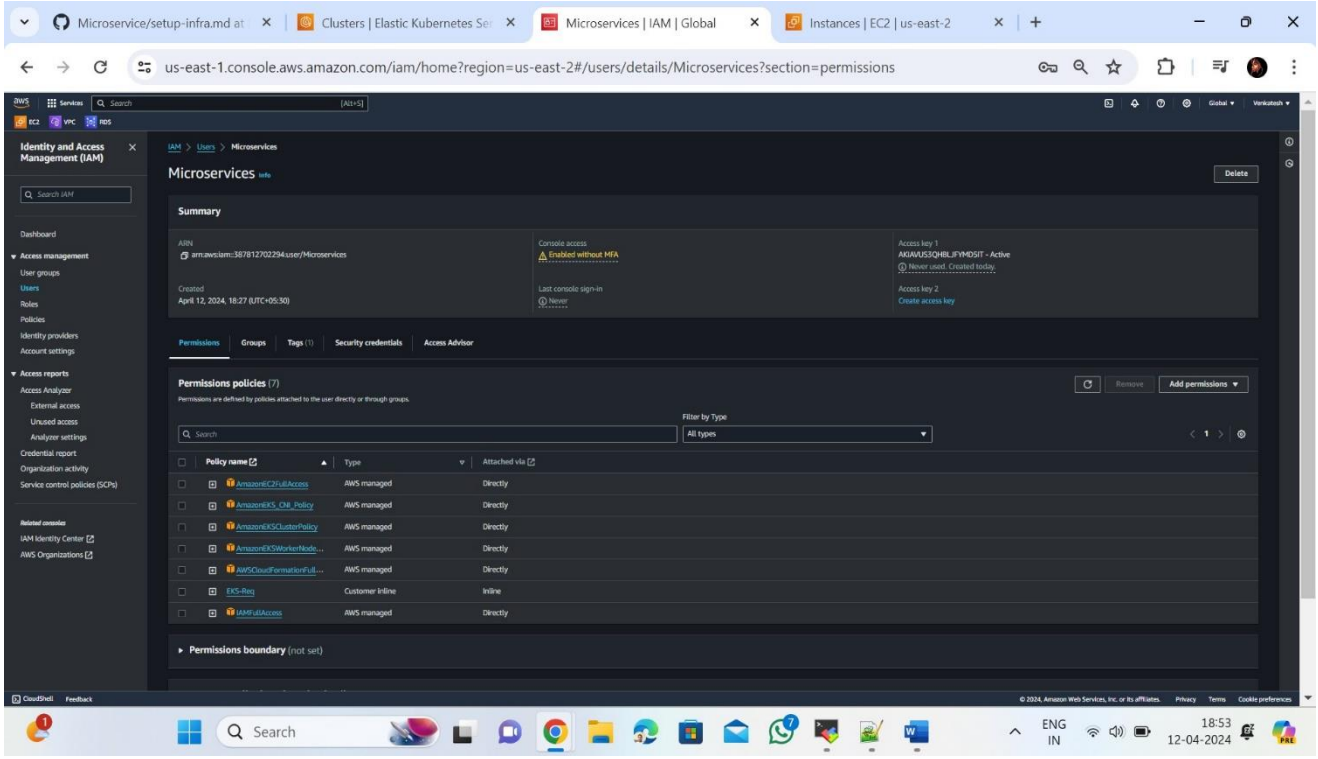
11-Microservices CI-CD Pipeline DEVOPS Project：

https://github.com/Singareddy-Venkatesh/Microservice.git

→Create EC2 Instance with t2.Large

→ Go to IAM Create user and attach policy

- EKS-Req →go to add permission → Create inline Policy → Add JSON And Paste It




```
AmazonEC2FullAccess

AmazonEKS_CNI_Policy

AmazonEKSClusterPolicy

AmazonEKSWorkerNodePolicy
```

