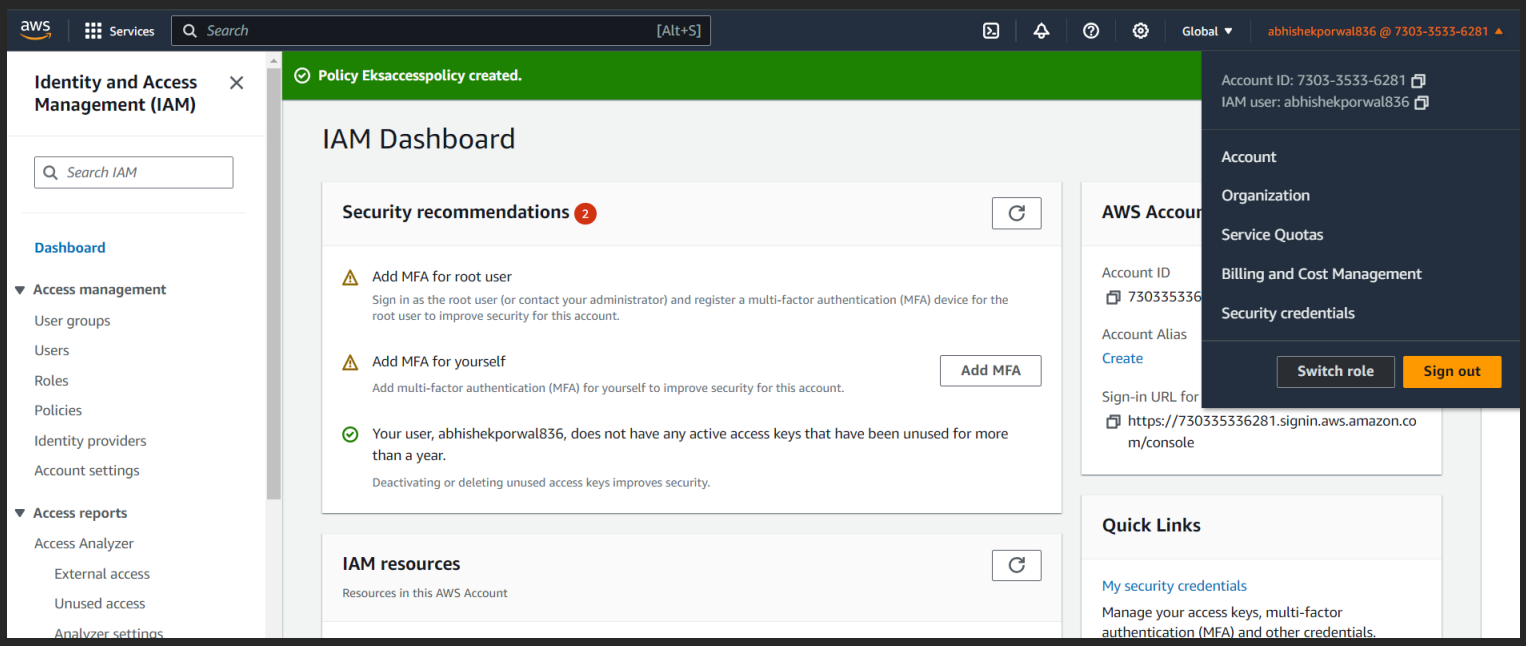
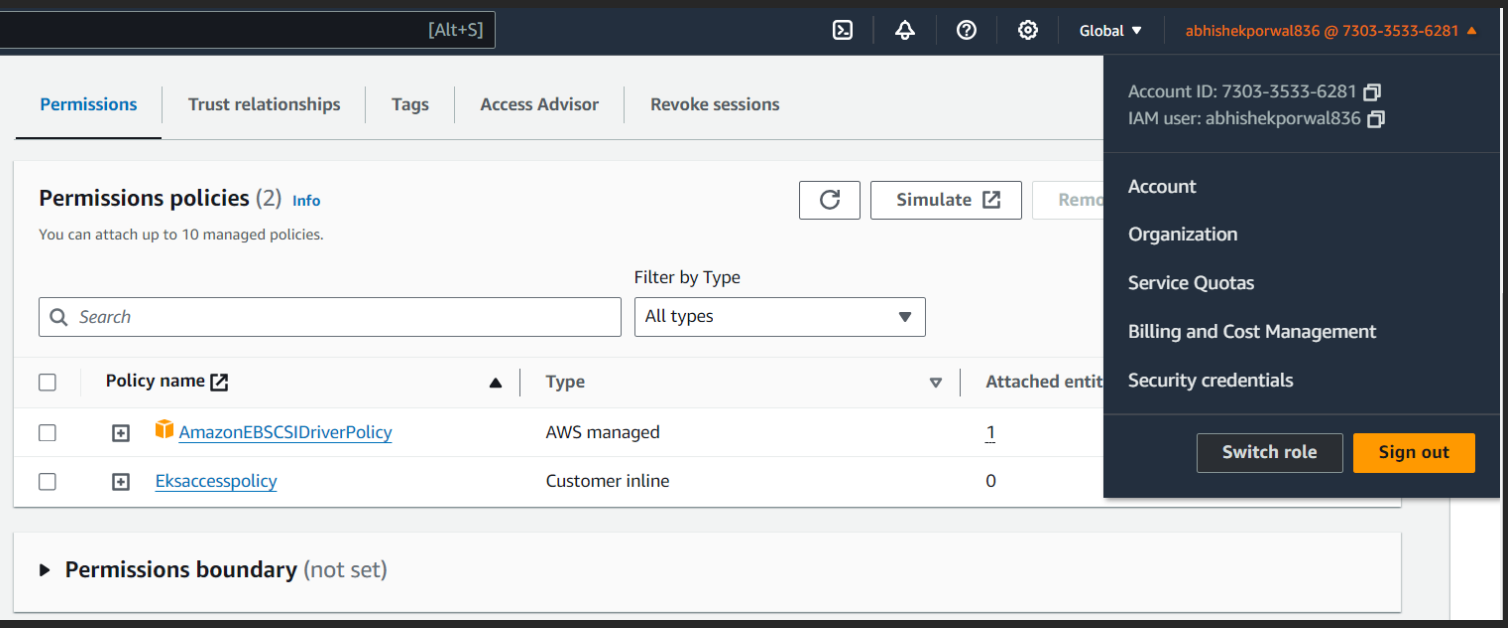
WEB-VOTING-APP DEPLOYMENT USING AWS EKS

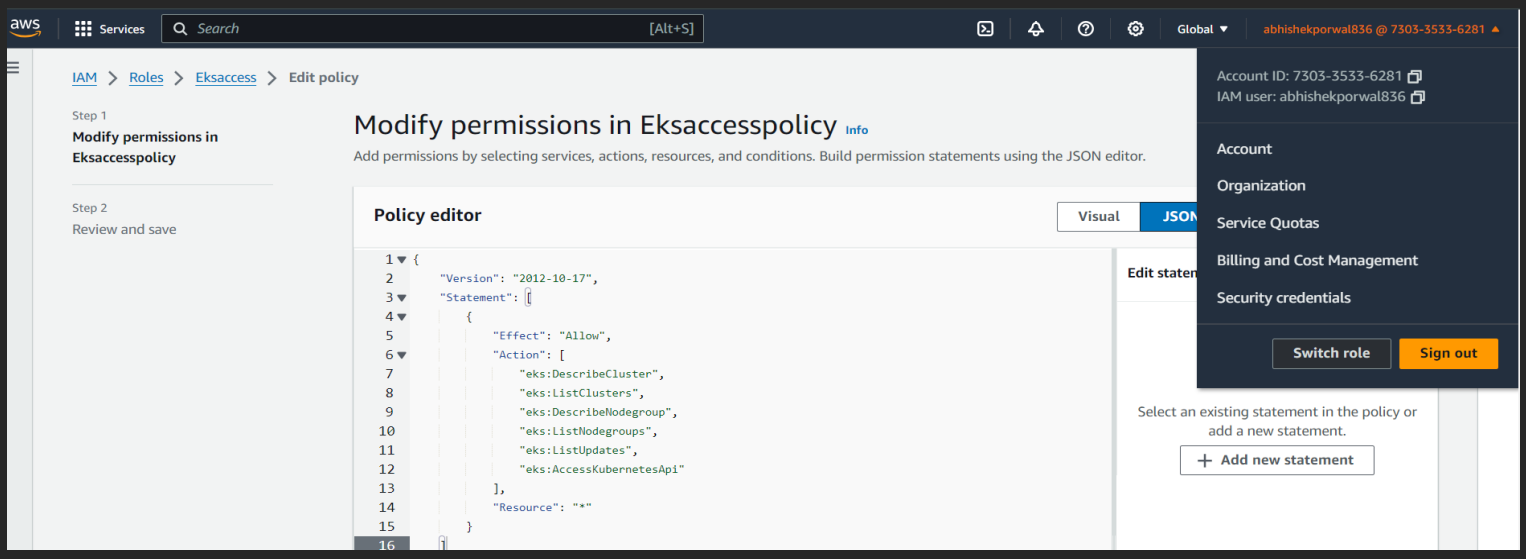
1. Logged in as IAM user name abhishekporwal836:



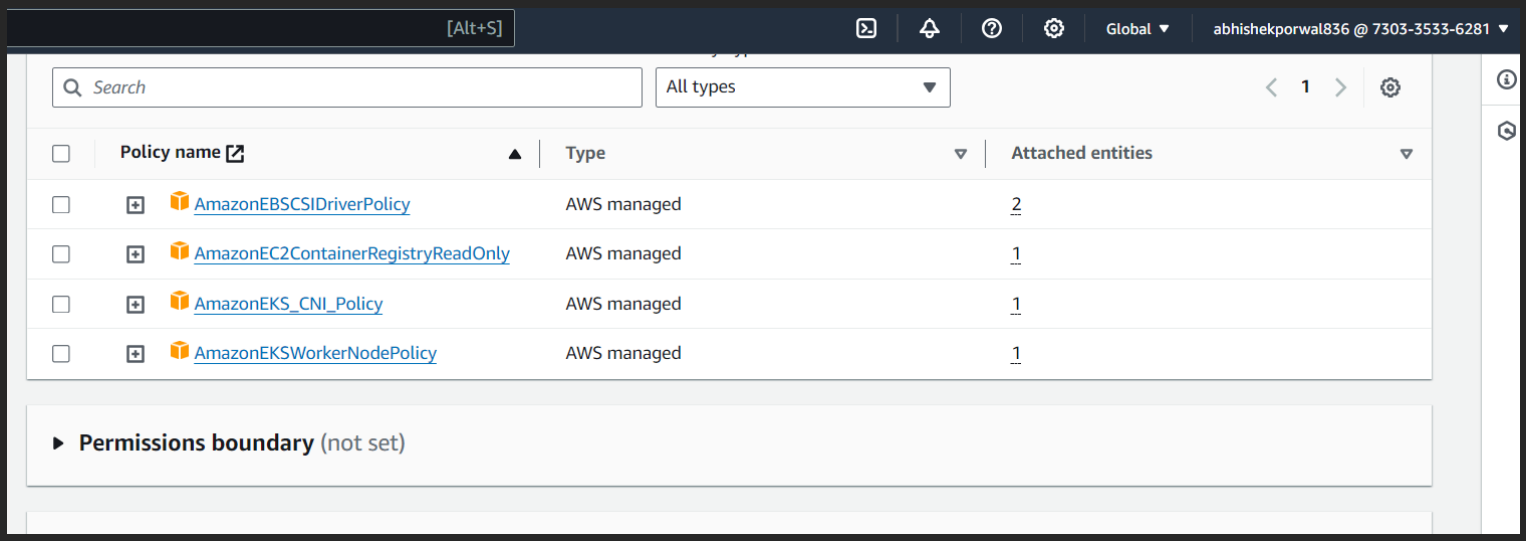
The roles and their permission policy:

a) Eksaccess:

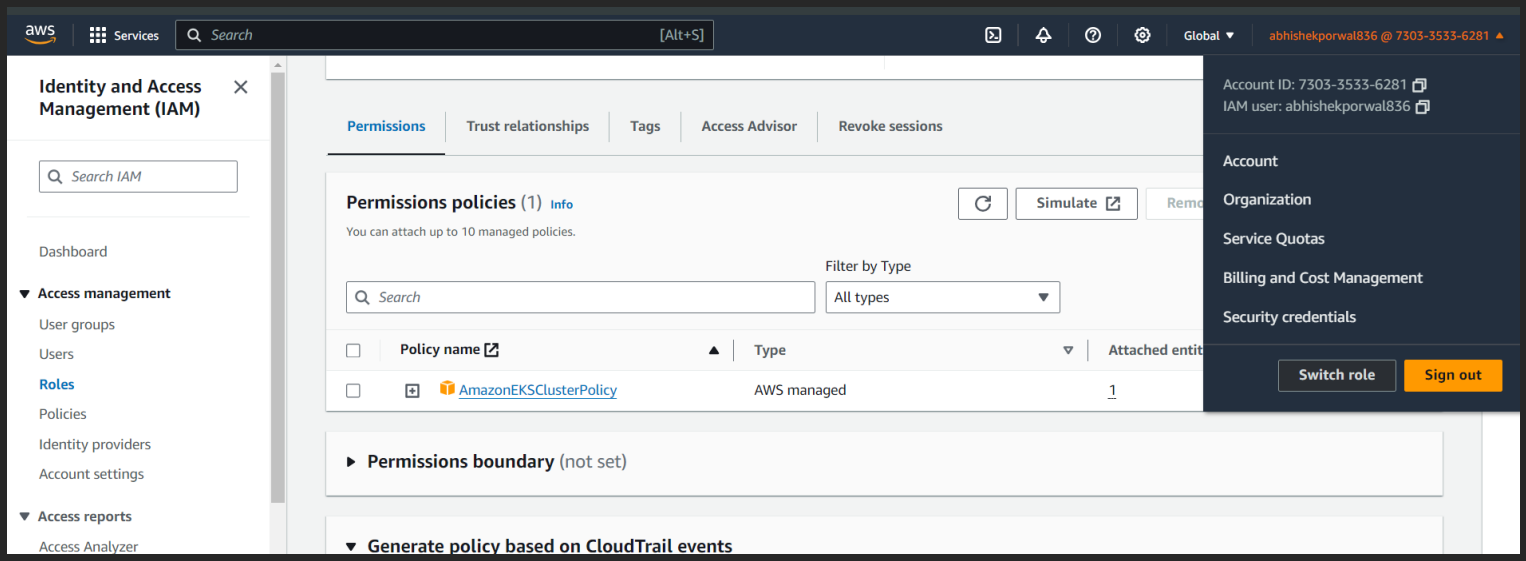




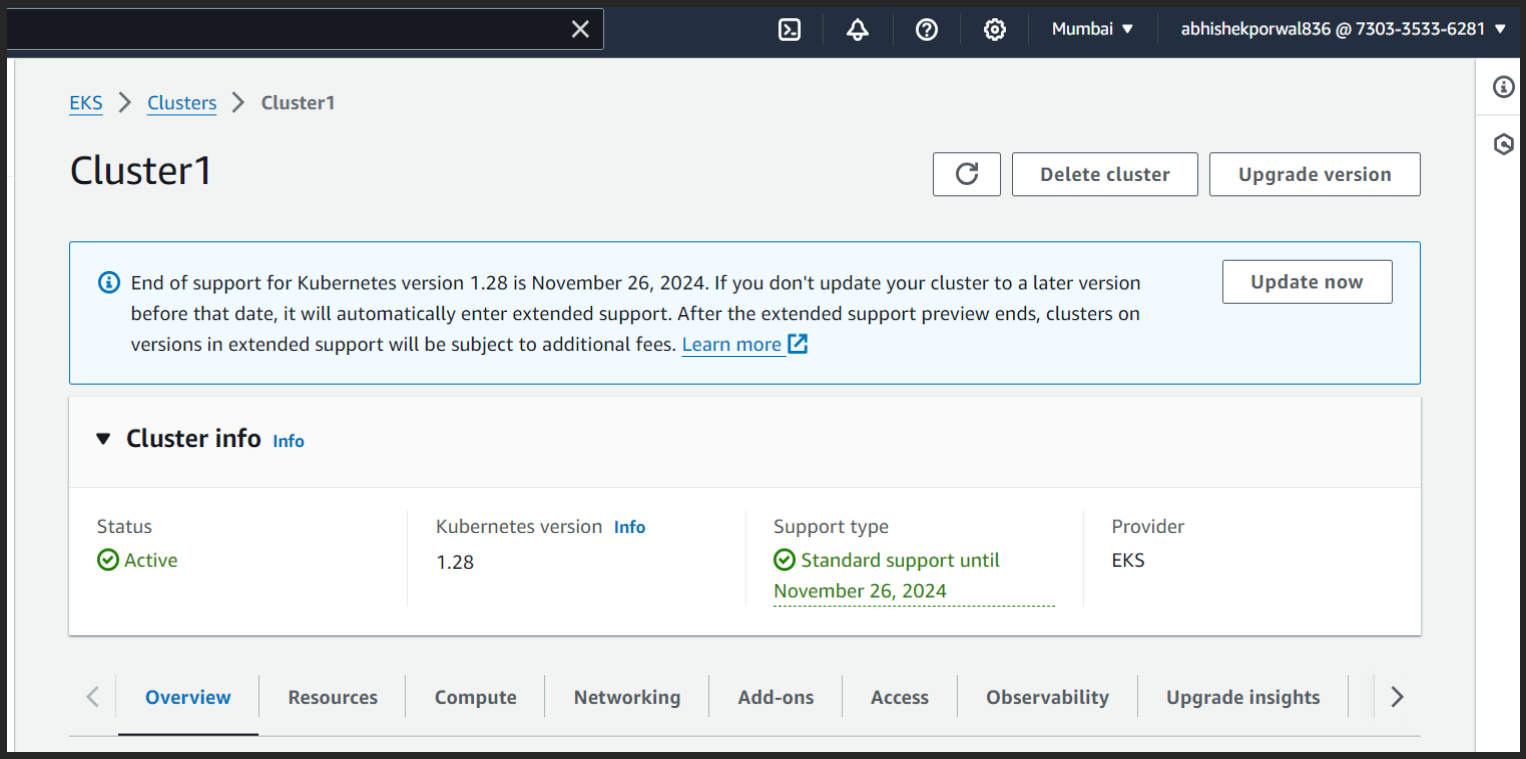
b) myEksNodeRolePolicy:



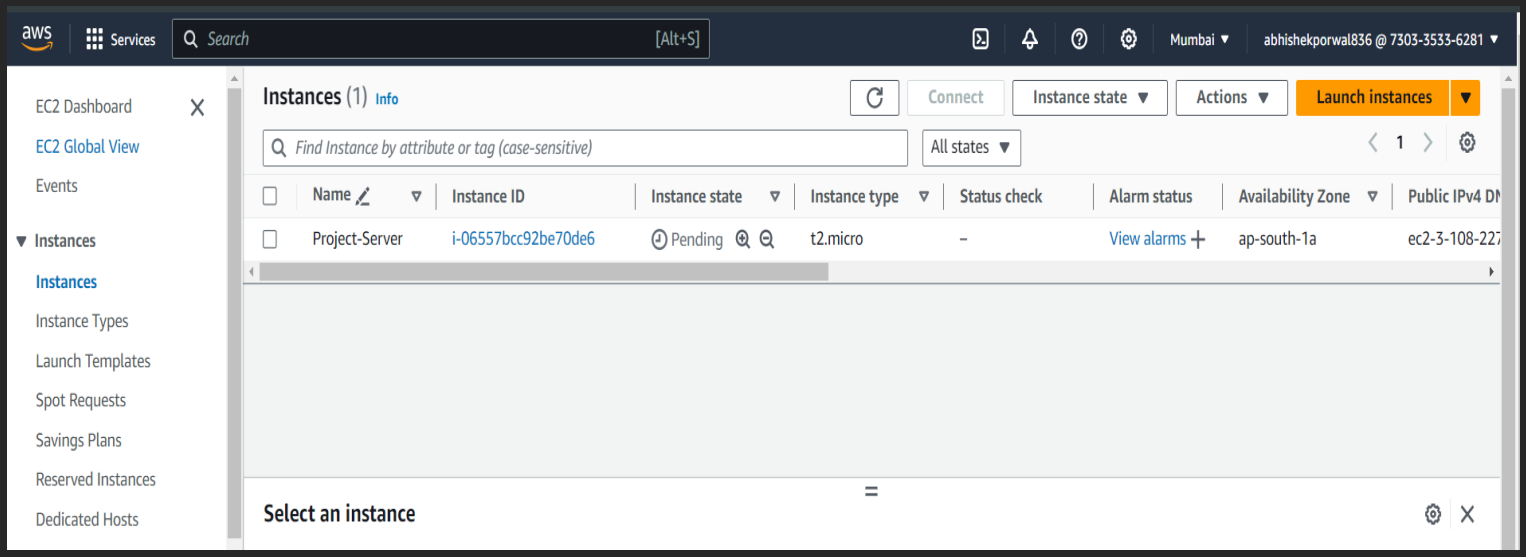
c) myEksClusterRolePolicy:

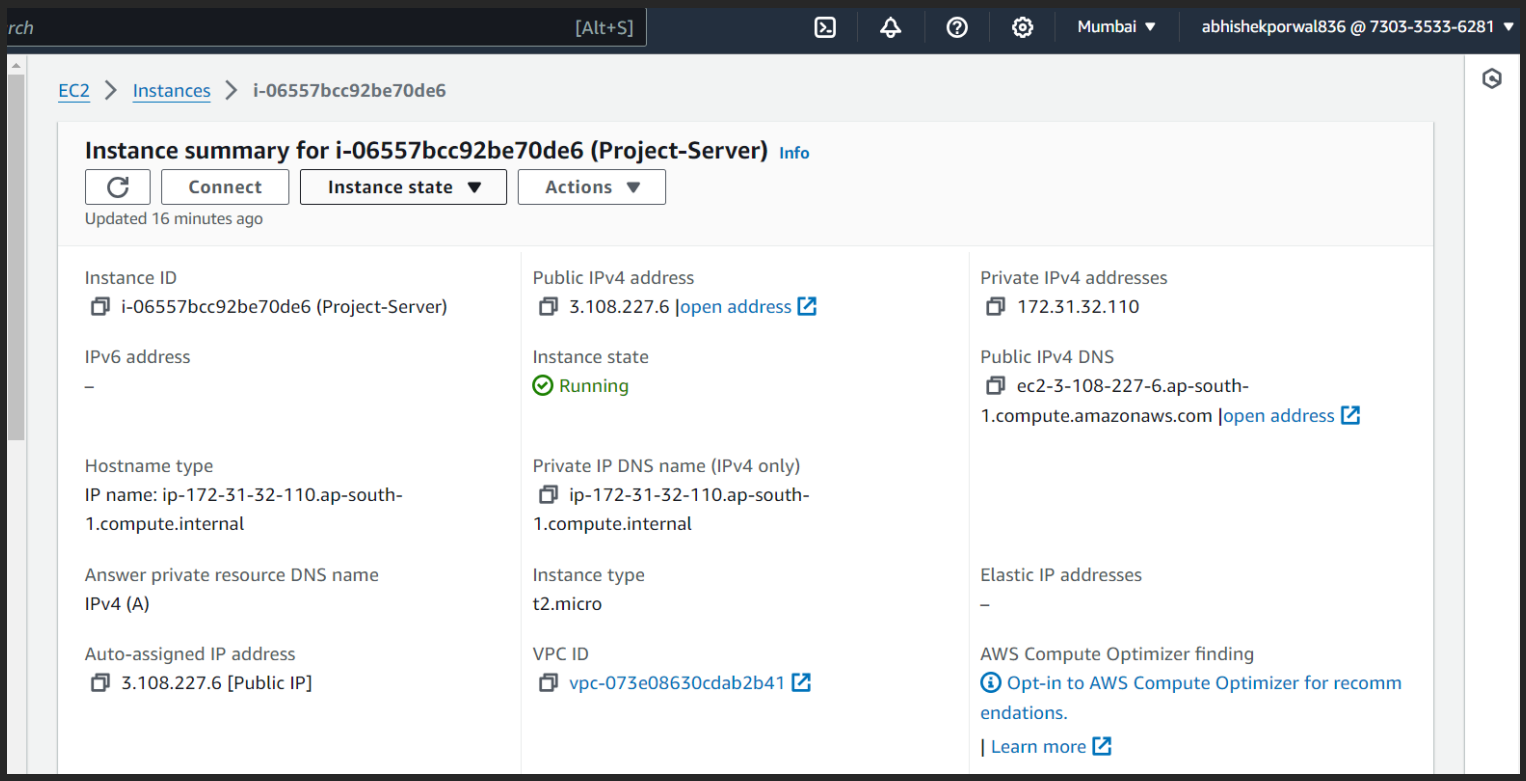


2) Create the cluster named Cluster1 on EKS(Elastic Kubernetes Service):

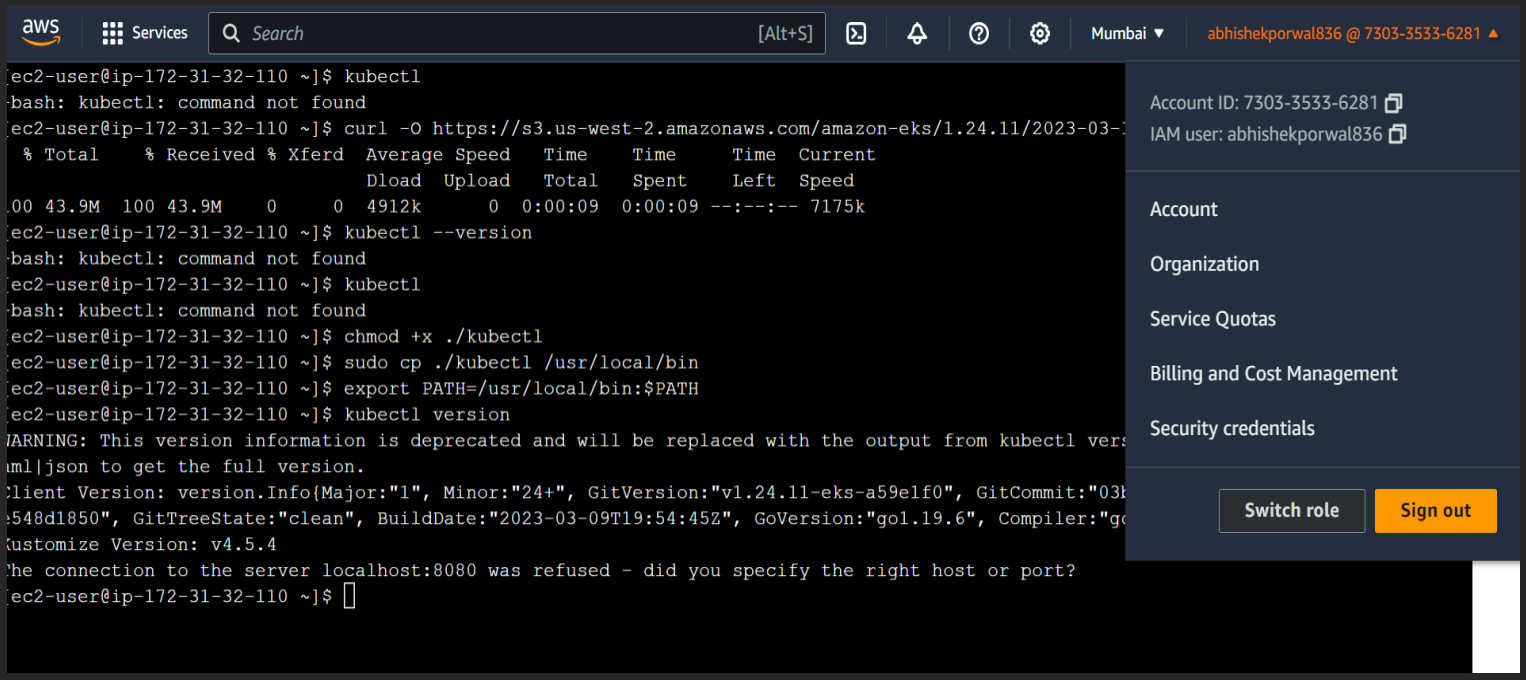


3) Create EC2 instance named Project-Server and connected to the server:





4) Installing kubectl on Project Server:



5) Installing AWS CLI:

```
[ec2-user@ip-172-31-32-110 ~]$ aws --version
aws-cli/2.15.33 Python/3.11.8 Linux/6.1.79-99.167.amzn2023.x86_64 exe/x86_64.amzn.2023 prompt/off
[ec2-user@ip-172-31-32-110 ~]$
```

Installing git: sudo yum install git -y

```
[ec2-user@ip-172-31-32-110 ~]$ git clone https://github.com/abhishekporwal-836/K8-voting-app.git
-bash: git: command not found
[ec2-user@ip-172-31-32-110 ~]$ sudo yum install git -y
Last metadata expiration check: 0:12:28 ago on Fri Mar 29 08:56:30 2024.
Dependencies resolved.
=================================================================================================================
=================================================================
 Package                                Architecture                    Version
          Repository                          Size
=================================================================================================================
=================================================================
Installing:
 git                                    x86_64                          2.40.1-1.amzn2023.0.1
          amazonlinux                          57 k
Installing dependencies:
 git-core                               x86_64                          2.40.1-1.amzn2023.0.1
          amazonlinux                         4.3 M
 git-core-doc                           noarch                          2.40.1-1.amzn2023.0.1
          amazonlinux                         2.6 M
 perl-Error                             noarch                          1:0.17029-5.amzn2023.0.2
          amazonlinux                          41 k
```

6) Cloning git repository:

```
[ec2-user@ip-172-31-32-110 ~]$ git clone https://github.com/abhishekporwal-836/K8-voting-app.git
Cloning into 'K8-voting-app'...
remote: Enumerating objects: 13, done.
remote: Counting objects: 100% (13/13), done.
remote: Compressing objects: 100% (10/10), done.
remote: Total 13 (delta 3), reused 12 (delta 2), pack-reused 0
Receiving objects: 100% (13/13), 6.41 KiB | 6.41 MiB/s, done.
Resolving deltas: 100% (3/3), done.
[ec2-user@ip-172-31-32-110 ~]$
```

7) Creating node in Cluster1:

EKS > Clusters > Cluster1 > Node groups > Add node group

Step 1
Configure node group

Step 2
Set compute and scaling configuration

Step 3
Specify networking

Step 4
Review and create

Configure node group Info

A node group is a group of EC2 instances that supply compute capacity to your Amazon EKS cluster. You can add multiple node groups to your cluster.

Node group configuration

These properties cannot be changed after the node group is created.

Name
Assign a unique name for this node group.

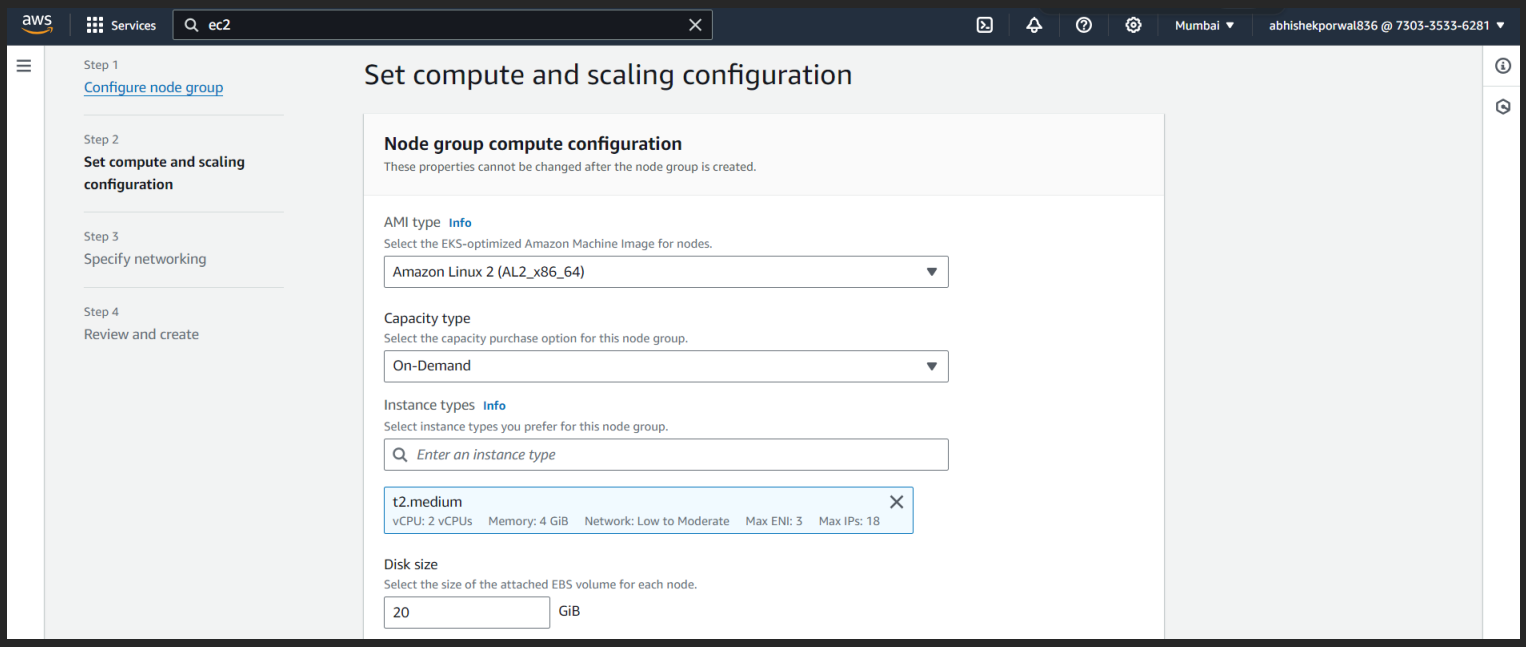
NodeGroup

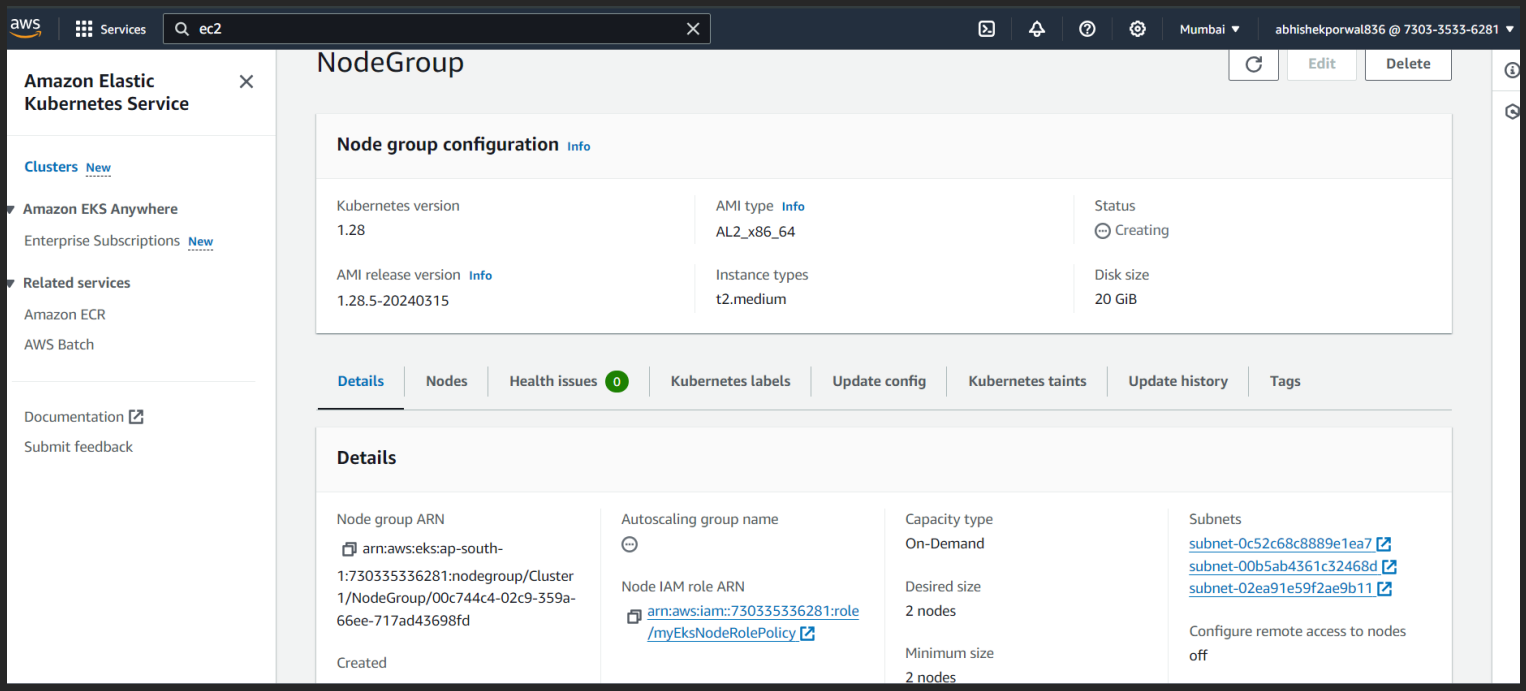
The node group name should begin with letter or digit and can have any of the following characters: the set of Unicode letters, digits, hyphens and underscores. Maximum length of 63.

Node IAM role Info
Select the IAM role that will be used by the nodes. To create a new role, go to the IAM console.

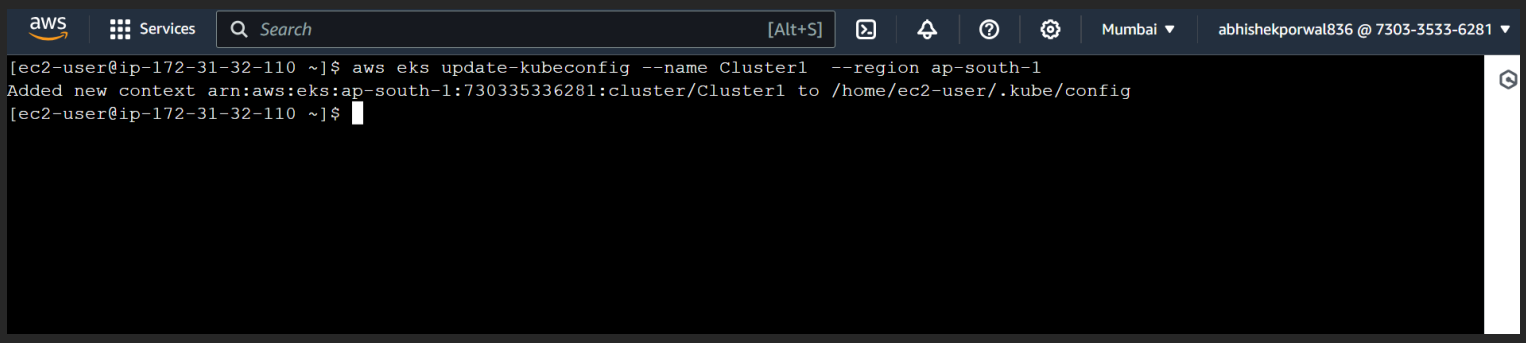
myEksNodeRolePolicy

The selected role must not be used by a self-managed node group as this could lead to a service interruption upon managed node group deletion.





8) Adding the context to the server:



Nodes (2) Info

Filter Nodes by property or value

Node name	Instance type	Node group	Created	Status
ip-172-31-11-252.ap-south-1.compute.internal	t2.medium	NodeGroup	Created 4 minutes ago	Ready
ip-172-31-46-7.ap-south-1.compute.internal	t2.medium	NodeGroup	Created 3 minutes ago	Ready

Node groups (1) Info

Edit | Delete | Add node group

Group name	Desired size	AMI release version	Launch template	Status
NodeGroup	2	1.28.5-20240315	-	Active

9) Accessing the pods:

aws | Services | Search [Alt+S]

```
[ec2-user@ip-172-31-32-110 ~]$ kubectl get nodes
error: You must be logged in to the server (Unauthorized)
[ec2-user@ip-172-31-32-110 ~]$ kubectl get nodes
error: You must be logged in to the server (Unauthorized)
[ec2-user@ip-172-31-32-110 ~]$
```

10) Resolved the error using config maps:

```
C:\Users\Abhishek Porwal>aws configure
AWS Access Key ID [****************MS6F]: AKIA2UC3A25MY2T6IQEA
AWS Secret Access Key [****************MqxX]: 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
Default region name [ap-south-1]: ap-south-1
Default output format [json]:

C:\Users\Abhishek Porwal>
C:\Users\Abhishek Porwal>aws eks update-kubeconfig --name Cluster1 --region ap-south-1.

Provided region_name 'ap-south-1.' doesn't match a supported format.

C:\Users\Abhishek Porwal>aws eks update-kubeconfig --name Cluster1 --region ap-south-1
Added new context arn:aws:eks:ap-south-1:730335336281:cluster/Cluster1 to C:\Users\Abhishek Porwal\.kube\config

C:\Users\Abhishek Porwal>kubectl edit configmap
Edit cancelled, no changes made.

C:\Users\Abhishek Porwal>kubectl edit configmap aws-auth
Error from server (NotFound): configmaps "aws-auth" not found

C:\Users\Abhishek Porwal>kubectl edit configmap aws-auth -n kube-system
error: configmaps "aws-auth" could not be patched: admission webhook "eks-aws-auth-configmap-validation-webhook.amazonaw
s.com" denied the request: Found Invalid YAML format in either mapRoles, mapUsers or mapAccounts. Please check for prope
r yaml format and try again
You can run `kubectl replace -f C:\Users\ABHISH~1\AppData\Local\Temp\kubectl-edit-633044155.yaml` to try this update aga
in.

C:\Users\Abhishek Porwal>
```

11) Configmap File wil be opened and we eill add the user in the file:

```
C:\Users\Abhishek Porwal>kubectl edit configmap aws-auth -n kube-system
error: configmaps "aws-auth" could not be patched: admission webhook "eks-aws-auth-configmap-validation-webhook.amazonaw
s.com" denied the request: Found Invalid YAML format in either mapRoles, mapUsers or mapAccounts. Please check for prope
r yaml format and try again
You can run `kubectl replace -f C:\Users\ABHISH~1\AppData\Local\Temp\kubectl-edit-2168753171.yaml` to try this update ag
ain.

C:\Users\Abhishek Porwal>kubectl edit configmap aws-auth -n kube-system
configmap/aws-auth edited

C:\Users\Abhishek Porwal>
```

```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: v1
data:
  mapRoles: "- groups:\n  - system:bootstrappers\n  - system:nodes\n  rolearn: arn:aws:iam::730335336281:role/myEksNodeRolePolicy
\n
    \ username: system:node:{{EC2PrivateDNSName}}\n- rolearn: arn:aws:iam::730335336281:role/Eksaccess\n
    \ username: Eksaccess\n  groups: \n   - system:masters\n"
kind: ConfigMap
metadata:
  creationTimestamp: "2024-03-29T09:27:02Z"
  name: aws-auth
  namespace: kube-system
  resourceVersion: "13858"
  uid: 32cd29b6-e261-466d-adb9-69220b4f982a
```

12) Role has acces to the cluster now:

Mail LMS c compiler CodeChef Spotify MonkeyType Microsoft apps Coding Ninjas HIRIST

aws Services Search [Alt+S]

```
[ec2-user@ip-172-31-32-110 ~]$ kubectl get nodes
NAME                                        STATUS   ROLES    AGE   VERSION
ip-172-31-11-252.ap-south-1.compute.internal   Ready    <none>   46m   v1.28.5-eks-5e0fdde
ip-172-31-46-7.ap-south-1.compute.internal     Ready    <none>   46m   v1.28.5-eks-5e0fdde
[ec2-user@ip-172-31-32-110 ~]$
```

13) Deploying mongodb using stateful sets:

aws Services Search [Alt+S] Mumbai ▾ abhishekporwal836 @ 7303-3533-6281 ▾

```
[ec2-user@ip-172-31-32-110 ~]$ ls
K8-voting-app  aws  awscliv2.zip  kubectl
[ec2-user@ip-172-31-32-110 ~]$ cd K8-voting-app
[ec2-user@ip-172-31-32-110 K8-voting-app]$ ls
README.md  manifests
[ec2-user@ip-172-31-32-110 K8-voting-app]$ cd manifests
[ec2-user@ip-172-31-32-110 manifests]$ ls
api-deployment.yaml  api-service.yaml  frontend-deployment.yaml  frontend-service.yaml  mongo-secret.yaml  mongo
-service.yaml  mongo-statefulset.yaml
[ec2-user@ip-172-31-32-110 manifests]$
```

```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get ns
NAME              STATUS   AGE
default           Active   82m
kube-node-lease   Active   82m
kube-public       Active   82m
kube-system       Active   82m
[ec2-user@ip-172-31-32-110 manifests]$ kubectl create ns cloudchamp
namespace/cloudchamp created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get ns
NAME              STATUS   AGE
cloudchamp        Active   17s
default           Active   83m
kube-node-lease   Active   83m
kube-public       Active   83m
kube-system       Active   83m
[ec2-user@ip-172-31-32-110 manifests]$
```


```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get ns
NAME              STATUS   AGE
default           Active   82m
kube-node-lease   Active   82m
kube-public       Active   82m
kube-system       Active   82m
[ec2-user@ip-172-31-32-110 manifests]$ kubectl create ns cloudchamp
namespace/cloudchamp created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get ns
NAME              STATUS   AGE
cloudchamp        Active   17s
default           Active   83m
kube-node-lease   Active   83m
kube-public       Active   83m
kube-system       Active   83m
```


```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get all -n cloudchamp
No resources found in cloudchamp namespace.
[ec2-user@ip-172-31-32-110 manifests]$
```

No resources as of now as we can can see in above image.

14) Applying the manifest file- mongo-stateful.yaml inside namespace cloudchamp:

```
[ec2-user@ip-172-31-32-110 manifests]$ ls
api-deployment.yaml  api-service.yaml  frontend-deployment.yaml  frontend-service.yaml  mongo-secret.yaml  mongo-
service.yaml  mongo-statefulset.yaml
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f mongo-statefulset.yaml
statefulset.apps/mongo created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get pods -n cloudchamp\
> ^C
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get pods -n cloudchamp
NAME      READY   STATUS    RESTARTS   AGE
mongo-0   1/1     Running   0          48s
mongo-1   1/1     Running   0          22s
mongo-2   0/1     Pending   0          0s
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get pods -n cloudchamp -w
NAME      READY   STATUS    RESTARTS   AGE
mongo-0   1/1     Running   0          71s
mongo-1   1/1     Running   0          45s
mongo-2   1/1     Running   0          23s
```

```
[ec2-user@ip-172-31-32-110 ~]$ kubectl get all -n cloudchamp
NAME          READY   STATUS    RESTARTS   AGE
pod/mongo-0   1/1     Running   0          13m
pod/mongo-1   1/1     Running   0          13m
pod/mongo-2   1/1     Running   0          13m

NAME                     READY   AGE
statefulset.apps/mongo   3/3     13m
[ec2-user@ip-172-31-32-110 ~]$ kubectl get pv
NAME                                       CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM                                                   STOR
AGECLASS   REASON   AGE
pvc-0ecc97d0-9ac9-434f-9d68-5d801f78fd52   1Gi        RWO            Delete           Bound    cloudchamp/mongodb-persistent-storage-claim-mongo-0   gp2
                    14m
pvc-86a69fc4-1d3a-4c32-8c88-2cf177e3d22f   1Gi        RWO            Delete           Bound    cloudchamp/mongodb-persistent-storage-claim-mongo-1   gp2
                    14m
pvc-a015bb33-96dd-48e1-be38-0a3aeafc8ee3   1Gi        RWO            Delete           Bound    cloudchamp/mongodb-persistent-storage-claim-mongo-2   gp2
                    13m
[ec2-user@ip-172-31-32-110 ~]$
```

```
[ec2-user@ip-172-31-32-110 ~]$ kubectl get pvc -n cloudchamp
NAME                                       STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   AGE
mongodb-persistent-storage-claim-mongo-0   Bound    pvc-0ecc97d0-9ac9-434f-9d68-5d801f78fd52   1Gi        RWO            gp2            15m
mongodb-persistent-storage-claim-mongo-1   Bound    pvc-86a69fc4-1d3a-4c32-8c88-2cf177e3d22f   1Gi        RWO            gp2            15m
mongodb-persistent-storage-claim-mongo-2   Bound    pvc-a015bb33-96dd-48e1-be38-0a3aeafc8ee3   1Gi        RWO            gp2            14m
[ec2-user@ip-172-31-32-110 ~]$
```

15) Exposing the mongodb pods through headless service:

```
[ec2-user@ip-172-31-32-110 manifests]$ ls
api-deployment.yaml  frontend-deployment.yaml  mongo-secret.yaml   mongo-statefulset.yaml
api-service.yaml     frontend-service.yaml     mongo-service.yaml
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f mongo-service.yaml
service/mongo created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get svc -n ccloudcham
No resources found in ccloudcham namespace.
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get svc -n cloudchamp
NAME    TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)     AGE
mongo   ClusterIP   None         <none>        27017/TCP   43s
[ec2-user@ip-172-31-32-110 manifests]$
```

16) Configure “cloudchamp” as namespace in order to avoid writing “-n cloudchamp” each time:

```
[ec2-user@ip-172-31-32-110 manifests]$  kubectl config set-context --current --namespace clou
dchamp
Context "arn:aws:eks:ap-south-1:730335336281:cluster/Cluster1" modified.
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
mongo-0   1/1     Running   0          25m
mongo-1   1/1     Running   0          25m
mongo-2   1/1     Running   0          25m
[ec2-user@ip-172-31-32-110 manifests]$
```

Now setting prmary and secondondary mongo replicas:

```
cat << EOF | kubectl exec -it mongo-0 -- mongo
rs.initiate();
sleep(2000);
rs.add("mongo-1.mongo:27017");
sleep(2000);
rs.add("mongo-2.mongo:27017");
sleep(2000);
cfg = rs.conf();
cfg.members[0].host = "mongo-0.mongo:27017";
rs.reconfig(cfg, {force: true});
sleep(5000);
EOF
```

```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl exec -it mongo-0 -- mongo
MongoDB shell version v4.2.24
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("8d88a388-4268-4195-85c2-1e2611534da6") }
MongoDB server version: 4.2.24
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
        https://docs.mongodb.com/
Questions? Try the MongoDB Developer Community Forums
        https://community.mongodb.com
Server has startup warnings:
2024-03-29T10:26:49.077+0000 I  STORAGE  [initandlisten]
2024-03-29T10:26:49.077+0000 I  STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem
 is strongly recommended with the WiredTiger storage engine
2024-03-29T10:26:49.077+0000 I  STORAGE  [initandlisten] **          See http://dochub.mongod
b.org/core/prodnotes-filesystem
```

Checking the status:

```
rs0:PRIMARY> rs.status()
```

```
{
        "_id" : 0,
        "name" : "mongo-0.mongo:27017",
        "health" : 1,
        "state" : 1,
        "stateStr" : "PRIMARY",
        "uptime" : 1942,
        "optime" : {
                "ts" : Timestamp(1711709948, 1),
                "t" : NumberLong(1)
        },
        "optimeDate" : ISODate("2024-03-29T10:59:08Z"),
        "syncingTo" : "",
        "syncSourceHost" : "",
        "syncSourceId" : -1,
        "infoMessage" : "could not find member to sync from",
        "electionTime" : Timestamp(1711709918, 2),
        "electionDate" : ISODate("2024-03-29T10:58:38Z"),
        "configVersion" : 36794,
        "self" : true,
        "lastHeartbeatMessage" : ""
},
```

```
{
        "_id" : 1,
        "name" : "mongo-1.mongo:27017",
        "health" : 1,
        "state" : 2,
        "stateStr" : "SECONDARY",
        "uptime" : 30,
        "optime" : {
                "ts" : Timestamp(1711709948, 1),
                "t" : NumberLong(1)
        },
        "optimeDurable" : {
                "ts" : Timestamp(1711709948, 1),
                "t" : NumberLong(1)
        },
        "optimeDate" : ISODate("2024-03-29T10:59:08Z"),
        "optimeDurableDate" : ISODate("2024-03-29T10:59:08Z"),
        "lastHeartbeat" : ISODate("2024-03-29T10:59:10.506Z"),
        "lastHeartbeatRecv" : ISODate("2024-03-29T10:59:09.812Z"),
        "pingMs" : NumberLong(1),
        "lastHeartbeatMessage" : "",
        "syncingTo" : "mongo-2.mongo:27017",
```

```
{
        "_id" : 2,
        "name" : "mongo-2.mongo:27017",
        "health" : 1,
        "state" : 2,
        "stateStr" : "SECONDARY",
        "uptime" : 28,
        "optime" : {
                "ts" : Timestamp(1711709948, 1),
                "t" : NumberLong(1)
        },
        "optimeDurable" : {
                "ts" : Timestamp(1711709948, 1),
                "t" : NumberLong(1)
        },
        "optimeDate" : ISODate("2024-03-29T10:59:08Z"),
        "optimeDurableDate" : ISODate("2024-03-29T10:59:08Z"),
        "lastHeartbeat" : ISODate("2024-03-29T10:59:10.492Z"),
        "lastHeartbeatRecv" : ISODate("2024-03-29T10:59:11.263Z"),
        "pingMs" : NumberLong(0),
        "lastHeartbeatMessage" : "",
        "syncingTo" : "mongo-0.mongo:27017",
        "syncSourceHost" : "mongo-0.mongo:27017",
        "syncSourceId" : 0,
        "infoMessage" : "",
        "configVersion" : 36794
}
```

17) Load the Data in the database:

```
cat << EOF | kubectl exec -it mongo-0 -- mongo
use langdb;
db.languages.insert({"name" : "csharp", "codedetail" : { "usecase" : "system, web, server-side", "rank" : 5,
    "compiled" : false, "homepage" : "https://dotnet.microsoft.com/learn/csharp", "download" :
    "https://dotnet.microsoft.com/download/", "votes" : 0}});
db.languages.insert({"name" : "python", "codedetail" : { "usecase" : "system, web, server-side", "rank" : 3, "script" :
    false, "homepage" : "https://www.python.org/", "download" : "https://www.python.org/downloads/", "votes"
    : 0}});
db.languages.insert({"name" : "javascript", "codedetail" : { "usecase" : "web, client-side", "rank" : 7, "script" : false,
    "homepage" : "https://en.wikipedia.org/wiki/JavaScript", "download" : "n/a", "votes" : 0}});
db.languages.insert({"name" : "go", "codedetail" : { "usecase" : "system, web, server-side", "rank" : 12, "compiled" :
    true, "homepage" : "https://golang.org", "download" : "https://golang.org/dl/", "votes" : 0}});
db.languages.insert({"name" : "java", "codedetail" : { "usecase" : "system, web, server-side", "rank" : 1, "compiled"
    : true, "homepage" : "https://www.java.com/en/", "download" : "https://www.java.com/en/download/",
    "votes" : 0}});
db.languages.insert({"name" : "nodejs", "codedetail" : { "usecase" : "system, web, server-side", "rank" : 20, "script"
    : false, "homepage" : "https://nodejs.org/en/", "download" : "https://nodejs.org/en/download/", "votes" : 0}});
```

18) Creating a secret & Deploying the api to access the database:

Secrets in Kubernetes are stored in base 64 format.

```
[ec2-user@ip-172-31-32-110 manifests]$ ls
api-deployment.yaml  api-service.yaml  frontend-deployment.yaml  frontend-service.yaml  mongo-secret.yaml  mongo
-service.yaml  mongo-statefulset.yaml
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f mongo-secret.yaml
secret/mongodb-secret created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f api-seploymentg.yaml
error: the path "api-seploymentg.yaml" does not exist
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f api-deploymentg.yaml
error: the path "api-deploymentg.yaml" does not exist
[ec2-user@ip-172-31-32-110 manifests]$ kubectl apply -f api-deployment.yaml
deployment.apps/api created
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get pods
NAME                    READY   STATUS    RESTARTS   AGE
api-6dd74f6f5d-cx8hq    1/1     Running   0          13s
api-6dd74f6f5d-gt85s    1/1     Running   0          13s
mongo-0                 1/1     Running   0          50m
mongo-1                 1/1     Running   0          49m
mongo-2                 1/1     Running   0          49m
[ec2-user@ip-172-31-32-110 manifests]$
```

19) All the resources that we have created:

```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get all
\NAME                        READY   STATUS    RESTARTS   AGE
pod/api-6dd74f6f5d-cx8hq     1/1     Running   0          114s
pod/api-6dd74f6f5d-gt85s     1/1     Running   0          114s
pod/mongo-0                  1/1     Running   0          51m
pod/mongo-1                  1/1     Running   0          51m
pod/mongo-2                  1/1     Running   0          51m

NAME            TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)     AGE
service/mongo   ClusterIP   None         <none>        27017/TCP   31m

NAME                  READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/api   2/2     2            2           114s

NAME                              DESIRED   CURRENT   READY   AGE
replicaset.apps/api-6dd74f6f5d    2         2         2       114s

NAME                      READY   AGE
statefulset.apps/mongo    3/3     51m
[ec2-user@ip-172-31-32-110 manifests]$
```

20) Test api using Load Balancer service using manifest:

```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl expose deploy api --name=api --type=LoadBalancer --port=80 --targ
et-port=8080
et-port=8080
service/api exposed
[ec2-user@ip-172-31-32-110 manifests]$
```

EC2 > Load balancers

Introducing resource map for Application Load Balancers
Resource map is a visual representation of the relationships between load balancer resources and provides the ability to view, explore, and troubleshoot the architecture of your load balancer. Resource map can be viewed on the load balancers detail page. Share feedback to help us improve your experience.

Give feedback

Load balancers (1)

Actions | Create load balancer

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

Name	DNS name	State	VPC ID	Availability Zones	Type
a1562800e89934af28...	a1562800e89934af286cf2...	–	vpc-073e08630cdab2...	3 Availability Zones	classic

```
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get svc
NAME    TYPE           CLUSTER-IP     EXTERNAL-IP                                                          PORT(S)     AGE
api     LoadBalancer   10.100.70.189  a1562800e89934af286cf25f961b61ed-1419882775.ap-south-1.elb.amazonaws.com  80:32621/TCP  2m27s
mongo   ClusterIP      None           <none>                                                               27017/TCP   39m
[ec2-user@ip-172-31-32-110 manifests]$
```

21) Access the LoadBalancer DNS to check API is working properly.

Not secure a1562800e89934af286cf25f961b61ed-1419882775.ap-south-1.elb.amazonaws.com/languages


```
{"csharp":{"usecase":"system, web, server-side","rank":5,"compiled":false,"homepage":"https://dotnet.microsoft.com/learn/csharp","download":"https://dotnet.microsoft.c
{"usecase":"system, web, server-side","rank":12,"compiled":true,"homepage":"https://golang.org","download":"https://golang.org/dl/","votes":0},"java":{"usecase":"syste
side","rank":1,"compiled":true,"homepage":"https://www.java.com/en/","download":"https://www.java.com/en/download/","votes":0},"javascript":{"usecase":"web, client-
side","rank":7,"compiled":false,"homepage":"https://en.wikipedia.org/wiki/JavaScript","download":"n/a","votes":0},"nodejs":{"usecase":"system, web, server-
side","rank":20,"compiled":false,"homepage":"https://nodejs.org/en/","download":"https://nodejs.org/en/download/","votes":0},"python":{"usecase":"system, web, server-
side","rank":3,"compiled":false,"homepage":"https://www.python.org/","download":"https://www.python.org/downloads/","votes":0}}
```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22) Using Curl to check API is working properly.

```
[ec2-user@ip-172-31-32-110 manifests]$ curl -s $API_ELB_PUBLIC_FQDN/languages | jq .
curl -s $API_ELB_PUBLIC_FQDN/languages/go | jq .
curl -s $API_ELB_PUBLIC_FQDN/languages/java | jq .
curl -s $API_ELB_PUBLIC_FQDN/languages/nodejs | jq .
```


```
{
  "csharp": {
    "usecase": "system, web, server-side",
    "rank": 5,
    "compiled": false,
    "homepage": "https://dotnet.microsoft.com/learn/csharp",
    "download": "https://dotnet.microsoft.com/download/",
    "votes": 0
  },
  "go": {
    "usecase": "system, web, server-side",
    "rank": 12,
    "compiled": true,
    "homepage": "https://golang.org",
    "download": "https://golang.org/dl/",
    "votes": 0
  },
```

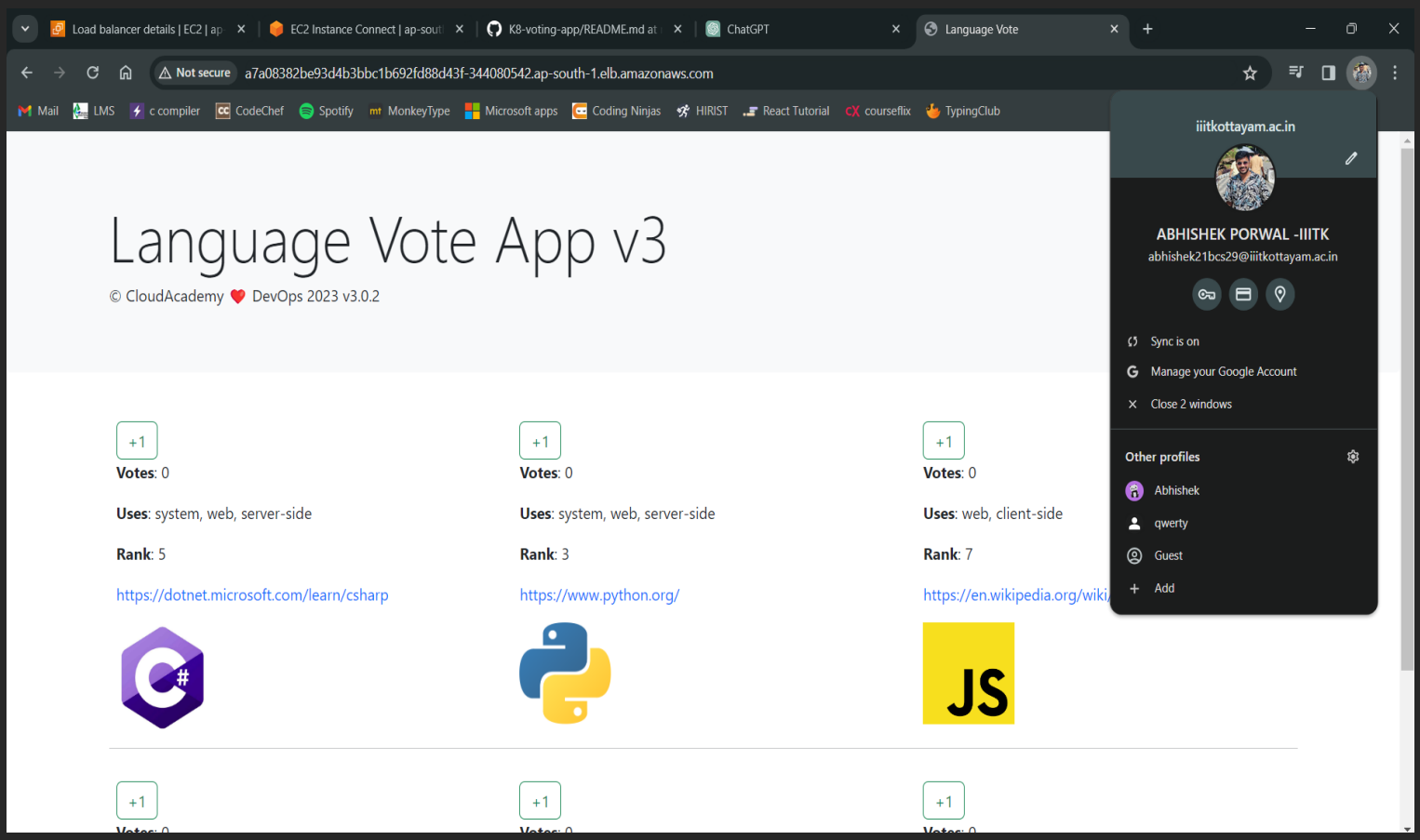
```
}
{
  "name": "go",
  "codedetail": {
    "usecase": "system, web, server-side",
    "rank": 12,
    "compiled": true,
    "homepage": "https://golang.org",
    "download": "https://golang.org/dl/",
    "votes": 0
  }
}
{
  "name": "java",
  "codedetail": {
    "usecase": "system, web, server-side",
    "rank": 1,
    "compiled": true,
    "homepage": "https://www.java.com/en/",
    "download": "https://www.java.com/en/download/",
    "votes": 0
  }
```

23) Apply frontend manifest:

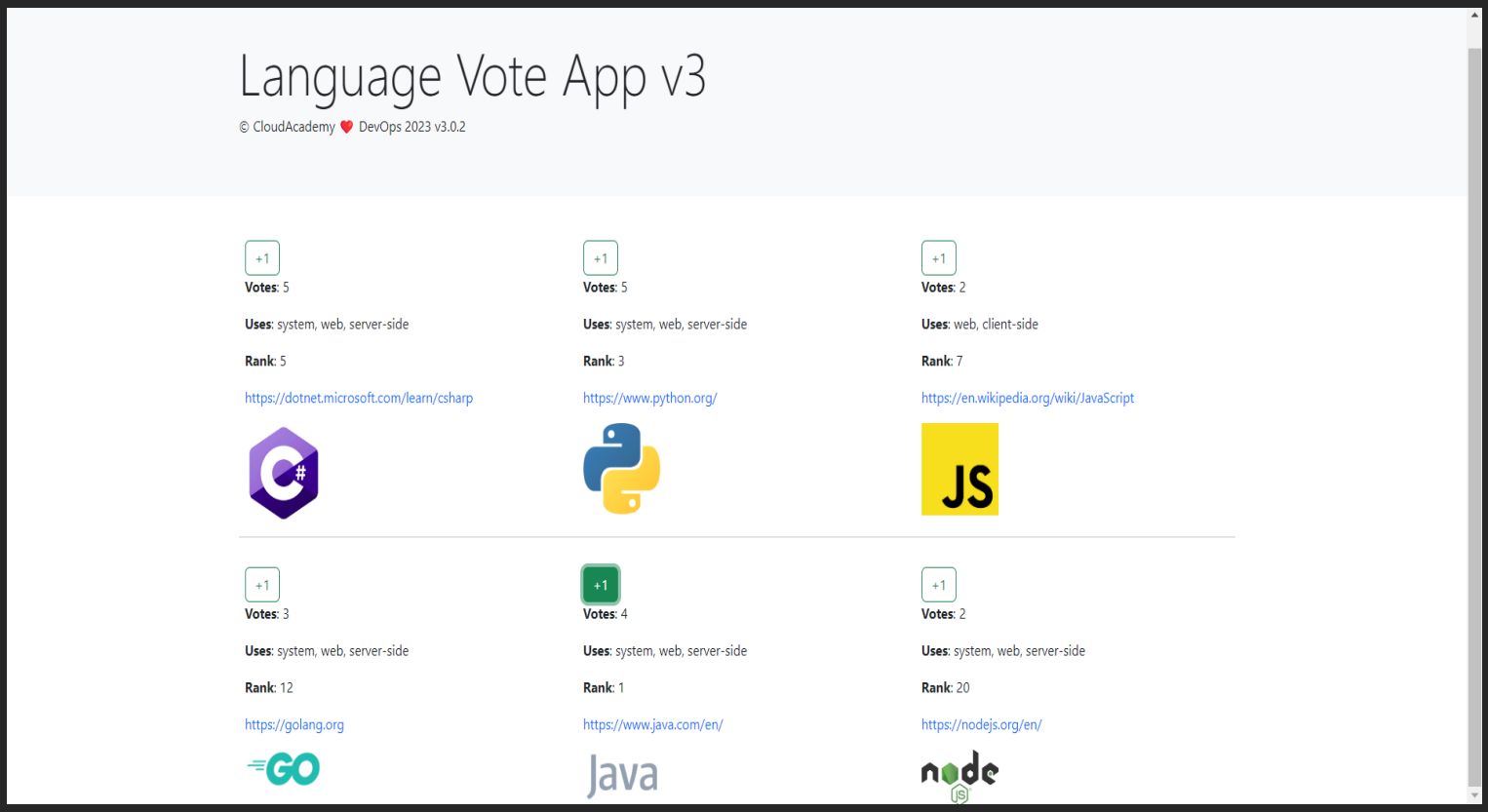
```
deployment.apps/frontend created
                kubectl expose deploy frontend --name=frontend --type=LoadBalancer --port=80 --target-port=8080oadBalancer --port=80 --target-port=80
80
service/frontend exposed
[ec2-user@ip-172-31-32-110 manifests]$ kubectl get all
NAME                                READY   STATUS    RESTARTS   AGE
pod/api-6dd74f6f5d-cx8hq            1/1     Running   0          106m
pod/api-6dd74f6f5d-gt85s            1/1     Running   0          106m
pod/frontend-f6bcfd869-h7ddl        1/1     Running   0          90s
pod/frontend-f6bcfd869-kddlp        1/1     Running   0          90s
pod/mongo-0                         1/1     Running   0          156m
pod/mongo-1                         1/1     Running   0          155m
pod/mongo-2                         1/1     Running   0          155m

NAME                TYPE           CLUSTER-IP       EXTERNAL-IP                                                                PORT(S)        AGE
service/api         LoadBalancer   10.100.70.189    a1562800e89934af286cf25f961b61ed-1419882775.ap-south-1.elb.amazonaws.com   80:32621/TCP   99m
service/frontend    LoadBalancer   10.100.104.225   a7a08382be93d4b3bbc1b692fd88d43f-344080542.ap-south-1.elb.amazonaws.com    80:32342/TCP   16s
service/mongo       ClusterIP      None             <none>                                                                     27017/TCP      136m

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/api        2/2     2            2           106m
deployment.apps/frontend   2/2     2            2           90s

NAME                                  DESIRED   CURRENT   READY   AGE
replicaset.apps/api-6dd74f6f5d        2         2         2       106m
replicaset.apps/frontend-f6bcfd869    2         2         2       90s

NAME                     READY   AGE
statefulset.apps/mongo   3/3     156m
[ec2-user@ip-172-31-32-110 manifests]$
```

```
[ec2-user@ip-172-31-32-110 manifests]$ {
FRONTEND_ELB_PUBLIC_FQDN=$(kubectl get svc frontend -ojsonpath="{.status.loadBalancer.ingress[0].hostname}")
until nslookup $FRONTEND_ELB_PUBLIC_FQDN >/dev/null 2>&1; do sleep 2 && echo waiting for DNS to propagate...; done
curl -I $FRONTEND_ELB_PUBLIC_FQDN
}
HTTP/1.1 200 OK
Server: nginx/1.21.6
Date: Fri, 29 Mar 2024 13:05:06 GMT
Content-Type: text/html
Content-Length: 523
Last-Modified: Tue, 14 Mar 2023 01:38:20 GMT
Connection: keep-alive
ETag: "640fd00c-20b"
Expires: Fri, 29 Mar 2024 13:05:05 GMT
Cache-Control: no-cache
Cache-Control: no-cache
Accept-Ranges: bytes

[ec2-user@ip-172-31-32-110 manifests]$
```

24) Accessing the application through frontend LoadBalancer DNS:



25) Checking the application:



26) Checking response updated on database:

```
[ec2-user@ip-172-31-32-110 ~]$ kubectl exec -it mongo-0 -- mongo langdb --eval "db.languages.find().pretty()"
MongoDB shell version v4.2.24
connecting to: mongodb://127.0.0.1:27017/langdb?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("2992f4a7-18b1-44e4-89e4-947899130831") }
MongoDB server version: 4.2.24
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41a"),
        "name" : "csharp",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 5,
                "compiled" : false,
                "homepage" : "https://dotnet.microsoft.com/learn/csharp",
                "download" : "https://dotnet.microsoft.com/download/",
                "votes" : 5
        }
}
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41b"),
        "name" : "python",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 3,
                "script" : false,
                "homepage" : "https://www.python.org/",
                "download" : "https://www.python.org/downloads/",
                "votes" : 5
        }
}
{
```

```
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41c"),
        "name" : "javascript",
        "codedetail" : {
                "usecase" : "web, client-side",
                "rank" : 7,
                "script" : false,
                "homepage" : "https://en.wikipedia.org/wiki/JavaScript",
                "download" : "n/a",
                "votes" : 2
        }
}
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41d"),
        "name" : "go",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 12,
                "compiled" : true,
                "homepage" : "https://golang.org",
                "download" : "https://golang.org/dl/",
                "votes" : 3
        }
}
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41e"),
        "name" : "java",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 1,
```

aws Services Search [Alt+S]

```
                "homepage" : "https://golang.org",
                "download" : "https://golang.org/dl/",
                "votes" : 3
        }
}
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41e"),
        "name" : "java",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 1,
                "compiled" : true,
                "homepage" : "https://www.java.com/en/",
                "download" : "https://www.java.com/en/download/",
                "votes" : 4
        }
}
{
        "_id" : ObjectId("6606a1d3e2c248f17eaff41f"),
        "name" : "nodejs",
        "codedetail" : {
                "usecase" : "system, web, server-side",
                "rank" : 20,
                "script" : false,
                "homepage" : "https://nodejs.org/en/",
                "download" : "https://nodejs.org/en/download/",
                "votes" : 2
        }
}
[ec2-user@ip-172-31-32-110 ~]$
```

**XXXX