metrics-server -n kube-system
```

```
[root@server helm]# kubectl get deployment metrics-server -n kube-system
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
metrics-server      1/1      1              1             24h
```

Autoscaling in Ansible with help of Creating and increasing Load

```
kubectl run -it --rm load-generator --image=busybox /bin/sh -n sandeep
```

```
while true; do wget -q -O- http://20.20.1.63; done
```

In other duplicate terminal

```
watch kubectl get all -n sandeep
```

Initially cpu utilization without generating load

The screenshot shows two terminal windows. The left window displays an HTML page with jQuery, Bootstrap, and DataTables. The right window shows the output of the command `watch kubectl get all -n sandeep`.

Left Terminal Output (HTML):

```
</div>
</div>
</div>
<!-- jQuery 3 -->
<script src="bower_components/jquery/dist/jquery.min.js"></script>
<!-- Bootstrap 3.3.7 -->
<script src="bower_components/bootstrap/dist/js/bootstrap.min.js"></script>
<!-- iCheck 1.0.1 -->
<script src="plugins/iCheck/icheck.min.js"></script>
<!-- DataTables -->
<script src="bower_components/datatables.net/js/jquery.dataTables.min.js"></script>
<script src="bower_components/datatables.net-bs/js/dataTables.bootstrap.min.js"></script>
<!-- SlimScroll -->
<script src="bower_components/jquery-slimscroll/jquery.slimscroll.min.js"></script>
<!-- FastClick -->
<script src="bower_components/fastclick/lib/fastclick.js"></script>
<!-- AdminLTE App -->
<script src="dist/js/adminlte.min.js"></script>
<!-- Data Table Initialize -->
<script>
$(function () {
  $('#example1').DataTable()
  var bookTable = $('#booklist').DataTable({
    'paging': true,
    'lengthChange': false,
    'searching': true,
    'ordering': true,
    'info': false,
    'autoWidth': false
  })
  $('#searchBox').on('keyup', function () {
    bookTable.search(this.value).draw();
  });
})
</script></body>
</html>
```

Right Terminal Output (kubectl get all -n sandeep):

```
Every 2.0s: kubectl get all -n sandeep      Tue May 10 07:58:54 2022
NAME                READY    STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-szjwd    1/1      Running   0           14m
pod/frontend-55f4f9b858-4phw7    1/1      Running   0           14m
pod/frontend-55f4f9b858-6ffnh    1/1      Running   0           14m
pod/load-generator             1/1      Running   0           40s

NAME                TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/backend     ClusterIP      10.100.135.8     <none>            3306/TCP          14m
service/frontend    LoadBalancer  10.100.225.33    a527ca7e40ff542eeb59cclbela 80:31865/TCP      14m
609fb-1188331077.eu-west-3.elb.amazonaws.com

NAME                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/backend    1/1      1              1             14m
deployment.apps/frontend    2/2      2              2             14m

NAME                DESIRED    CURRENT    READY    AGE
replicaset.apps/backend-594cf8dbcf    1          1          1         14m
replicaset.apps/frontend-55f4f9b858    2          2          2         14m

NAME                MINPODS    MAXPODS    REPLICAS    AGE                REFERENCE                TARGETS
horizontalpodautoscaler.autoscaling/frontend    2           10          2            14m                Deployment/frontend    0%/30%
```

Generating the load where replicas are Creating

```

root@server/sandeep
$(('example1')).DataTable()
var bookTable = $('#booklist').DataTable({
  'paging'      : true,
  'lengthChange': false,
  'searching'   : true,
  'ordering'    : true,
  'info'        : false,
  'autoWidth'   : false
})

$('#searchBox').on('keyup', function(){
  bookTable.search(this.value).draw();
});
})
</script></body>
</html>