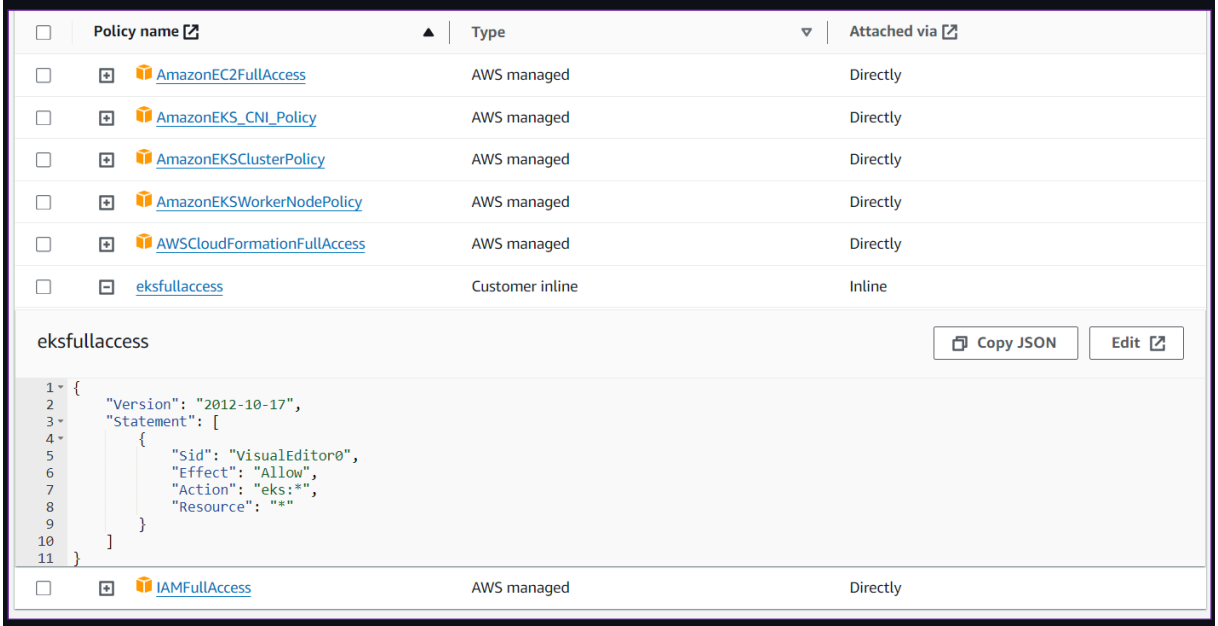
AWSCloudFormationFullAccess

IAMFullAccess

One more policy we need to create with content as below

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": "eks:*",
            "Resource": "*"
        }
    ]
}
```

Attach this policy to your user as well



Vi microservice.sh

AWSCLI

```
curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o
"awscliv2.zip"
sudo apt install unzip
unzip awscliv2.zip
sudo ./aws/install
aws configure
```

KUBECTL

```
curl -o kubectl https://amazon-eks.s3.us-west-2.amazonaws.com/1.19.6/2021-01-05/bin/linux/amd64/kubectl
chmod +x ./kubectl
sudo mv ./kubectl /usr/local/bin
kubectl version --short --client
```

EKSCTL

```
curl --silent --location "https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /tmp
sudo mv /tmp/eksctl /usr/local/bin
eksctl version
```

chmod +x microservice.sh

./microservice.sh

- ➔ aws configure
- ➔ provide access key and secret access keys and zone.
- ➔ Vi cluster.sh

Create EKS CLUSTER

```
eksctl create cluster --name=EKS-1 \
                      --region=ap-south-1 \
                      --zones=ap-south-1a,ap-south-1b \
                      --without-nodegroup

eksctl utils associate-iam-oidc-provider \
    --region ap-south-1 \
    --cluster EKS-1 \
    --approve

eksctl create nodegroup --cluster=EKS-1 \
                        --region=ap-south-1 \
                        --name=node2 \
                        --node-type=t3.medium \
                        --nodes=3 \
                        --nodes-min=2 \
                        --nodes-max=4 \
                        --node-volume-size=20 \
                        --ssh-access \
                        --ssh-public-key=DevOps \
                        --managed \
                        --asg-access \
                        --external-dns-access \
```

```
--full-ecr-access \
--appmesh-access \
--alb-ingress-access
```

→chmod +x Cluster.sh

→./cluster.sh

→Install Jenkins and Docker

→vi jenkins.sh

```
sudo apt update -y
apt install openjdk-17-jre-headless -y
sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
  https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
echo "deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc]" \
  https://pkg.jenkins.io/debian-stable binary/ | sudo tee \
  /etc/apt/sources.list.d/jenkins.list > /dev/null
sudo apt-get update -y
sudo apt-get install jenkins -y
sudo systemctl enable jenkins
sudo systemctl start jenkins
sudo systemctl status jenkins
```

