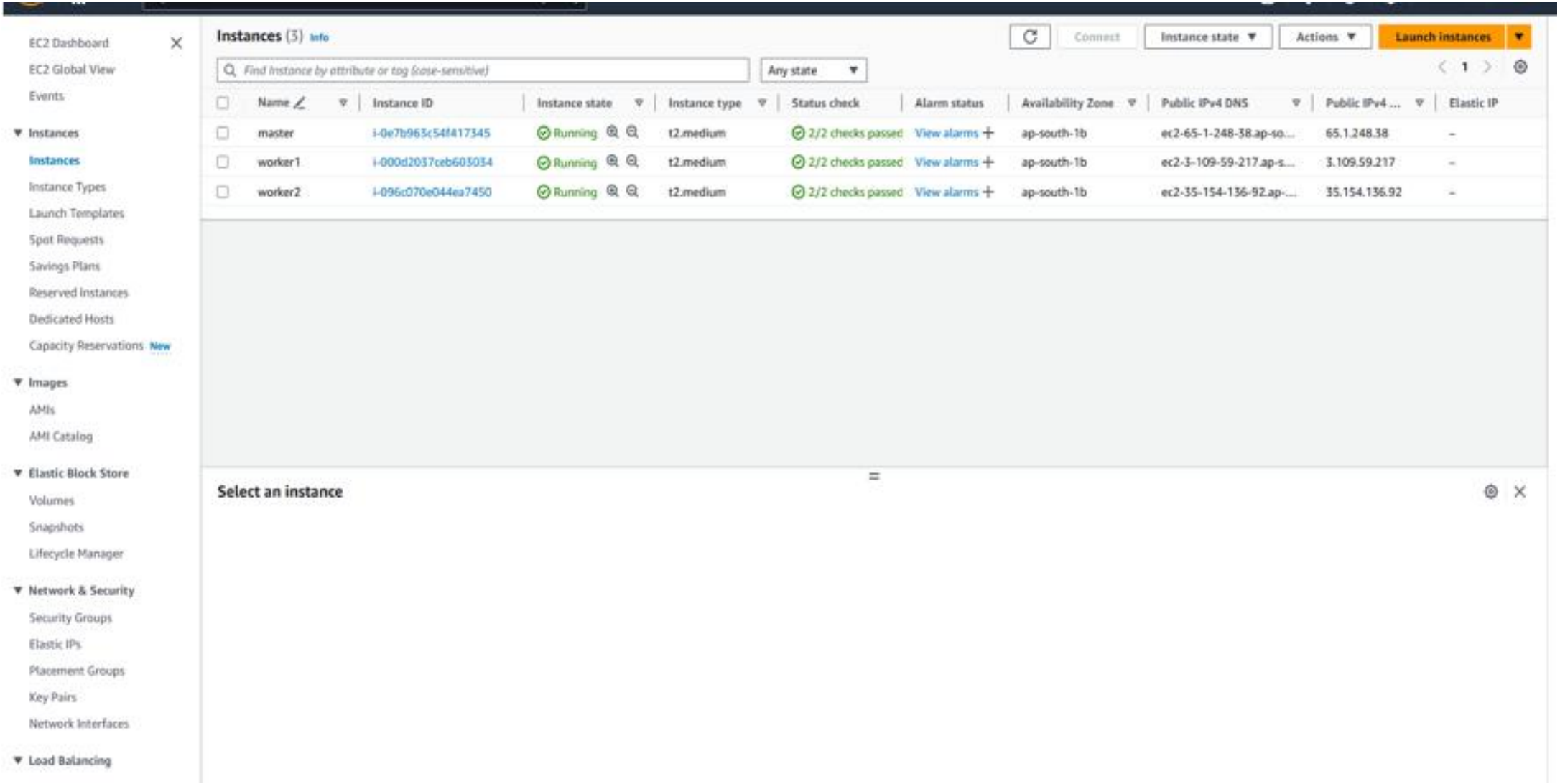
EC2 Dashboard
EC2 Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
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Elastic IPs
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Key Pairs
Network Interfaces
Load Balancing
Instances (3) Info
Connect
Instance state
Actions
Launch instances
Find instance by attribute or tag (case-sensitive)
Any state
1
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Public IPv4 DNS
Public IPv4 ...
Elastic IP
master
i-0e7b963c54f417345
Running
t2.medium
2/2 checks passed
View alarms
ap-south-1b
ec2-65-1-248-38.ap-so...
65.1.248.38
-
worker1
i-000d2037ceb603034
Running
t2.medium
2/2 checks passed
View alarms
ap-south-1b
ec2-3-109-59-217.ap-s...
3.109.59.217
-
worker2
i-096c070e044ea7450
Running
t2.medium
2/2 checks passed
View alarms
ap-south-1b
ec2-35-154-136-92.ap-...
35.154.136.92
-
Select an instance

Kubernetes Cluster Installation:

$ sudo kubeadm init –control-plane-endpoint=master
Join the worker nodes to run token:

This output confirms that the master node is ready. Additionally, you can check the pod namespaces:

```
[root@master /]#
[root@master /]#
[root@master /]# kubectl get nodes -o wide
NAME      STATUS   ROLES           AGE    VERSION   INTERNAL-IP     EXTERNAL-IP   OS-IMAGE           KERNEL-VERSION                  CONTAINE
R-RUNTIME
master    Ready    control-plane   4d7h   v1.28.6   172.31.13.236   <none>        Amazon Linux 2023   6.1.75-99.163.amzn2023.x86_64   containe
rd://1.7.11
worker1   Ready    <none>          4d7h   v1.28.6   172.31.13.128   <none>        Amazon Linux 2023   6.1.75-99.163.amzn2023.x86_64   containe
rd://1.7.11
worker2   Ready    <none>          4d7h   v1.28.6   172.31.0.223    <none>        Amazon Linux 2023   6.1.75-99.163.amzn2023.x86_64   containe
rd://1.7.11
[root@master /]#
[root@master /]#
```

```
[root@master /]# kubectl get nodes
NAME      STATUS   ROLES           AGE    VERSION
master    Ready    control-plane   4d7h   v1.28.6
worker1   Ready    <none>          4d7h   v1.28.6
worker2   Ready    <none>          4d7h   v1.28.6
[root@master /]#
```

Create Docker Image And Push To Docker Hub

Create a Dockerfile: Create a Dockerfile in our project directory with the necessa

Build the Docker image: navigate to the directory containing your Dockerfile and e

```
[root@master finalwebsite]# docker images
REPOSITORY            TAG       IMAGE ID       CREATED        SIZE
hpcsaweb              latest    e9101332018d   12 hours ago   168MB
tarunshori/hpcsaweb   <none>    c0cf8eb4d4f7   3 days ago     167MB
[root@master finalwebsite]#
[root@master finalwebsite]# docker tag hpcsaweb tarunshori/hpcsaweb:5
[root@master finalwebsite]#
[root@master finalwebsite]# docker images
REPOSITORY            TAG       IMAGE ID       CREATED        SIZE
hpcsaweb              latest    e9101332018d   12 hours ago   168MB
tarunshori/hpcsaweb   5         e9101332018d   12 hours ago   168MB
tarunshori/hpcsaweb   <none>    c0cf8eb4d4f7   3 days ago     167MB
[root@master finalwebsite]#
[root@master finalwebsite]# docker push tarunshori/hpcsaweb:5
The push refers to repository [docker.io/tarunshori/hpcsaweb]
188e1442e17f: Layer already exists
83e84e8d7bd1: Layer already exists
ee9a39d3b67e: Layer already exists
70d67450158d: Layer already exists
5f70bf18a086: Layer already exists
8f562cbc866f: Layer already exists
ceb365432eec: Layer already exists
5: digest: sha256:867510099f12c48c9932c451671d5daa372b8eb7767c0d69b564056d43045dd9 size: 1782
[root@master finalwebsite]#
```

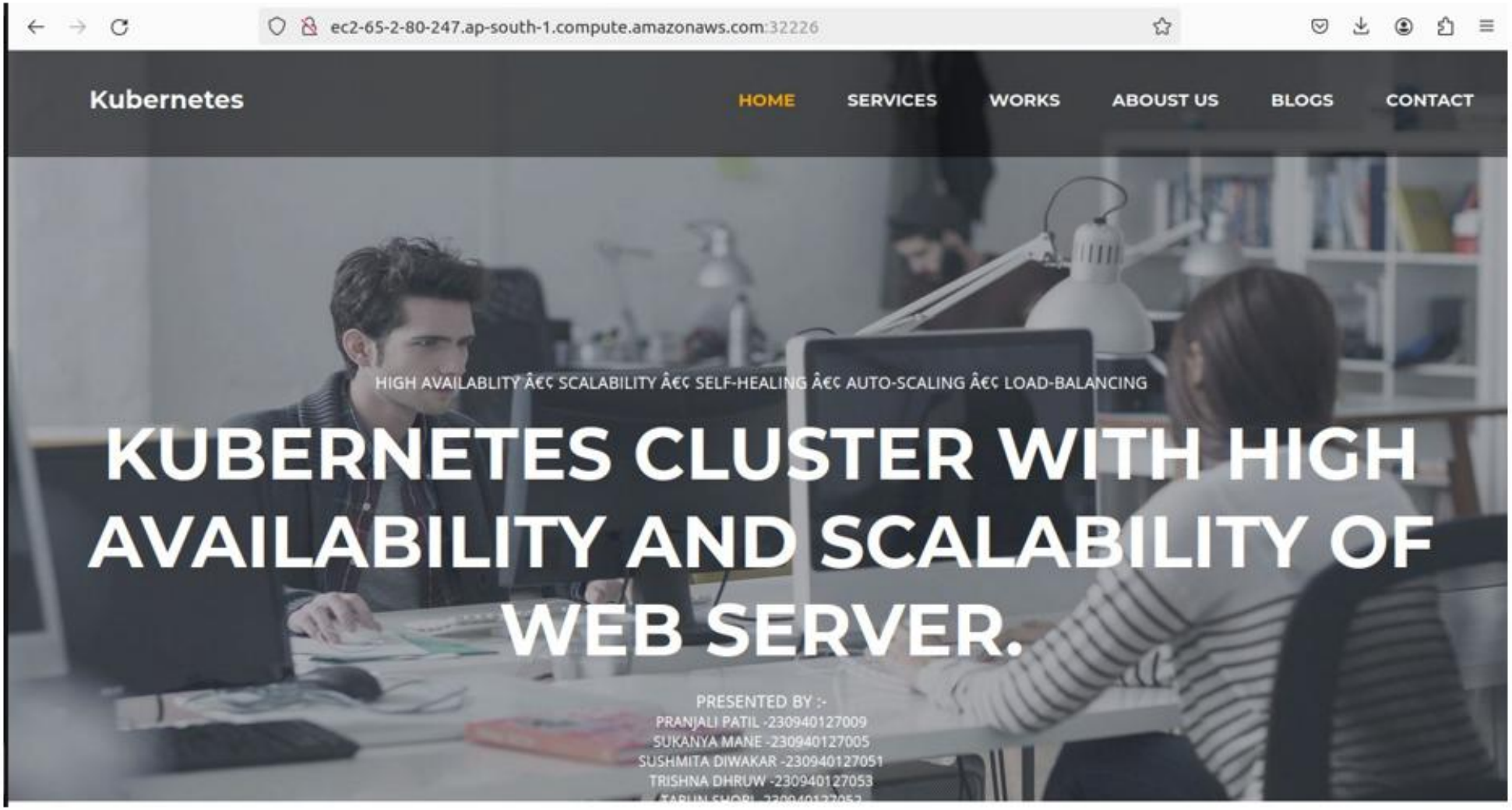
Create YAML Manifest:

run an application by creating a Kubernetes Deployment,Services,Horizontal Pod Autoscaler and other object. we describe all configurations in a YAML file.

Create a Deployment based on the YAML file:

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-web
  namespace: project-website
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-web
  template:
    metadata:
      labels:
        app: my-web
    spec:
      containers:
      - name: web-container
        image: docker.io/tarunshori/hpcsaweb
        ports:
        - containerPort: 80
        volumeMounts:
        - name: data-volume
          mountPath: /data/
      volumes:
      - name: data-volume
        persistentVolumeClaim:
          claimName: web-pvc  # Reference to the PVC
```

Access Web-Server From Outside The Cluster Using Node Port:



Validation

1. Verify High Availability of Pods if worker node is Failed:
2. Verify Scalability of Pods - Horizontal Pod Autoscaling (HPA):
3. verify Manual Scaling:

```
[root@master /]# kubectl get pods -o wide -n=project-website
NAME                      READY   STATUS    RESTARTS   AGE   IP               NODE      NOMINATED NODE   READINESS GATES
my-web-7f67bfb967-5rhrh   1/1     Running   0          26m   192.168.189.116   worker2   <none>           <none>
my-web-7f67bfb967-9w95t   1/1     Running   0          26m   192.168.189.107   worker2   <none>           <none>
my-web-7f67bfb967-kmdgb   1/1     Running   0          26m   192.168.189.112   worker2   <none>           <none>
[root@master /]#
[root@master /]# kubectl scale deploy my-web --replicas=5 -n=project-website
deployment.apps/my-web scaled
[root@master /]#
[root@master /]# kubectl get pods -o wide -n=project-website
NAME                      READY   STATUS              RESTARTS   AGE   IP               NODE      NOMINATED NODE   READINESS GATES
my-web-7f67bfb967-5rhrh   1/1     Running             0          26m   192.168.189.116   worker2   <none>           <none>
my-web-7f67bfb967-9w95t   1/1     Running             0          26m   192.168.189.107   worker2   <none>           <none>
my-web-7f67bfb967-kmdgb   1/1     Running             0          26m   192.168.189.112   worker2   <none>           <none>
my-web-7f67bfb967-twrl5   0/1     ContainerCreating   0          3s    <none>            worker1   <none>           <none>
my-web-7f67bfb967-v6dl8   1/1     Running             0          3s    192.168.235.145   worker1   <none>           <none>
[root@master /]# kubectl get pods -o wide -n=project-website
NAME                      READY   STATUS    RESTARTS   AGE   IP               NODE      NOMINATED NODE   READINESS GATES
my-web-7f67bfb967-5rhrh   1/1     Running   0          26m   192.168.189.116   worker2   <none>           <none>
my-web-7f67bfb967-9w95t   1/1     Running   0          26m   192.168.189.107   worker2   <none>           <none>
my-web-7f67bfb967-kmdgb   1/1     Running   0          26m   192.168.189.112   worker2   <none>           <none>
my-web-7f67bfb967-twrl5   1/1     Running   0          7s    192.168.235.143   worker1   <none>           <none>
my-web-7f67bfb967-v6dl8   1/1     Running   0          7s    192.168.235.145   worker1   <none>           <none>
[root@master /]#
```