<!DOCTYPE html>
<html>
<head>
  <meta charset="utf-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <title>Voting System using PHP</title>
  <!-- Tell the browser to be responsive to screen width -->
  <meta content="width=device-width, initial-scale=1, maximum-scale=1, user-scalable=no" name="viewport">
  <!-- Bootstrap 3.3.7 -->
  <link rel="stylesheet" href="bower_components/bootstrap/dist/css/bootstrap.min.css">
  <!-- iCheck for checkboxes and radio inputs -->
  <link rel="stylesheet" href="plugins/iCheck/all.css">
  <!-- DataTables -->
  <link rel="stylesheet" href="bower_components/datatables.net-bs/css/dataTables.bootstrap.min.css">
  <!-- Font Awesome -->
  <link rel="stylesheet" href="bower_components/font-awesome/css/font-awesome.min.css">
  <!-- Theme style -->
  <link rel="stylesheet" href="dist/css/AdminLTE.min.css">
  <!-- AdminLTE Skins. Choose a skin from the css/skins folder instead of downloading all of them to reduce the load. -->
  <link rel="stylesheet" href="dist/css/skins/skin-blue.css">
</head>
<body>
  <div class="hold-transition login-page">
    <div class="login-box">
      <div class="login-logo">
        <b>Voting System</b>
      </div>
      <div class="login-box-body">
        <p class="login-box-msg">Sign in to start your session</p>
        <form action="login.php" method="POST">
          <div class="form-group has-feedback">
            <input type="text" class="form-control" name="voter" placeholder="Voter's ID" required>
            <span class="glyphicon glyphicon-user form-control-feedback">
          </div>
          <div class="form-group has-feedback">
            <input type="password" class="form-control" name="password" placeholder="Password" required>
            <span class="glyphicon glyphicon-lock form-control-feedback">
          </div>
          <div class="form-group">
            <input type="submit" value="Sign In" class="btn btn-primary">
          </div>
        </form>
      </div>
    </div>
  </div>
</body>
</html>

```

```

root@server:~
Every 2.0s: kubectl get all -n sandeep
Tue May 10 07:59:14 2022

NAME                                READY    STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-szjwd        1/1      Running   0           15m
pod/frontend-55f4f9b858-4phw7      1/1      Running   0           15m
pod/frontend-55f4f9b858-6ffnh       1/1      Running   0           14m
pod/frontend-55f4f9b858-8cp5k       1/1      Running   0           4s
pod/frontend-55f4f9b858-z7rjp       1/1      Running   0           4s
pod/load-generator                   1/1      Running   0           60s

NAME                                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/backend                      ClusterIP      10.100.135.8   <none>          3306/TCP    15m
service/frontend                    LoadBalancer  10.100.225.33  a527ca7e40ff542eeb59cc1bela609fb-1188331077.eu-west-3.elb.amazonaws.com  80:31865/TCP  15m

NAME                                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/backend              1/1      1              1             15m
deployment.apps/frontend             4/4      4              4             15m

NAME                                DESIRED    CURRENT    READY    AGE
replicaset.apps/backend-594cf8dbcf  1          1          1        15m
replicaset.apps/frontend-55f4f9b858  4          4          4        15m

NAME                                REFERENCE    TARGETS
horizontalpodautoscaler.autoscaling/frontend  Deployment/frontend  56%/30%
2          10          2          15m

```

Decreasing the load due to newly Creating replicas

```

root@server/sandeep
margin-top:20px;

#candidate list ul{
  list-style-type:none;
}

#candidate list ul li{
  margin:0 30px 30px 0;
  vertical-align:top;
}

.clist{
  margin-left: 20px;
}

.cname{
  font-size: 25px;
}

.votelist{
  font-size: 17px;
}

</style>
</head><body class="hold-transition login-page">
<div class="login-box">
  <div class="login-logo">
    <b>Voting System</b>
  </div>
  <div class="login-box-body">
    <p class="login-box-msg">Sign in to start your session</p>
    <form action="login.php" method="POST">
      <div class="form-group has-feedback">
        <input type="text" class="form-control" name="voter" placeholder="Voter's ID" required>
        <span class="glyphicon glyphicon-user form-control-feedback">
      </div>
      <div class="form-group has-feedback">
        <input type="password" class="form-control" name="password" placeholder="Password" required>
        <span class="glyphicon glyphicon-lock form-control-feedback">
      </div>
      <div class="form-group">
        <input type="submit" value="Sign In" class="btn btn-primary">
      </div>
    </form>
  </div>
</div>
</body>
</html>

```

```

root@server:~
Every 2.0s: kubectl get all -n sandeep
Tue May 10 08:00:06 2022

NAME                                READY    STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-szjwd        1/1      Running   0           16m
pod/frontend-55f4f9b858-4phw7      1/1      Running   0           16m
pod/frontend-55f4f9b858-6ffnh       1/1      Running   0           15m
pod/frontend-55f4f9b858-8cp5k       1/1      Running   0           56s
pod/frontend-55f4f9b858-8z7l7       1/1      Running   0           25s
pod/frontend-55f4f9b858-kz7c7       1/1      Running   0           56s
pod/frontend-55f4f9b858-z7rjp       1/1      Running   0           112s
pod/load-generator                   1/1      Running   0           112s