```
chmod +x jenkins.sh
./jenkins.sh
```

→sudo apt install docker.io -y

→chmod 666 /var/run/docker.sock

→Change docker Image venkatesh09:latest in the GitHub Account in Every Microservices.

→Install Plugins (Docker, docker pipeline, Kubernetes, Kubernetes CLI, Multiple Scan Webhook Trigger.

→In Jenkins New Item and Select Multi-branch pipeline

→Manage Jenkins → Tools → docker setup and add credentials (docker username and Password)

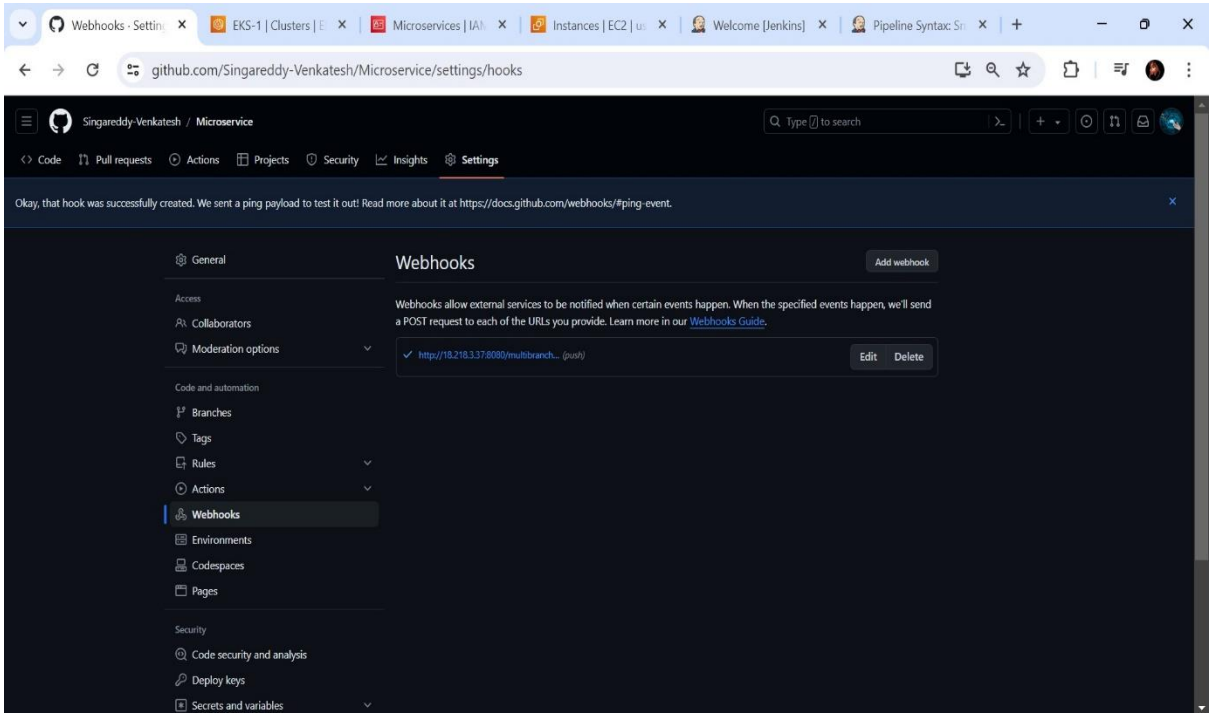
→Kubernetes Credentials By using Secret Text

→In Jenkins pipeline Go to Branch Source →select git

→go to scan Multibranch pipeline triggers→select scan by webhook (Give Any name) venky

Ex. Jenkins URL/multibranch-webhook-trigger/invoke?Token=venky

http://18.218.3.37:8080/multibranch-webhook-trigger/invoke?token=VenkateswaraReddy



→Go to GitHub Account Settings select Webhook and paste in it→select Application/JSON→select just the push event→add Webhook

Here whenever code changes the pipeline is Automatically Triggered Itself →**CONTINOUS INTEGRATION**

CONTINOUS DEPLOYMENT: Create Role Based Service Account: -

Create Service Account, Role & Assign that role, and create a secret for Service Account and generate a Token

Creating Service Account

→kubectl create namespace webapps

Vi svc.yml

```
apiVersion: v1
kind: ServiceAccount
metadata:
  name: jenkins
  namespace: webapps
```

→kubectl apply -f svc.yml

Create Role

Vi role.yml

```
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: app-role
  namespace: webapps
rules:
  - apiGroups:
        - ""
        - apps
        - autoscaling
        - batch
        - extensions
```

```
        - policy
        - rbac.authorization.k8s.io
    resources:
      - pods
      - componentstatuses
      - configmaps
      - daemonsets
      - deployments
      - events
      - endpoints
      - horizontalpodautoscalers
      - ingress
      - jobs
      - limitranges
      - namespaces
      - nodes
      - pods
      - persistentvolumes
      - persistentvolumeclaims
      - resourcequotas
      - replicasets
      - replicationcontrollers
      - serviceaccounts
      - services
    verbs: ["get", "list", "watch", "create", "update", "patch", "delete"]
```

→kubectl apply -f role.yml

Bind the role to service account

```
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: app-rolebinding
  namespace: webapps
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: app-role
subjects:
- namespace: webapps
  kind: ServiceAccount
  name: jenkins
```

→kubectl apply -f bind.yml

Generate token using service account in the namespace

Create Token

Vi secret.yml

apiVersion: v1

kind: Secret

type: kubernetes.io/service-account-token

metadata:

name: mysecretname

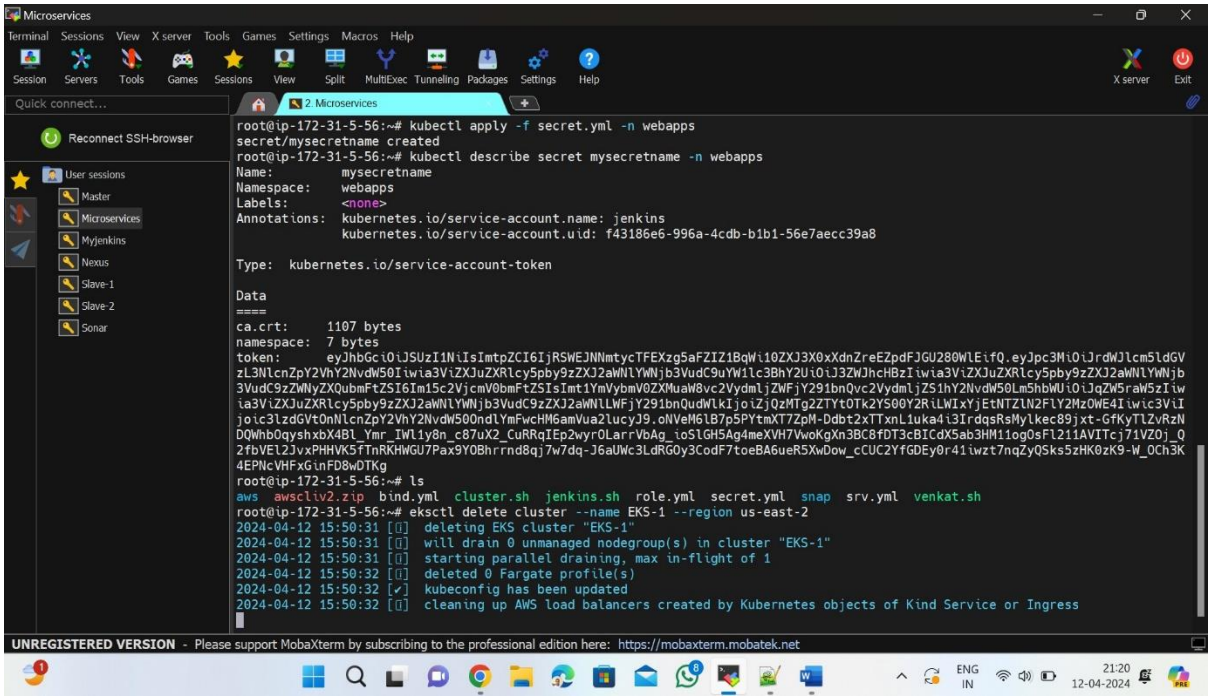
annotations:

kubernetes.io/service-account.name: jenkins

→kubectl apply -f secret.yml -n webapps

→kubectl describe secret mysecretname -n webapps

→Kubernetes Credentials By using Secret Text



Take a sample pipeline and create Kubernetes pipeline by using pipeline syntax:

Create New file in GitHub in **main** branch with the name

Jenkinsfile

```
pipeline {
    agent any
```

```
stages {
    stage('Deploy To Kubernetes') {
        steps {
            withKubeCredentials(kubectlCredentials:
[[caCertificate: '', clusterName: 'EKS-1', contextName: '',
credentialsId: 'k8-token', namespace: 'webapps', serverUrl:
'https://4B67A39F29010B03576C25C3C3EE080A.gr7.us-east-
2.eks.amazonaws.com']]) {
                sh "kubectl apply -f deployment-service.yml -n
webapps"


            }
        }
    }


    stage('verify Deployment') {
        steps {
            withKubeCredentials(kubectlCredentials:
[[caCertificate: '', clusterName: 'EKS-1', contextName: '',
credentialsId: 'k8-token', namespace: 'webapps', serverUrl:
'https://4B67A39F29010B03576C25C3C3EE080A.gr7.us-east-
2.eks.amazonaws.com']]) {
                sh "kubectl get svc -n webapps"
            }
        }
```