NAME                                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/backend                      ClusterIP      10.100.135.8   <none>          3306/TCP    15m
service/frontend                    LoadBalancer  10.100.225.33  a527ca7e40ff542eeb59cc1bela609fb-1188331077.eu-west-3.elb.amazonaws.com  80:31865/TCP  16m

NAME                                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/backend              1/1      1              1             16m
deployment.apps/frontend             6/6      6              6             16m

NAME                                DESIRED    CURRENT    READY    AGE
replicaset.apps/backend-594cf8dbcf  1          1          1        16m
replicaset.apps/frontend-55f4f9b858  6          6          6        16m

NAME                                REFERENCE    TARGETS
horizontalpodautoscaler.autoscaling/frontend  Deployment/frontend  27%/30%
2          10          6          15m

```

Helm Installation in Cluster

```
curl https://raw.githubusercontent.com/helm/helm/master/scripts/get-helm-3 > get_helm.sh
```

```
ls
```

```
chmod 700 get_helm.sh
```

```
cp /usr/local/bin/helm /usr/bin/
```

```
./get_helm.sh
```

```
helm version
```

```
helm create team
```

```
tree team
```

```
[root@server helm]# tree team
team
├── charts
├── Chart.yaml
├── templates
│   ├── deployment.yaml
│   ├── hpa.yaml
│   └── service.yaml
└── values.yaml

2 directories, 5 files
```

```
cd team
```

```
cd templates
```

Keep these files only deployment.yaml ,service.yaml,hpa.yaml,_helpers.tpl

Vi deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: {{ .Values.frontend.name }}
    name: {{ .Values.frontend.name }}
    namespace: {{ .Values.frontend.namespace }}
spec:
  replicas: {{ .Values.frontend.replicaCount }}
  selector:
    matchLabels:
      app: {{ .Values.frontend.name }}
  template:
    metadata:
      labels:
        app: {{ .Values.frontend.name }}
    spec:
      containers:
```

```

- image: {{ .Values.frontend.image.repository}}
  name: {{ .Values.frontend.name}}
  resources:
    limits:
      cpu: 500m
    requests:
      cpu: 200m
---

apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: {{ .Values.backend.name}}
    name: {{ .Values.backend.name}}
    namespace: {{ .Values.backend.namespace}}
spec:
  replicas: {{ .Values.backend.replicaCount }}
  selector:
    matchLabels:
      app: {{ .Values.backend.name}}
  template:
    metadata:
      labels:
        app: {{ .Values.backend.name}}
    spec:
      containers:
        - image: {{ .Values.backend.image.repository}}
          name: {{ .Values.backend.name}}
          env:
            - name: MYSQL_ROOT_PASSWORD
              value: "123"

```

vi service.yaml

```

apiVersion: v1
kind: Service
metadata:
  labels:
    app: {{ .Values.frontend.name}}
    name: {{ .Values.frontend.name}}
    namespace: {{ .Values.frontend.namespace}}
spec:
  ports:
    - port: 80
      protocol: TCP
      targetPort: 80
  selector:
    app: {{ .Values.frontend.name}}
  type: LoadBalancer
---

apiVersion: v1
kind: Service
metadata:
  labels:
    app: {{ .Values.backend.name}}

```

```
name: {{ .Values.backend.name }}
namespace: {{ .Values.backend.namespace }}
spec:
  ports:
  - port: 3306
    protocol: TCP
    targetPort: 3306
  selector:
    app: {{ .Values.backend.name }}
  type: ClusterIP
```

vi hpa.yaml

```
apiVersion: autoscaling/v1
kind: HorizontalPodAutoscaler
metadata:
  name: {{ .Values.hpa.name }}
  namespace: {{ .Values.hpa.namespace }}
spec:
  scaleTargetRef:
    apiVersion: apps/v1
    kind: Deployment
    name: {{ .Values.hpa.name }}
  minReplicas: 2
  maxReplicas: 10
  targetCPUUtilizationPercentage: 30
```

```
cd ..
```