```
        }
    }
}
```

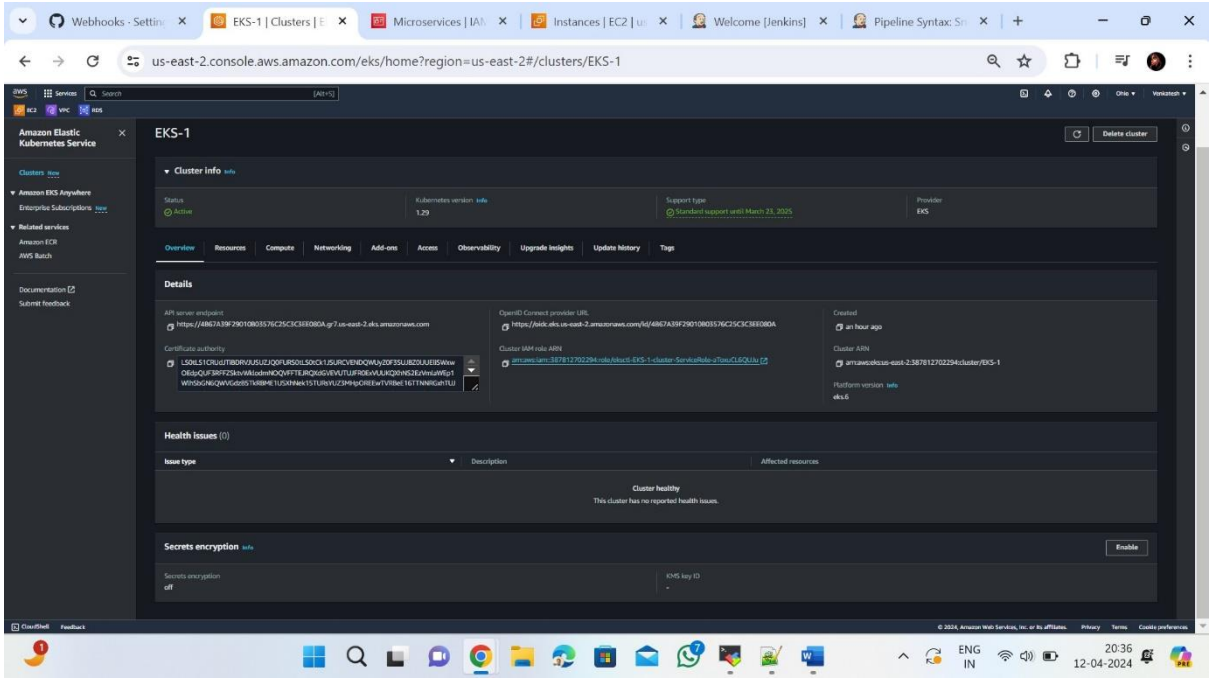
Plugin: withKubecredentials: Kubernetes CLI

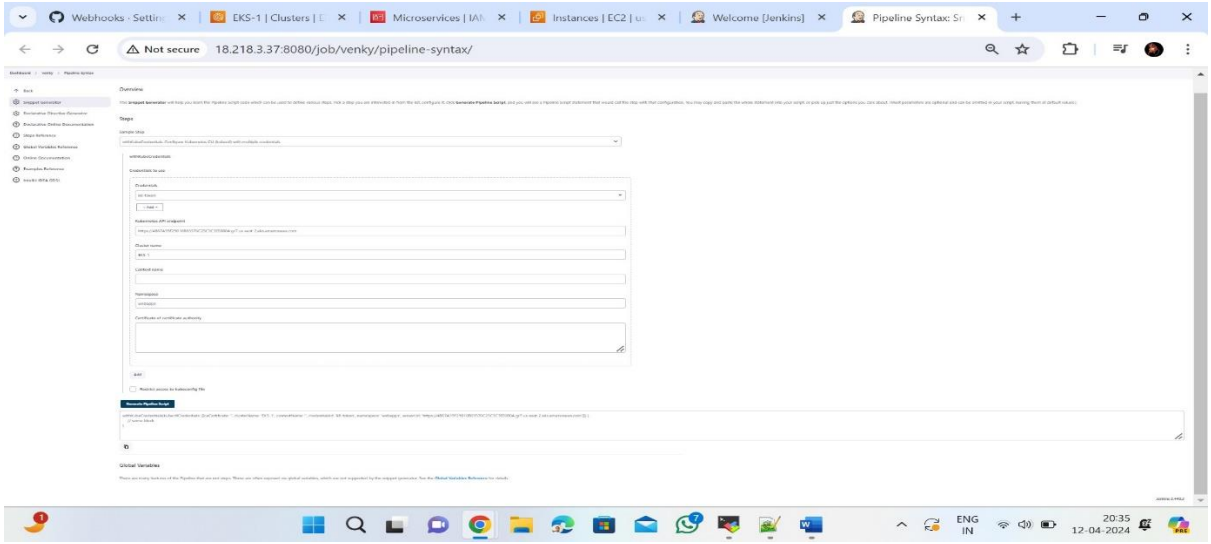
Kubernetes API Endpoint (You will Get in the AWS Cluster Info)

Credentials: Select Token

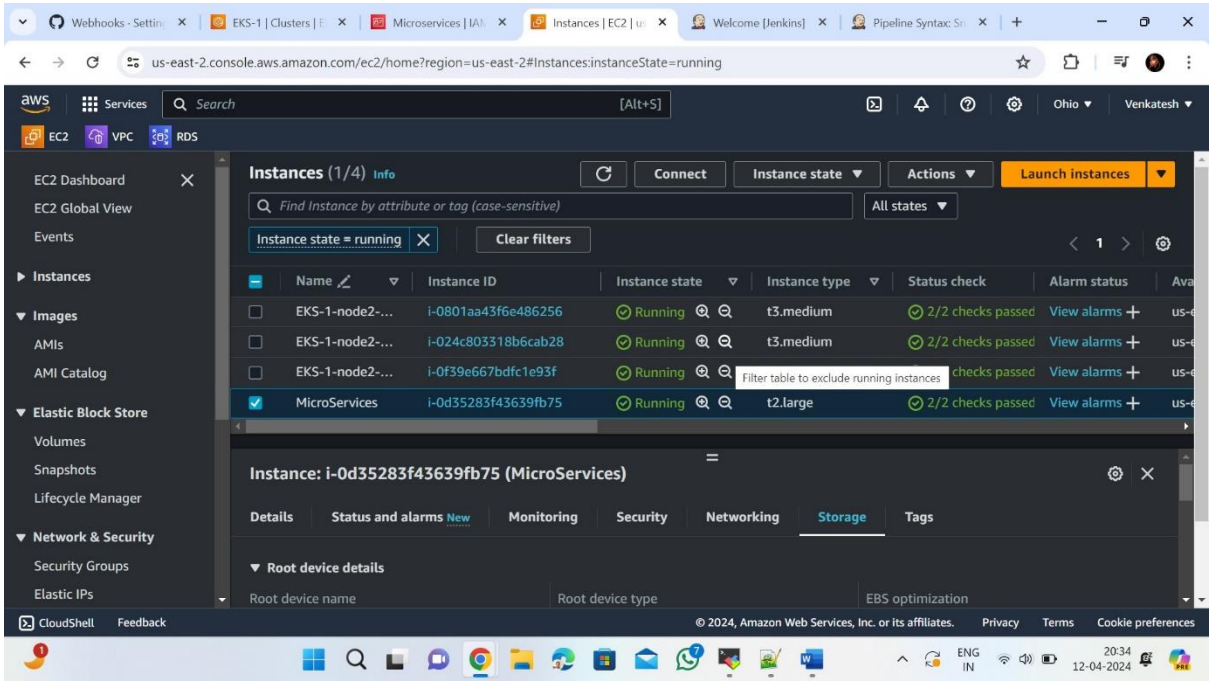
Cluster name: EKS-1 (See Your Created Cluster)

Namespace: webapps

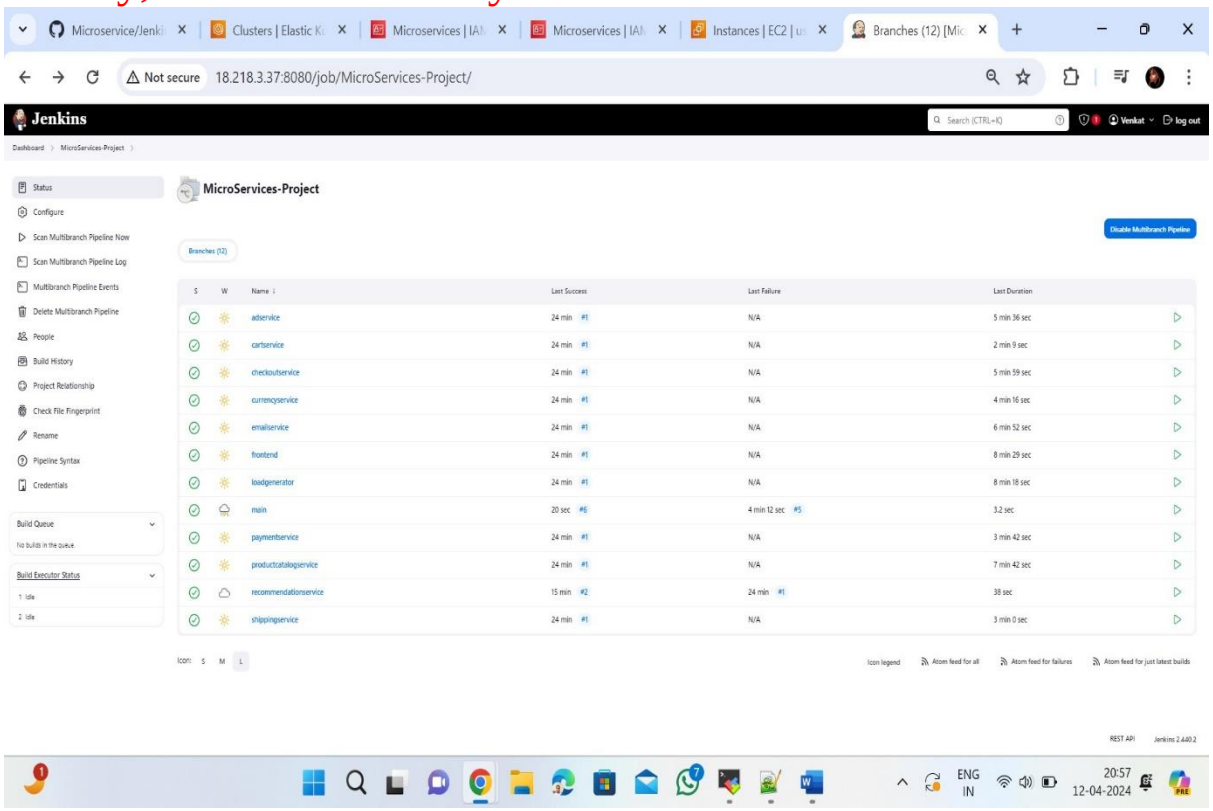