vi values.yaml

```
frontend:
  name: frontend
  namespace: sandeep
  enabled: true
  replicaCount: 1
  image:
    repository: sandeep9583/vote:frontend

backend:
  name: backend
  namespace: sandeep
  enabled: true
  replicaCount: 1
  image:
    repository: sandeep9583/vote:backend
hpa:
  name: frontend
  namespace: sandeep
```

```
cd ..
```

```
helm install helm-sandeep1 team
```



```
[root@server helm]# helm install helm-sandeepl team
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
NAME: helm-sandeepl
LAST DEPLOYED: Tue May 10 06:14:59 2022
NAMESPACE: default
STATUS: deployed
REVISION: 1
TEST SUITE: None
```

```
kubectl get all -n sandeep
```

```
[root@server helm]# kubectl get all -n sandeep
NAME                                READY    STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-rtgt6        1/1      Running   0           102s
pod/frontend-55f4f9b858-77mgw       1/1      Running   0           102s
pod/frontend-55f4f9b858-mwcdw       1/1      Running   0           84s

NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/backend                    ClusterIP           10.100.79.183   <none>           3306/TCP         102s
service/frontend                   LoadBalancer       10.100.135.25   afcc47aad60ba48fa8f896f6011299ad-1922620569.eu-west-3.elb.amazonaws.com 80:31108/TCP    102s

NAME                                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/backend             1/1      1              1            102s
deployment.apps/frontend            2/2      2              2            102s

NAME                                DESIRED    CURRENT    READY    AGE
replicaset.apps/backend-594cf8dbcf 1           1          1        102s
replicaset.apps/frontend-55f4f9b858 2           2          2        102s

NAME                                REFERENCE            TARGETS  MINPODS  MAXPODS  REPLICAS  AGE
horizontalpodautoscaler.autoscaling/frontend  Deployment/frontend  0%/30%   2         10        2          102s
```

Accessing through loadbalancer in Browser

Not secure | afcc47aad60ba48fa8f896f6011299ad-1922620569.eu-west-3.elb.amazonaws.com/admin/home.php

Apps Managed bookmarks Consulting Solution... Internship Experience ae6e86effbebc41e5... Sign in to your acco... Amazon Web Servic... Mandatory Complia...

VotingSystem Admin Team

Admin Team Online

REPORTS

- Dashboard
- Votes

MANAGE

- Voters
- Positions
- Candidates

SETTINGS

- Ballot Position
- Election Title

Dashboard

2 No. of Positions More info

5 No. of Candidates More info

5 Total Voters More info

Voters Voted More info

Votes Tally

President

Candidate	Votes
Mohan Manoj	1
Harini	0
sandeepl	1

Vice president

Candidate	Votes
Soumyanil	0
Likhitha	0

Print

Installation of metric server for auto scaling

```
kubectl apply -f https://github.com/kubernetes-sigs/metrics-server/releases/latest/download/components.yaml
```

Checking whether installed or not

```
kubectl get deployment metrics-server -n kube-system
```

```
[root@server helm]# kubectl get deployment metrics-server -n kube-system
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
metrics-server      1/1      1              1            24h
```

```
kubectl get pods -o wide -n sandeep
```

```
[root@server helm]# kubectl get pods -o wide -n sandeep
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE	NOMINATED NODE	READINESS GATES
backend-594cf8dbcf-rtgt6	1/1	Running	0	22m	20.20.1.164	ip-20-20-1-6.eu-west-3.compute.internal	<none>	<none>
frontend-55f4f9b858-77mgw	1/1	Running	0	22m	20.20.1.45	ip-20-20-1-196.eu-west-3.compute.internal	<none>	<none>
frontend-55f4f9b858-mwcdw	1/1	Running	0	22m	20.20.1.205	ip-20-20-1-6.eu-west-3.compute.internal	<none>	<none>

To Create and increase the load in frontend Pod

```
kubectl run -it --rm load-generator --image=busybox /bin/sh -n sandeep
```

```
[root@server helm]# kubectl run -it --rm load-generator --image=busybox /bin/sh -n sandeep
If you don't see a command prompt, try pressing enter.
/ #
```

```
while true; do wget -q -O- http://20.20.1.45; done
```

In other duplicate terminal

```
watch kubectl get all -n sandeep
```

Initially cpu utilization without generating load

The left terminal window shows the source code for a web application, including a script for a DataTable and an HTML file for a voting system. The right terminal window shows the output of the command `watch kubectl get all -n sandeep`, which displays the status of all resources in the `sandeep` namespace. The output includes a table of pods, a table of services, a table of deployments, a table of replicasets, and a table of horizontal pod autoscalers.

NAME	READY	STATUS	RESTARTS	AGE
pod/backend-594cf8dbcf-rtgt6	1/1	Running	0	28m
pod/frontend-55f4f9b858-77mgw	1/1	Running	0	28m
pod/frontend-55f4f9b858-mwcdw	1/1	Running	0	27m
pod/load-generator	1/1	Running	0	4m12s

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/backend	ClusterIP	10.100.79.183	<none>	3306/TCP	28m
service/frontend	LoadBalancer	10.100.135.25	afcc47aad60ba48fa8f896f6011299ad-1922620569.eu-west-3.elb.amazonaws.com	80:31108/TCP	28m

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/backend	1/1	1	1	28m
deployment.apps/frontend	2/2	2	2	28m

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/backend-594cf8dbcf	1	1	1	28m
replicaset.apps/frontend-55f4f9b858	2	2	2	28m

NAME	MINPODS	MAXPODS	REPLICAS	AGE	REFERENCE	TARGETS
horizontalpodautoscaler.autoscaling/frontend	2	10	2	28m	Deployment/frontend	0%/30%

Generating the load where replicas are Creating

```
root@server:/sandeep/helm
```

```
margin:0 30px 30px 0;
vertical-align:top
}

.olist{
margin-left: 20px;
}

.cname{
font-size: 25px;
}

.votelist{
font-size: 17px;
}
}
</style>
head<body class="hold-transition login-page">
<div class="login-box">
<div class="login-logo">
<b>Voting System</b>
</div>
<div class="login-box-body">
<p class="login-box-msg">Sign in to start your session</p>
<form action="login.php" method="POST">
<div class="form-group has-feedback">
<input type="text" class="form-control" name="voter" placeholder="Voter's ID" required>
<span class="glyphicon glyphicon-user form-control-feedback"></span>
</div>
<div class="form-group has-feedback">
<input type="password" class="form-control" name="password" placeholder="Password" required>
<span class="glyphicon glyphicon-lock form-control-feedback"></span>
</div>
<div class="row">
<div class="col-xs-4">
<button type="submit" class="btn btn-primary btn-block btn-flat" name="login"><i class="fa fa-sign-in"></i> Sign In</button>
</div>
</div>
</div>
</div>
```

```
root@server:/sandeep/helm
```

```
Every 2.0s: kubectl get all -n sandeep
```

```
Tue May 10 06:43:25 2022
```

NAME	READY	STATUS	RESTARTS	AGE
pod/backend-594cf8dbcf-rtgt6	1/1	Running	0	28m
pod/frontend-55f4f9b858-77mgw	1/1	Running	0	28m
pod/frontend-55f4f9b858-fx2dp	1/1	Running	0	8s
pod/frontend-55f4f9b858-mwcdw	1/1	Running	0	28m
pod/frontend-55f4f9b858-tvb5f	1/1	Running	0	8s
pod/load-generator	1/1	Running	0	4m26s

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/backend	ClusterIP	10.100.79.183	<none>	3306/TCP	28m
service/frontend	LoadBalancer	10.100.135.25	afcc47aad60ba48fa8f896f6011299ad-1922620569.eu-west-3.elb.amazonaws.com	80:31108/TCP	28m

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/backend	1/1	1	1	28m
deployment.apps/frontend	4/4	4	4	28m

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/backend-594cf8dbcf	1	1	1	28m
replicaset.apps/frontend-55f4f9b858	4	4	4	28m

NAME	MINPODS	MAXPODS	REPLICAS	AGE	REFERENCE	TARGETS
horizontalpodautoscaler.autoscaling/frontend	2	10	2	28m	Deployment/frontend	74%/30%

Decreasing the load due to newly Creating replicas

```
root@server:/sandeep/helm
```

```
AdminLTE.min.css">
<!-- Theme style -->
<link rel="stylesheet" href="dist/css/AdminLTE.min.css">
<!-- AdminLTE Skins. Choose a skin from the css/skins
folder instead of downloading all of them to reduce the load. -->
<link rel="stylesheet" href="dist/css/skins/_all-skins.min.css">

<!-- HTML5 Shim and Respond.js IE8 support of HTML5 elements and media queries -->
<!-- WARNING: Respond.js doesn't work if you view the page via file:// -->
<!--[if lt IE 9]>
<script src="https://oss.maxcdn.com/html5shiv/3.7.3/html5shiv.min.js"></script>
<script src="https://oss.maxcdn.com/respond/1.4.2/respond.min.js"></script>
</if>
</script></body>
</html>

<!-- DOCTYPE html -->
<html>
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<title>Voting System using PHP</title>
<!-- Tell the browser to be responsive to screen width -->
<meta content="width=device-width, initial-scale=1, maximum-scale=1, user-scalable=no" name="viewport">
<!-- Bootstrap 3.3.7 -->
<link rel="stylesheet" href="bower_components/bootstrap/dist/css/bootstrap.min.css">
<!-- iCheck for checkboxes and radio inputs -->
<link rel="stylesheet" href="plugins/iCheck/all.css">
<!-- DataTables -->
<link rel="stylesheet" href="bower_components/datatables.net-bs/css/dataTables.bootstrap.min.css">
<!-- Font Awesome -->
<link rel="stylesheet" href="bower_components/font-awesome/css/font-awesome.min.css">
</head>
```

```
root@server:/sandeep/helm
```

```
Every 2.0s: kubectl get all -n sandeep
```

```
Tue May 10 06:44:02 2022
```

NAME	READY	STATUS	RESTARTS	AGE
pod/backend-594cf8dbcf-rtgt6	1/1	Running	0	29m
pod/frontend-55f4f9b858-77mgw	1/1	Running	0	29m
pod/frontend-55f4f9b858-8gw2m	1/1	Running	0	30s
pod/frontend-55f4f9b858-fx2dp	1/1	Running	0	45s
pod/frontend-55f4f9b858-19jtv	1/1	Running	0	30s
pod/frontend-55f4f9b858-mwcdw	1/1	Running	0	28m
pod/frontend-55f4f9b858-tvb5f	1/1	Running	0	45s
pod/load-generator	1/1	Running	0	5m3s

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/backend	ClusterIP	10.100.79.183	<none>	3306/TCP	29m
service/frontend	LoadBalancer	10.100.135.25	afcc47aad60ba48fa8f896f6011299ad-1922620569.eu-west-3.elb.amazonaws.com	80:31108/TCP	29m

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/backend	1/1	1	1	29m
deployment.apps/frontend	6/6	6	6	29m

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/backend-594cf8dbcf	1	1	1	29m
replicaset.apps/frontend-55f4f9b858	6	6	6	29m

NAME	MINPODS	MAXPODS	REPLICAS	AGE	REFERENCE	TARGETS
horizontalpodautoscaler.autoscaling/frontend	2	10	6	29m	Deployment/frontend	50%/30%

Steps for Creating Helm Repository

1. Create Repository in github
2. Create Directory in Local Machine that contains helm chart team
3. Git Clone in the directory

```
[root@server helm]# git clone git@github.com:harinimellacheruvu/votesystem_helm.git
Cloning into 'votesystem_helm'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
[root@server helm]#
```

4. Compress the Helm Chart

```
helm package team
```

```
[root@server helm]# helm package team
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
Successfully packaged chart and saved it to: /harini/helm/team-0.1.0.tgz
[root@server helm]# ls
team team-0.1.0.tgz votesystem_helm
[root@server helm]#
```

5. Copy the Compressed Helm Chart to Git Repository

6. Create index.yaml file in Git Repository

```
team team-0.1.0.tgz votesystem_helm
[root@server helm]# cp team-0.1.0.tgz votesystem_helm
[root@server helm]# helm repo index votesystem_helm
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
[root@server helm]#
```

7. git add .

8. git commit -m "Online vote system"

9. git push origin master

```
[root@server votesystem_helm]# git add --all
[root@server votesystem_helm]# git commit -m "Online votesystem"
[master a43131d] Online votesystem
2 files changed, 14 insertions(+)
create mode 100644 index.yaml
create mode 100644 team-0.1.0.tgz
[root@server votesystem_helm]# git push origin master
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 2 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 1.68 KiB | 1.68 MiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:harinimellacheruvu/votesystem_helm.git
87766d0..a43131d master -> master
```

10. Add this git Repository to Helm Repository

11. search the Helm Repository

```
[root@server helm]# helm repo add votesystem_helm https://harinimellacheruvu.github.io/votesystem_helm/
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
"votesystem_helm" has been added to your repositories
[root@server helm]# helm search repo votesystem_helm/team
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
NAME                CHART VERSION  APP VERSION     DESCRIPTION
votesystem_helm/team 0.1.0          1.16.0          A Helm chart for Kubernetes
```

Steps for installing Helm chart from Repository

```
helm search repo votesystem_helm/team
```

```
[root@server sandeep]# helm search repo votesystem_helm/team
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
NAME                CHART VERSION  APP VERSION     DESCRIPTION
votesystem_helm/team 0.1.0          1.16.0          A Helm chart for Kubernetes
```

```
helm install samplevote votesystem_helm/team
```

```
[root@server sandeep]# helm install helmsandeep votesystem_helm/team
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /root/.kube/config
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /root/.kube/config
NAME: helmsandeep
LAST DEPLOYED: Tue May 10 09:43:33 2022
NAMESPACE: default
STATUS: deployed
REVISION: 1
TEST SUITE: None
```

```
watch kubectl get all
```

```
root@server/sandeep
Every 2.0s: kubectl get all                                     Tue May 10 09:44:52 2022

NAME                                     READY   STATUS    RESTARTS   AGE
pod/backend-594cf8dbcf-dlvnm            1/1     Running   0           80s
pod/frontend-55f4f9b858-bjczl          1/1     Running   0           80s
pod/frontend-55f4f9b858-nr49w          1/1     Running   0           64s

NAME                                     TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)
service/backend                          ClusterIP      10.100.158.89   <none>            3306/TCP
service/frontend                         LoadBalancer  10.100.63.68    a6c9f24f8df03402c814f6e42583cd01-594925727.eu-west-3.elb.amazonaws.com 80:31762/TCP
service/kubernetes                       ClusterIP      10.100.0.1      <none>            443/TCP

NAME                                     READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/backend                 1/1     1             1           81s
deployment.apps/frontend                2/2     2             2           81s

NAME                                     DESIRED   CURRENT   READY   AGE
replicaset.apps/backend-594cf8dbcf      1         1         1       81s
replicaset.apps/frontend-55f4f9b858     2         2         2       81s

NAME                                     REFERENCE   TARGETS  MINPODS  MAXPODS  REPLICAS  AGE
horizontalpodautoscaler.autoscaling/frontend  Deployment/frontend  0%/30%   2         10         2          81s
```

Accessing the application through LoadBalancer in Browser

The screenshot displays the VotingSystem application interface. The top navigation bar includes the application name 'VotingSystem' and the user 'Admin Team'. The main dashboard features four key metrics: 2 No. of Positions, 5 No. of Candidates, 5 Total Voters, and a 'Voters Voted' button. Below these, there are two bar charts: 'President' and 'Vice president'. The 'President' chart shows three candidates: Mohan Manoj, Harini, and sandeep. The 'Vice president' chart shows two candidates: Soumyanil and Likhitha. The footer indicates 'Copyright © 2021 CampCodes' and 'All rights reserved'.

Assigning Domain Using Route53 in AWS

<https://aws.amazon.com/premiumsupport/knowledge-center/simple-resource-record->

```
aws route53 list-hosted-zones-by-name
```

```
root@server ~]# aws route53 list-hosted-zones-by-name
```

ListHostedZonesByName	
IsTruncated	False
MaxItems	100
HostedZones	
CallerReference	efala946-a144-44bf-a274-4d74496960fd
Id	/hostedzone/Z011640426V6E2L2XC5PR
Name	priartw.com.
ResourceRecordSetCount	5
Config	
Comment	
PrivateZone	False
HostedZones	
CallerReference	e8eaec52-73e2-40df-9b88-37a0f26a07e4
Id	/hostedzone/Z01715222439GKORX0695
Name	priartw.com.
ResourceRecordSetCount	2
Config	
Comment	
PrivateZone	False

```
[root@server ~]# aws route53 list-hosted-zones-by-name
```

ListHostedZonesByName	
IsTruncated	False
MaxItems	100
HostedZones	
CallerReference	efala946-a144-44bf-a274-4d74496960fd
Id	/hostedzone/Z011640426V6E2L2XC5PR
Name	priartw.com.
ResourceRecordSetCount	5
Config	
Comment	
PrivateZone	False
HostedZones	
CallerReference	e8eaec52-73e2-40df-9b88-37a0f26a07e4
Id	/hostedzone/Z01715222439GKORX0695
Name	priartw.com.
ResourceRecordSetCount	2
Config	
Comment	
PrivateZone	False

Creating JSON File For Routes3

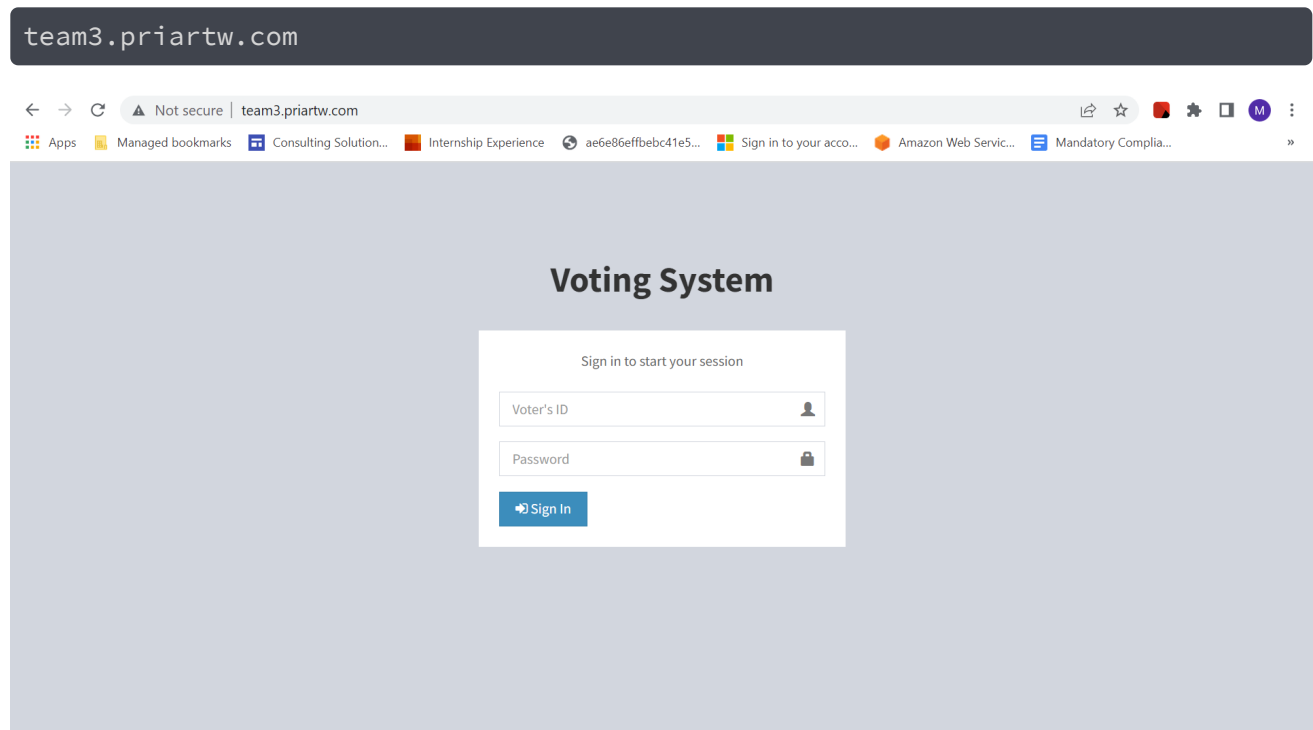
Creating Record using json

vi sample.json

```
{
  "Comment": "CREATE/DELETE/UPSERT a record ",
  "Changes": [{
    "Action": "CREATE",
    "ResourceRecordSet": {
      "Name": "team3.priartw.com",
      "Type": "CNAME",
      "TTL": 300,
      "ResourceRecords": [{ "Value":
"a578ee54f6c7e4e3aa4a43fef378e71c-2119385227.eu-west-3.elb.amazonaws.com"}]
    }]
}
```

```
aws route53 change-resource-record-sets --hosted-zone-id Z011640426V6E2L2XC5PR
--change-batch file://sample.json
```

Copy in Browser



To delete record the ROUTE53
vi delete.json

```
{
  "Comment": "CREATE/DELETE/UPSERT a record ",
  "Changes": [{
    "Action": "DELETE",
    "ResourceRecordSet": {
      "Name": "team3.priartw.com",
      "Type": "CNAME",
      "TTL": 300,
      "ResourceRecords": [{ "Value":
"a578ee54f6c7e4e3aa4a43fef378e71c-2119385227.eu-west-3.elb.amazonaws.com"}]
    }]
  }
}
```

```
aws route53 change-resource-record-sets --hosted-zone-id Z011640426V6E2L2XC5PR
--change-batch file://delete.json
```