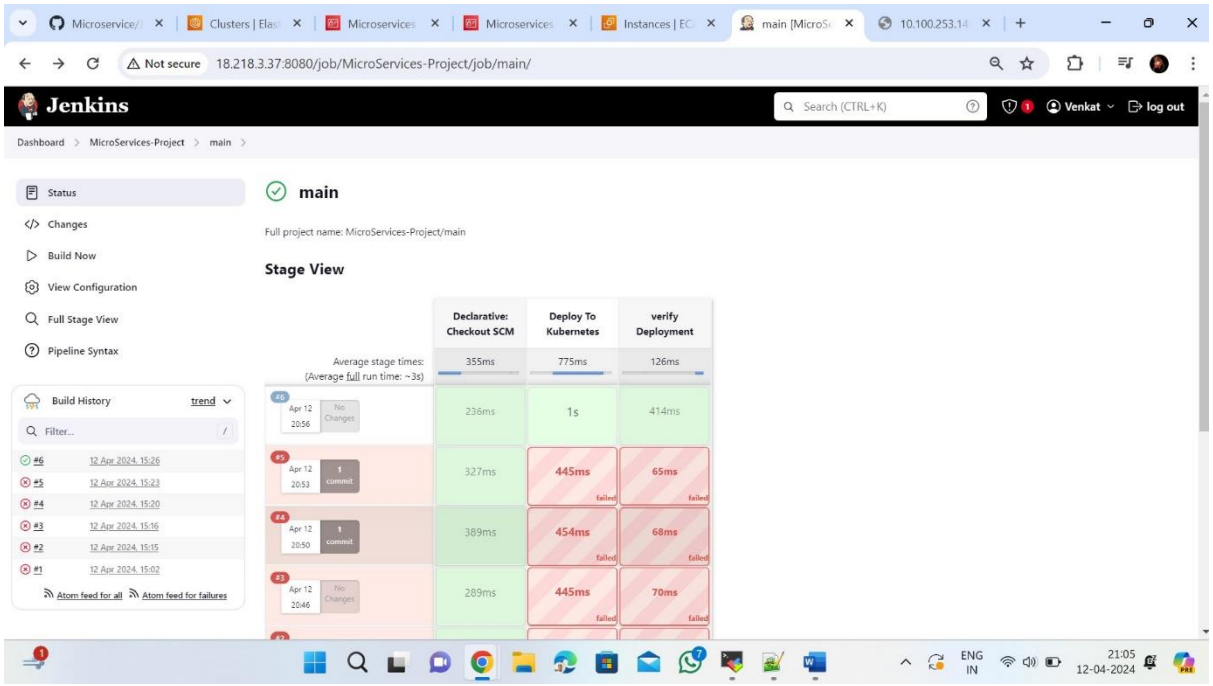
Here It Will Creates Worker Nodes Automatically:



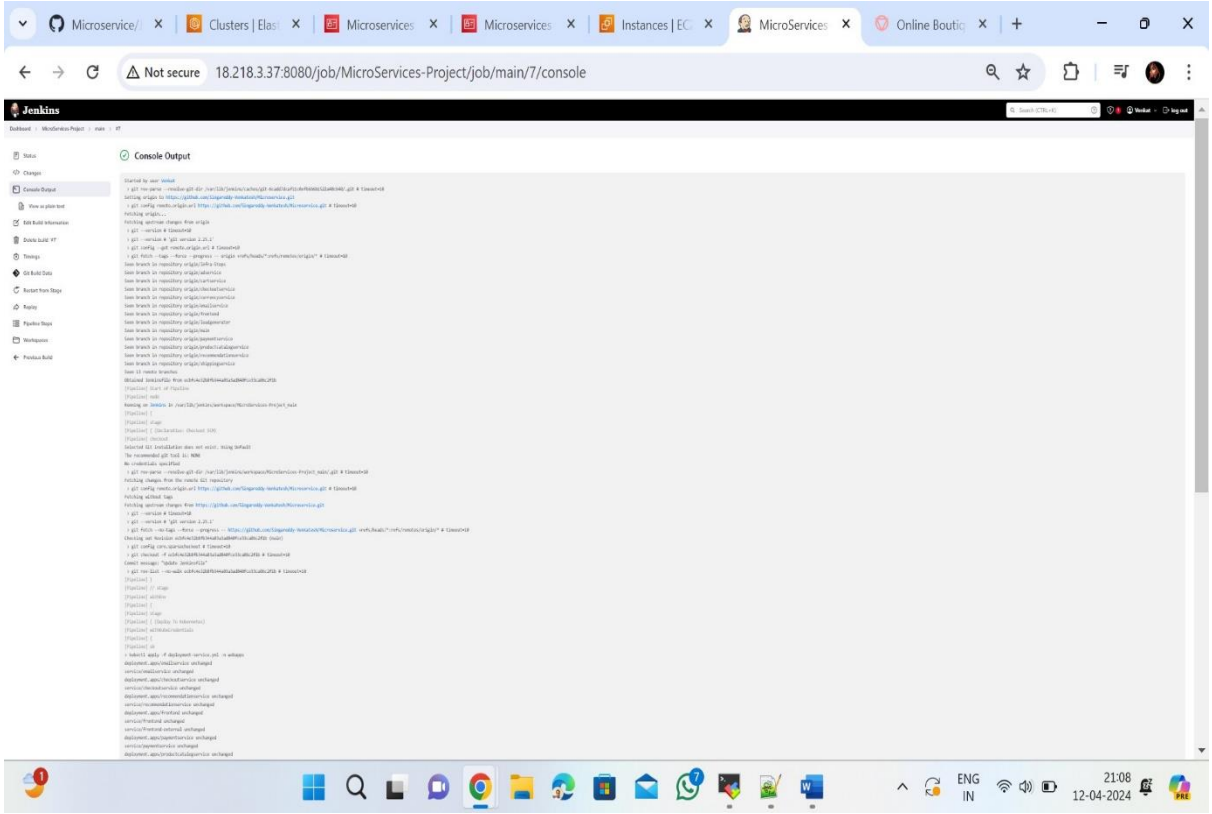
Finally, Here Successfully Creates Our Microservices:

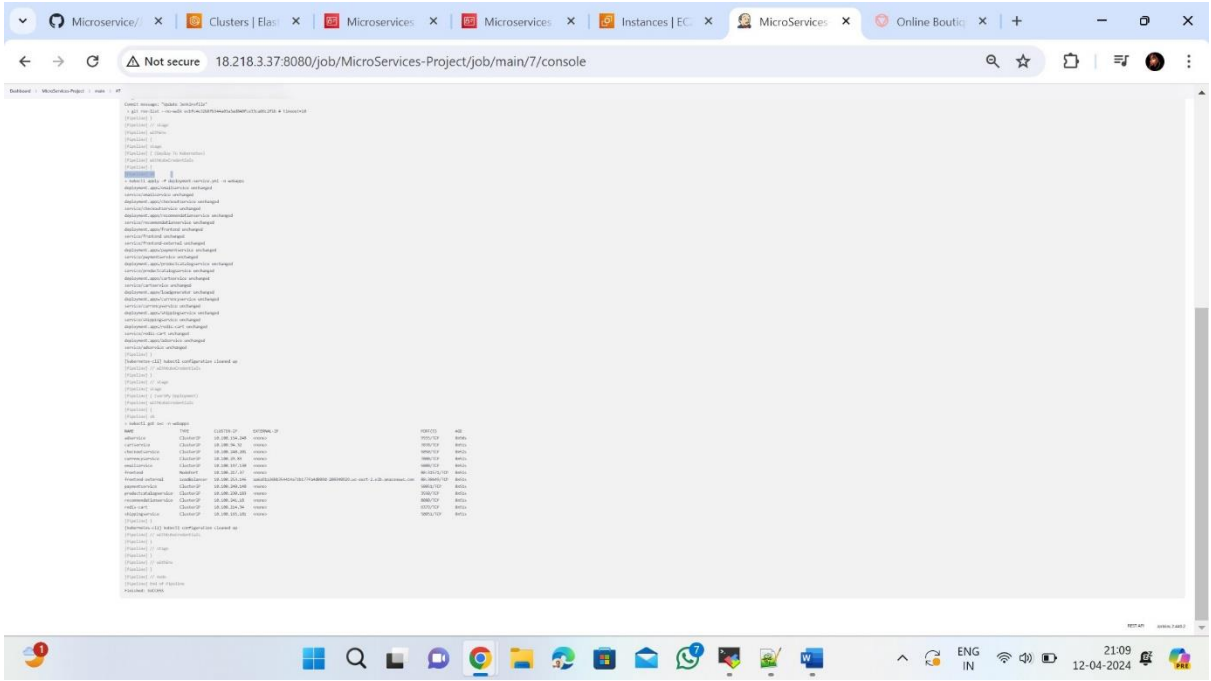


Kubernetes Deployment:



Console Output:





Here You will Get Load balancer URL In Console Output from that yow can access in the browser.

Here Our Final Output: