Jenkins Pipeline 3 - CICD with Terraform

CI -> Continuous Integration
CD -> Continuous Deployment or Delivery

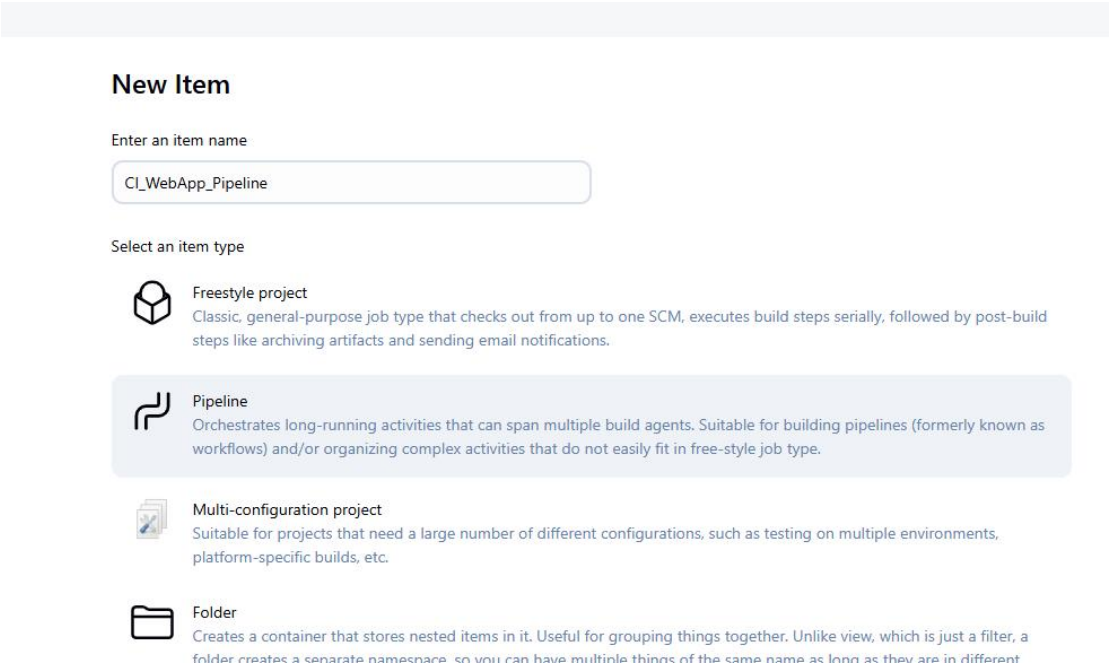
CI Job:
Multiple stages will be there
Pipeline1: Git Clone -> Maven Build -> Docker Image -> Push Image -> Deployment

CD Job:
Pipeline2: Git Clone (to clone K8s manifest file and if we are writing manifest file in pipeline then need not clone) -> K8s Deployment

If Pipeline1 is successful, it should automatically trigger the CD job

Starting EKS clusters in EKS-host VM
eksctl create cluster --name my-eks-cluster --region ca-central-1 --node-type t2.medium --zones ca-central-1a,ca-central-1b

New Item



This repo has both manifest and Dockerfile

```
pipeline {
agent any

environment {
        IMAGE_NAME = "CI-web-app"
        DOCKER_TAG = "latest"
}

  tools {
    maven "maven-3.9.10"
  }
```

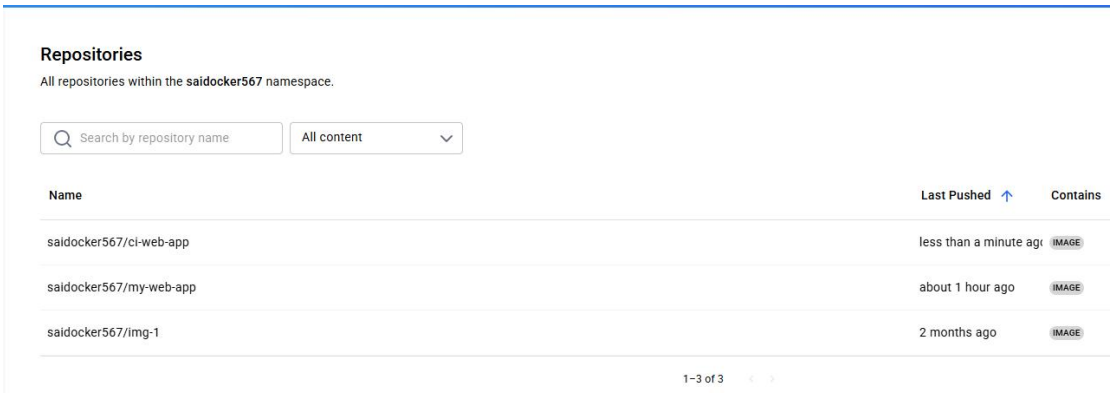
```
    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/WebAppMaven.git'
            }
        }
        stage('maven build') {
            steps {
                sh 'mvn clean package'
            }
        }
        stage('Build Docker Image') {
            steps {
                script {
                    writeFile file: 'Dockerfile', text: '''
                    # Use an official Tomcat base image
                    FROM tomcat:latest
                    LABEL maintainer="DemoDockerfile"

                    # Remove default webapps
                    RUN rm -rf /usr/local/tomcat/webapps/*

                    # Copy WAR to Tomcat webapps
                    COPY target/*.war /usr/local/tomcat/webapps/ROOT.war

                    # Expose port
                    EXPOSE 8080
                '''
                    echo "✅ Dockerfile generated"

                        sh "docker build -t ${IMAGE_NAME}:${DOCKER_TAG} ."
                }
            }
        }

        stage('Docker push') {
            steps {
                withCredentials([string(credentialsId: 'Sai-Docker-Pwd', variable: 'Docker_Hub_PWD_New')])
                {
                    sh 'docker login -u saidocker567 -p ${Docker_Hub_PWD_New}'
                    sh 'docker tag ${IMAGE_NAME}:${DOCKER_TAG}
saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
                    sh 'docker push saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
                }
            }
        }
}
}
```

```
9574addb8357: Layer already exists
37d26a060906: Layer already exists
4d8cb8462bc9: Layer already exists
78635f3af26b: Layer already exists
45a01f98e78c: Layer already exists
2c4ffe76ce80: Pushed
latest: digest: sha256:c81ddbd8b41fe7a6656c426df9f19e765148eb8d5e97b41add93a9549ba8ba4d size: 2619
[Pipeline] }
[Pipeline] // withCredentials
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

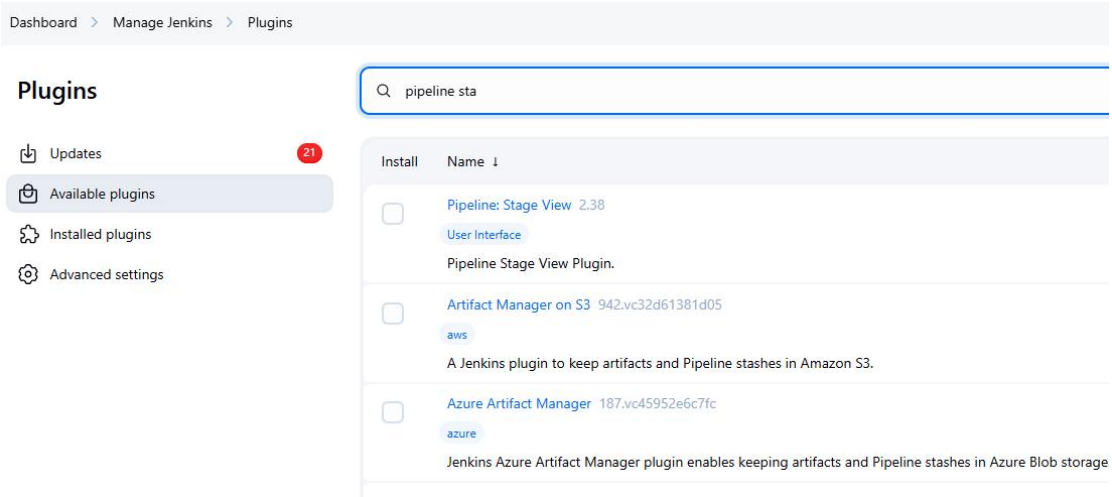
Change the image name

```
pipeline {
agent any

environment {
        IMAGE_NAME = "ci-web-app"
        DOCKER_TAG = "latest"
}

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/WebAppMaven.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean package'
      }
    }
    stage('Build Docker Image') {
      steps {
        script {
          writeFile file: 'Dockerfile', text: '''
          # Use an official Tomcat base image
          FROM tomcat:latest
          LABEL maintainer="DemoDockerfile"

          # Remove default webapps
          RUN rm -rf /usr/local/tomcat/webapps/*
```

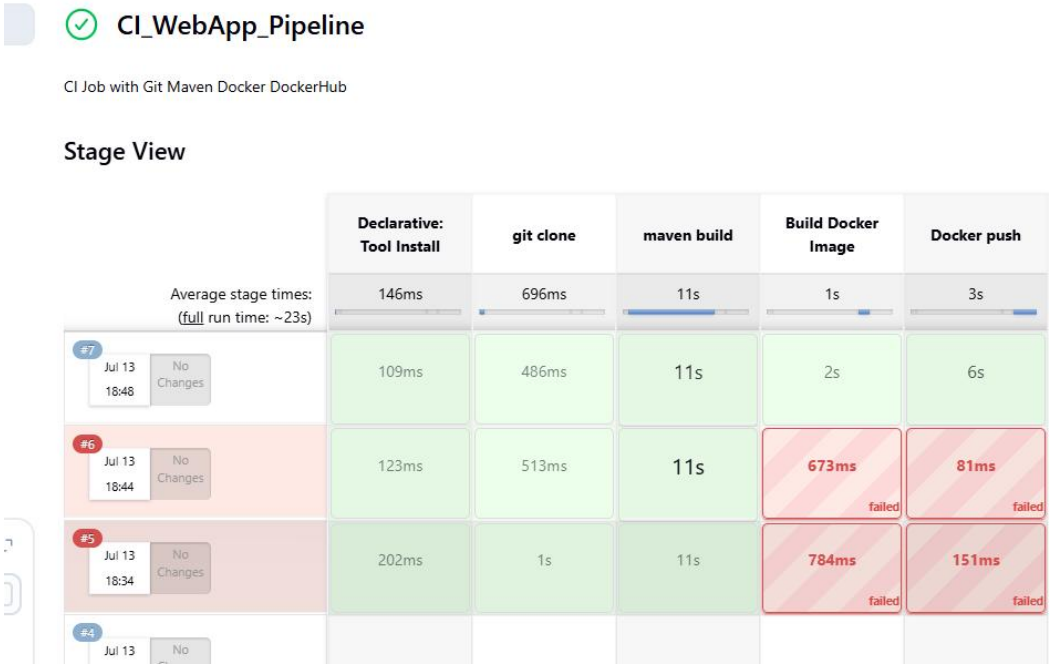
```
            # Copy WAR to Tomcat webapps
            COPY target/*.war /usr/local/tomcat/webapps/ROOT.war

            # Expose port
            EXPOSE 8080
          '''
            echo "✅ Dockerfile generated"

                sh "docker build -t ${IMAGE_NAME}:${DOCKER_TAG} ."
          }
        }
      }

      stage('Docker push') {
        steps {
          withCredentials([string(credentialsId: 'Sai-Docker-Pwd', variable: 'Docker_Hub_PWD_New')])
          {
              sh 'docker login -u saidocker567 -p ${Docker_Hub_PWD_New}'
              sh 'docker tag ${IMAGE_NAME}:${DOCKER_TAG}
saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
              sh 'docker push saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
          }
        }
      }
}
}
```



To trigger CD, we need Pipeline Stage



Different view due to Pipeline Stage View Plugin

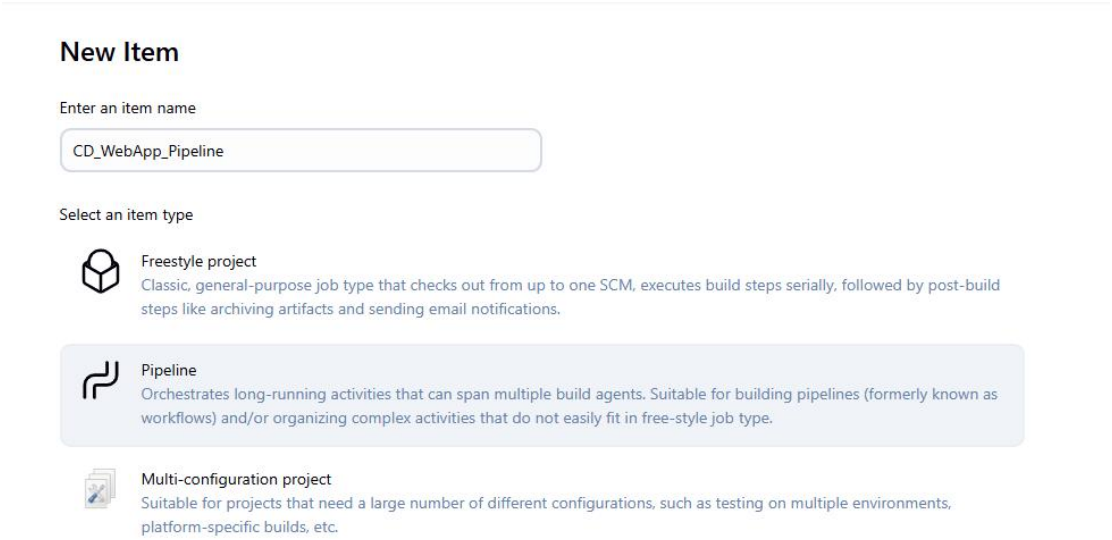


CD as another pipeline

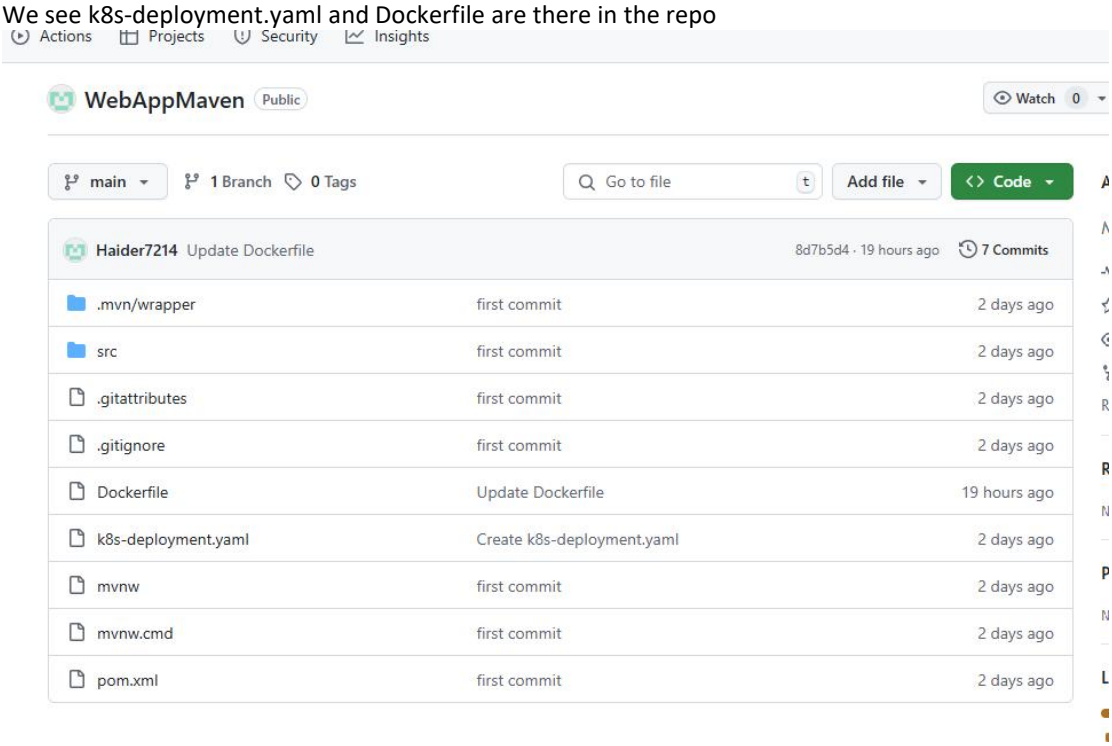
git clone (to clone k8s manifest file and if we are writing manifest file in pipeline then need not to clone)
k8s deployment

```
pipeline {
   agent any
   tools {
                        maven "maven-3.9.10"
            }

   stages {
      stage('git clone') {
         steps {
            git branch: 'main', url: 'https://github.com/Haider7214/WebAppMaven.git'
         }
      }
            stage('k8s - deployment') {
         steps {
            sh 'kubectl apply -f k8s-deployment.yaml'

         }
      }
   }
}
```

35:44



We see k8s-deployment.yaml and Dockerfile are there in the repo



CD Pipeline was successful

CD_WebApp_Pipeline

CD deployment pipeline

Stage View

	Declarative: Tool Install	git clone	k8s - deployment
Average stage times: (full run time: ~3s)	111ms	520ms	1s
#1 Jul 13 20:20 No Changes	111ms	520ms	1s

Permalinks

Once the CI pipeline is successful, it needs to trigger CD pipeline automatically. How do we do it?

Modifying CI Pipeline Script
CI pipeline Pipeline Syntax

Definition

Pipeline script

Script ?

```
pipeline {
agent any

environment {
    IMAGE_NAME = "ci-web-app"
    DOCKER_TAG = "latest"
}

    tools {
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
```

Use Groovy Sandbox ?

Pipeline Syntax

Build Build a Job
Select : CD_WebApp_Pipeline
Copy Script: build 'CD_WebApp_Pipeline'

pipeline {
agent any

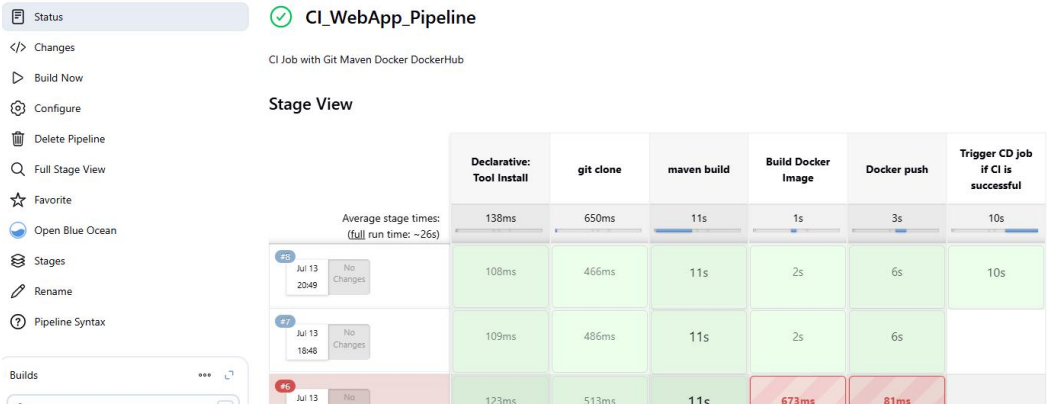
environment {

```
            IMAGE_NAME = "ci-web-app"
            DOCKER_TAG = "latest"
}

   tools {
      maven "maven-3.9.10"
   }

   stages {
      stage('git clone') {
         steps {
            git branch: 'main', url: 'https://github.com/Haider7214/WebAppMaven.git'
         }
      }
      stage('maven build') {
         steps {
            sh 'mvn clean package'
         }
      }
      stage('Build Docker Image') {
         steps {
            script {
               writeFile file: 'Dockerfile', text: '''
               # Use an official Tomcat base image
               FROM tomcat:latest
               LABEL maintainer="DemoDockerfile"

               # Remove default webapps
               RUN rm -rf /usr/local/tomcat/webapps/*

               # Copy WAR to Tomcat webapps
               COPY target/*.war /usr/local/tomcat/webapps/ROOT.war

               # Expose port
               EXPOSE 8080
            '''
               echo "✅ Dockerfile generated"

                     sh "docker build -t ${IMAGE_NAME}:${DOCKER_TAG} ."
            }
         }
      }

      stage('Docker push') {
         steps {
            withCredentials([string(credentialsId: 'Sai-Docker-Pwd', variable: 'Docker_Hub_PWD_New')])
            {
                  sh 'docker login -u saidocker567 -p ${Docker_Hub_PWD_New}'
                  sh 'docker tag ${IMAGE_NAME}:${DOCKER_TAG}
saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
                  sh 'docker push saidocker567/${IMAGE_NAME}:${DOCKER_TAG}'
            }
         }
      }

      stage('Trigger CD job if CI is successful') {
         steps {
```

```
            build 'CD_WebApp_Pipeline'
        }
    }
}
}
```

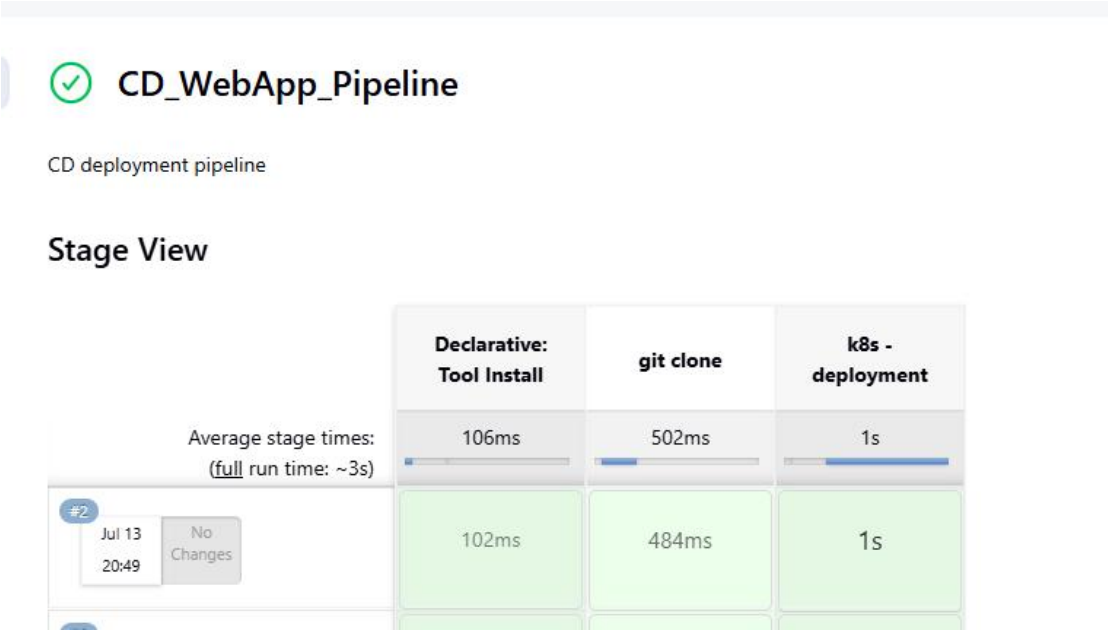
Apply and Save

Now it triggers CD job successfully



1:11

CD pipeline automatically getting executed



Go to Configure --> Poll SCM --> ***** means every minute we have a new commit it will trigger automatically

Usually people use Terraform to provision the infrastructure
Jenkins will execute Terraform script to provision infrastructure
1:16

Run on EKS host
kubectl delete all --all
eksctl delete cluster --name my-eks-cluster --region ca-central-1

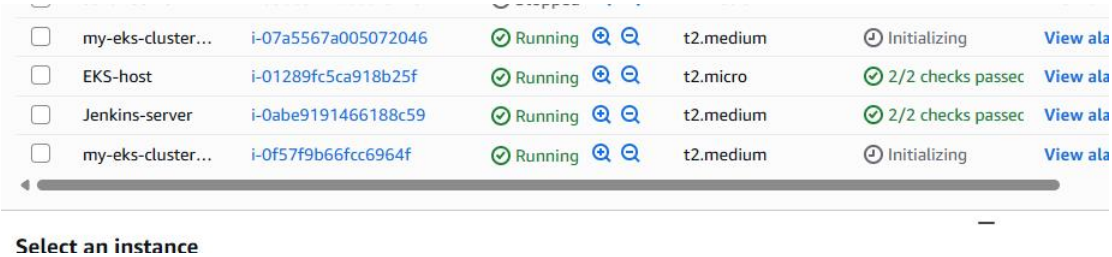
Make sure cluster is created on EKS-Host
Create EKS Cluster using eksctl

Create K8s cluster in **EKS-host VM**
eksctl create cluster --name my-eks-cluster --region ca-central-1 --node-type t2.medium --zones ca-central-1a,ca-central-1b

From EKS-host VM
ubuntu@ip-172-31-9-165:~$ cat .kube/config
apiVersion: v1
clusters:
- cluster:
  certificate-authority-data:
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSURCVENDQWUyZ0F3SUJBZ0lJUklsSGRPcno3SjR3RFFZ
SktvWklodmNOQVFFTEJRQXdGVEVUTUJFR0ExVUUKQXhNS2EzVmlaWEp1WlhSbGN6QWVGdzB5TlRB
M01UVXdNREEzTXpKYUZ3MHpOVEEzTVRNd01ERXlNekphTUJVeApFekFSQmdOVkJBTVRDbXQxWW1
WeWJtVjBaWE13Z2dFaU1BMEdDU3FHU0liM0RRRUJBUVVBQTRJQkR3QXdnZ0VLCkFvSUJBUUN2OXNy
TWpOZ3c3bTM3amFCZHlzdGNLMXhBa1hBUHZvVmZIVzdrdzFSaU45SEQrTjd4dStRQzZocjgKdkN5ZWsv
WC9vVmxEWEJmenRxUXVhYU1pOERSYkhLaml2NUF4QWhXaE5rdUw4elpyQ0EyWGRLaHJpNjZZMVA0
awpmdUNvNkJEVnAvcGozaDlrem91YXg5UHkvTituUWZnK3Y5QzN6WCtsOGI2TEIzTzRQNGJ0MncrVDZ
GK2tOTURQCkRmZUxsSHlUWitCK1FHcloybk9VRFFTWENrN0tuSForY3RGZ2F6UW03aEtXSVVDZnNGT2
RibmVEMXdZMnB4bmgKeUxaTVVnUmoySVIvbDVZUUtxOEJDdkJkY0h4QmROSkFvekV0YUdnSWp6S2p
ZTC9BckZDbExQTnVxU3VvTHgvQQpzSDZMb3lxcGtEUDNOeW5RVUlNK3VuODRJK2EvQWdNQkFBR2pX
VEJYTUE0R0ExVWREd0VCL3dRRUF3SUNwREFQCkJnTlZIUk1CQWY4RUJUQURBUUgvTUIwR0ExVWREZ
1FXQkJSYlZ4SnF6ak03dG5vUkZpV0VvUzVtdGtMZ1FqQVYKQmdOVkhSRUVEakFNZ2dwcmRXSmxjbTVs
ZEdWek1BMEdDU3FHU0liM0RRRUJDd1VBQTRJQkFRQTFaRkVabjhLQgpia3VxMmFKNHl6UDFCNm13U
mNVcldVdi90OWtTNm1YRWdPd1ZXZGlaeWR4RC9NWTdKNlFjOHVKamIyMmQrL3B1CmVqZG5GaFFFY
VZHOFpOMmo4K2E0eGRNSllJSjJNNkpzdEZWVXVqYUdYd1MyU2VFYkFtYXZKWXcvUHcwNTZ2T1cKWX
BValc1Y2pUMTV3dDR3Zk9qdTN4ajh3NEtOMUlRTmxtYXVEblZCWWR3WmlMWW5WV0RqMit6U3VaV
Hk1RTE4LwpUQU1FMzFPd2lZeTZvd3AzMWo4NXBHektXaU1mYkFpRnJYOXdjamF5NnQySXhCUlFaM1J
zTS9uTVBNVk1LYktHCjB5OFhaQTJodTNmL2o2RTRFMEtNdXR4VnFUUTkzVkRxN0E3L3ZGTGUzcGloY2cz
VkJIZ0NMQnNWTmRSN1Z1TFQKekhvU2hYYWtqQW5QCi0tLS0tRU5EIENFUlRJRklDQVRFLS0tLS0K
  server: https://E359CB3780B483E3DEE92E09CDE915C8.gr7.ca-central-1.eks.amazonaws.com
 name: my-eks-cluster.ca-central-1.eksctl.io
contexts:

```
- context:
    cluster: my-eks-cluster.ca-central-1.eksctl.io
    user: i-01289fc5ca918b25f@my-eks-cluster.ca-central-1.eksctl.io
  name: i-01289fc5ca918b25f@my-eks-cluster.ca-central-1.eksctl.io
current-context: i-01289fc5ca918b25f@my-eks-cluster.ca-central-1.eksctl.io
kind: Config
preferences: {}
users:
- name: i-01289fc5ca918b25f@my-eks-cluster.ca-central-1.eksctl.io
  user:
    exec:
      apiVersion: client.authentication.k8s.io/v1beta1
      args:
      - eks
      - get-token
      - --output
      - json
      - --cluster-name
      - my-eks-cluster
      - --region
      - ca-central-1
      command: aws
      env:
      - name: AWS_STS_REGIONAL_ENDPOINTS
        value: regional
      provideClusterInfo: false
```

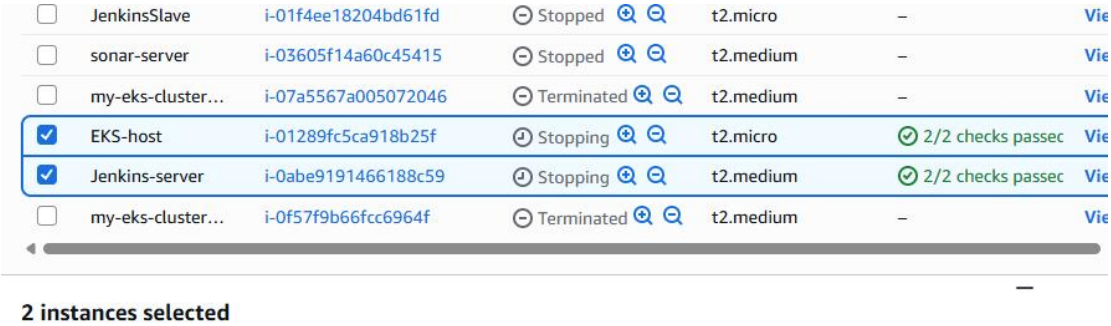
Update in Jenkins Server
ubuntu@ip-172-31-11-116:~$ sudo vi .kube/config




```
ubuntu@ip-172-31-11-116:~$ sudo vi .kube/config
ubuntu@ip-172-31-11-116:~$ kubectl get nodes
NAME                                          STATUS   ROLES    AGE   VERSION
ip-192-168-25-28.ca-central-1.compute.internal   Ready    <none>   25m   v1.32.3-eks-473151a
ip-192-168-61-42.ca-central-1.compute.internal   Ready    <none>   24m   v1.32.3-eks-473151a
```

EKS-VM deleting cluster
kubectl delete all --all
eksctl delete cluster --name my-eks-cluster --region ca-central-1

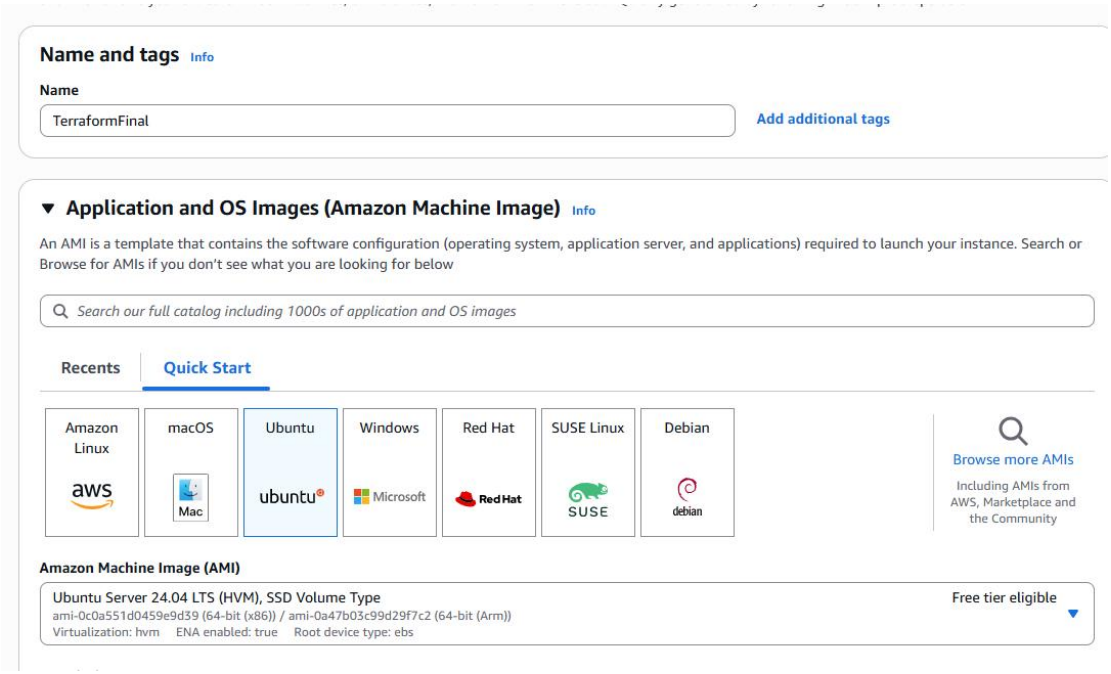
We don’t need these machines anymore so stopped them



2 instances selected

In the next Pipeline, we are going to automate Jenkins with Terraform to provision EKS cluster
Terraform --> Jenkins --> EKS cluster

1. Have a machine to launch an EC2 instance (Ubuntu --> t2.medium) so we can have Terraform in it
2. Install Terraform, Java and Jenkins in this machine
3.



Description

Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Canonical, Ubuntu, 24.04, amd64 noble image

Architecture	AMI ID	Publish Date	Username	
64-bit (x86)	ami-0c0a551d0459e9d39	2025-06-10	ubuntu	Verified provider

Instance type Info | Get advice

Instance type

t2.medium
Family: t2 2 vCPU 4 GiB Memory Current generation: true
On-Demand Ubuntu Pro base pricing: 0.0547 USD per Hour On-Demand RHEL base pricing: 0.08 USD per Hour
On-Demand SUSE base pricing: 0.1512 USD per Hour On-Demand Windows base pricing: 0.0692 USD per Hour
On-Demand Linux base pricing: 0.0512 USD per Hour

All generations

Compare instance types

Additional costs apply for AMIs with pre-installed software

Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

DevOpsMar30

Create new key pair

Network settings Info

Edit

Network Info

vpc-0a752647f0a021f2e | default_VPC

Subnet Info

No preference (Default subnet in any availability zone)

Auto-assign public IP Info

Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group | Select existing security group

Common security groups Info

Select security groups

DevOps-sg sg-031a081efd38c0e3a
VPC: vpc-0a752647f0a021f2e

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

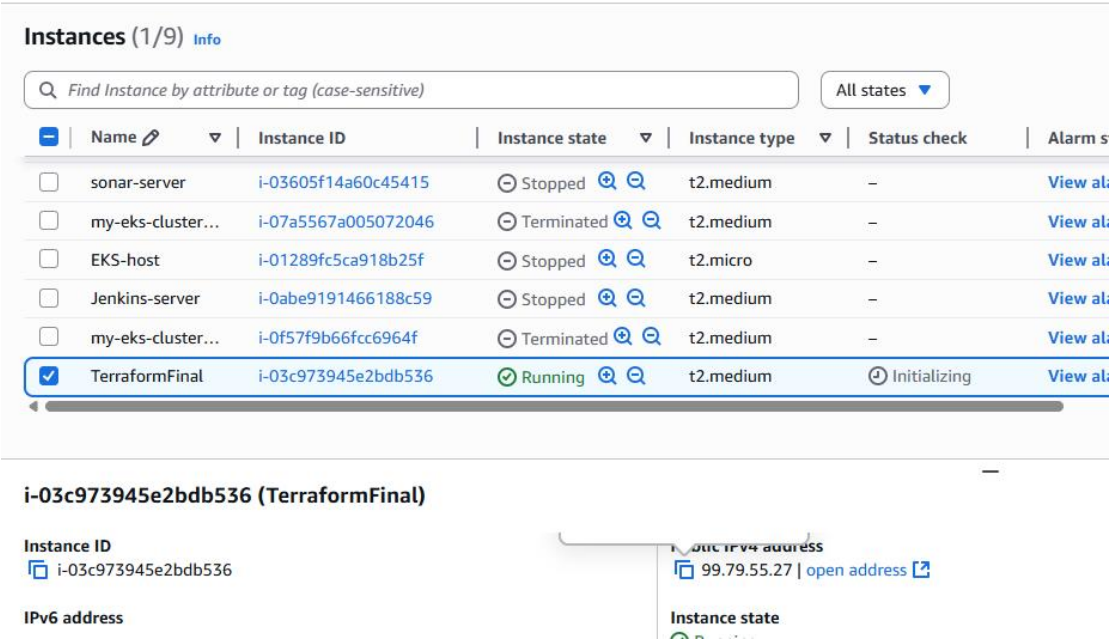
Configure storage Info

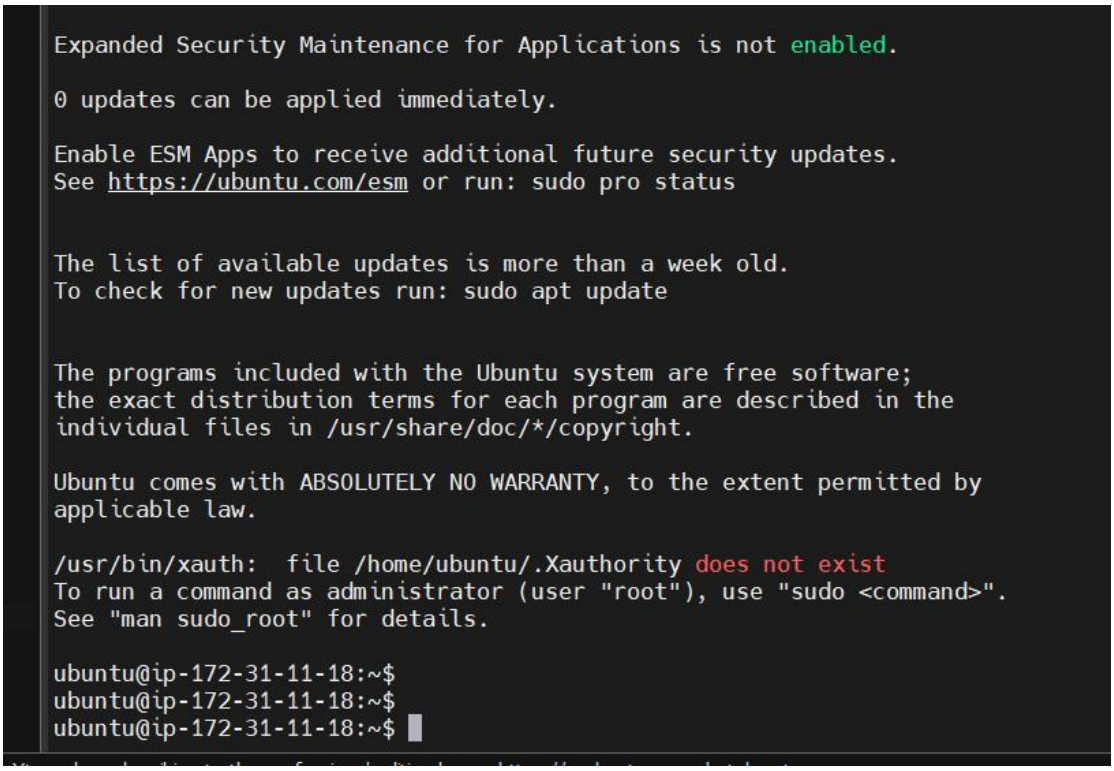
Advanced

1x 8 GiB gp3 Root volume, 3000 IOPS, Not encrypted

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

Launch Instance





1. Create Linux VM on AWS Cloud - Ubuntu (preferred to use min t2.medium as instance type)
   Get connected to Linux VM using ssh gitbash or terminal or any medium

2. install Java

   1.sudo apt update -> update the package manager
   2.sudo apt install openjdk-21-jdk -> install java
   java -version -> To check java is installed or not

sudo apt update
sudo apt install openjdk-17-jdk

3. Install Jenkins

# Create keyring directory if it doesn't exist
sudo mkdir -p /etc/apt/keyrings

# Download and add the Jenkins GPG key
sudo wget -O /etc/apt/keyrings/jenkins-keyring.asc https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key

Add Jenkins repo to your sources list
echo "deb [signed-by=/etc/apt/keyrings/jenkins-keyring.asc] https://pkg.jenkins.io/debian-stable binary/" \
| sudo tee /etc/apt/sources.list.d/jenkins.list > /dev/null

sudo apt update
sudo apt install -y jenkins

4. Start and verify Jenkins

sudo systemctl enable jenkins
sudo systemctl start jenkins

Verify Jenkins
sudo systemctl status jenkins

5. Open Jenkins server in browser (also make sure edit inbond rules and add 8080 in security group)

http://public-ip:8080/

6: Copy Jenkins admin password

/var/lib/jenkins/secrets/initialAdminPassword

$ sudo cat /var/lib/jenkins/secrets/initialAdminPassword

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-11-18:~$ sudo systemctl enable jenkins
sudo systemctl start jenkins
Synchronizing state of jenkins.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable jenkins
ubuntu@ip-172-31-11-18:~$ sudo systemctl status Jenkins
Unit Jenkins.service could not be found.
ubuntu@ip-172-31-11-18:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
     Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: enabled)
     Active: active (running) since Tue 2025-07-15 01:21:24 UTC; 37s ago
   Main PID: 4365 (java)
      Tasks: 49 (limit: 4670)
     Memory: 568.5M (peak: 580.9M)
        CPU: 19.351s
     CGroup: /system.slice/jenkins.service
             └─4365 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war

Jul 15 01:21:20 ip-172-31-11-18 jenkins[4365]: d47f0116307a4d23ace70aafa71e62d1
Jul 15 01:21:20 ip-172-31-11-18 jenkins[4365]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Jul 15 01:21:20 ip-172-31-11-18 jenkins[4365]: *************************************************************
Jul 15 01:21:20 ip-172-31-11-18 jenkins[4365]: *************************************************************
Jul 15 01:21:20 ip-172-31-11-18 jenkins[4365]: *************************************************************
```

Install Terraform

ubuntu@ip-172-31-11-18:~$ sudo vi terraform.sh

#!/bin/bash

```
set -e

echo "   Updating system packages..."
sudo apt-get update -y
sudo apt-get install -y curl unzip gnupg software-properties-common

echo "   Adding HashiCorp GPG key..."
curl -fsSL https://apt.releases.hashicorp.com/gpg | sudo gpg --dearmor -o
/usr/share/keyrings/hashicorp-archive-keyring.gpg

echo "   Adding HashiCorp repo to apt sources..."
echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg]
https://apt.releases.hashicorp.com $(lsb_release -cs) main" \
  | sudo tee /etc/apt/sources.list.d/hashicorp.list > /dev/null

echo "   Updating package list and installing Terraform..."
sudo apt-get update -y
sudo apt-get install terraform -y

echo "✅ Verifying Terraform version..."
terraform -version

echo "   Terraform installation completed!"

ubuntu@ip-172-31-11-18:~$ sudo vi terraform.sh
ubuntu@ip-172-31-11-18:~$ ls
terraform.sh
ubuntu@ip-172-31-11-18:~$ sudo chmod +x terraform.sh
ubuntu@ip-172-31-11-18:~$ ls -l
total 4
-rwxr-xr-x 1 root root 798 Jul 15 01:28 terraform.sh

ubuntu@ip-172-31-11-18:~$ sudo sh terraform.sh
```

```
Fetched 204 kB in 1s (354 kB/s)
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  terraform
0 upgraded, 1 newly installed, 0 to remove and 59 not upgraded.
Need to get 28.4 MB of archives.
After this operation, 93.6 MB of additional disk space will be used.
Get:1 https://apt.releases.hashicorp.com noble/main amd64 terraform amd64 1.12.2-1 [28.4 MB]
Fetched 28.4 MB in 0s (87.4 MB/s)
Selecting previously unselected package terraform.
(Reading database ... 86268 files and directories currently installed.)
Preparing to unpack .../terraform_1.12.2-1_amd64.deb ...
Unpacking terraform (1.12.2-1) ...
Setting up terraform (1.12.2-1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
☑ Verifying Terraform version...
Terraform v1.12.2
on linux_amd64
🎉 Terraform installation completed!
ubuntu@ip-172-31-11-18:~$
```

1:40

ubuntu@ip-172-31-11-18:~$ sudo vi k8s.sh

```
#!/bin/bash

set -e

echo "   Updating system packages..."
sudo apt-get update -y

echo "   Downloading latest kubectl binary..."
curl -LO "https://dl.k8s.io/release/$(curl -L -s
https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"

echo "   Verifying the binary checksum..."
curl -LO "https://dl.k8s.io/release/$(curl -s
https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl.sha256"
echo "$(cat kubectl.sha256)  kubectl" | sha256sum --check

echo "   Installing kubectl..."
chmod +x kubectl
sudo mv kubectl /usr/local/bin/

echo "✅ Verifying kubectl version..."
kubectl version --client

echo "   kubectl installed successfully!"
```

ubuntu@ip-172-31-11-18:~$ sudo vi k8s.sh
ubuntu@ip-172-31-11-18:~$ sudo chmod +x k8s.sh

```
ubuntu@ip-172-31-11-18:~$ sh k8s.sh
#!/bin/bash

set -e

echo "   Updating system packages..."
sudo apt-get update -y

echo "   Fetching latest stable version..."
KUBECTL_VERSION=$(curl -L -s https://dl.k8s.io/release/stable.txt)

echo "   Downloading kubectl version $KUBECTL_VERSION..."
curl -LO "https://dl.k8s.io/release/${KUBECTL_VERSION}/bin/linux/amd64/kubectl"

echo "   Downloading checksum..."
curl -LO "https://dl.k8s.io/release/${KUBECTL_VERSION}/bin/linux/amd64/kubectl.sha256"

echo "✅ Verifying checksum..."
echo "$(cat kubectl.sha256)  kubectl" | sha256sum --check -

echo "   Installing kubectl..."
chmod +x kubectl
sudo mv kubectl /usr/local/bin/

echo "   Verifying installation..."
kubectl version --client

echo "   kubectl installed successfully!"
```

```
100   138  100   138    0     0   1745      0 --:--:-- --:--:-- --:--:--  1769
100 57.3M  100 57.3M    0     0  3281k      0  0:00:17  0:00:17 --:--:-- 3315k
📥 Downloading checksum...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   138  100   138    0     0   1737      0 --:--:-- --:--:-- --:--:--  1746
100    64  100    64    0     0    446      0 --:--:-- --:--:-- --:--:--   446
☑ Verifying checksum...
kubectl: OK
🚀 Installing kubectl...
🔍 Verifying installation...
Client Version: v1.33.2
Kustomize Version: v5.6.0
🎉 kubectl installed successfully!
ubuntu@ip-172-31-11-18:~$
```

```
ubuntu@ip-172-31-11-18:~$ sudo vi aws-cli.sh
ubuntu@ip-172-31-11-18:~$ sudo chmod +x aws-cli.sh

#!/bin/bash

set -e

echo "   Updating system packages..."
sudo apt-get update -y
sudo apt-get install -y unzip curl

echo "   Downloading AWS CLI v2..."
curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"
```

```
echo "   Unzipping..."
unzip -q awscliv2.zip

echo "   Installing AWS CLI..."
sudo ./aws/install

echo "   Cleaning up..."
rm -rf aws awscliv2.zip

echo "✅ Verifying AWS CLI installation..."
aws --version

echo "   AWS CLI installed successfully!"
```

ubuntu@ip-172-31-11-18:~$ sh aws-cli.sh

```
Hit:4 https://apt.releases.hashicorp.com noble InRelease
Ign:5 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:6 https://pkg.jenkins.io/debian-stable binary/ Release
Hit:7 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
unzip is already the newest version (6.0-28ubuntu4.1).
curl is already the newest version (8.5.0-2ubuntu10.6).
0 upgraded, 0 newly installed, 0 to remove and 59 not upgraded.
📥 Downloading AWS CLI v2...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 63.2M  100 63.2M    0     0  32.5M      0  0:00:01  0:00:01 --:--:-- 32.4M
📦 Unzipping...
🚀 Installing AWS CLI...
Found preexisting AWS CLI installation: /usr/local/aws-cli/v2/current. Please rer
ubuntu@ip-172-31-11-18:~$
```

1:46

install kubectl

```
curl -LO "https://dl.k8s.io/release/$(curl -L -s
https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"
# Make executable and move to /usr/local/bin
chmod +x kubectl
sudo mv kubectl /usr/local/bin/
# Verify installation
kubectl version --client --output=yaml
```

install AWS CLI

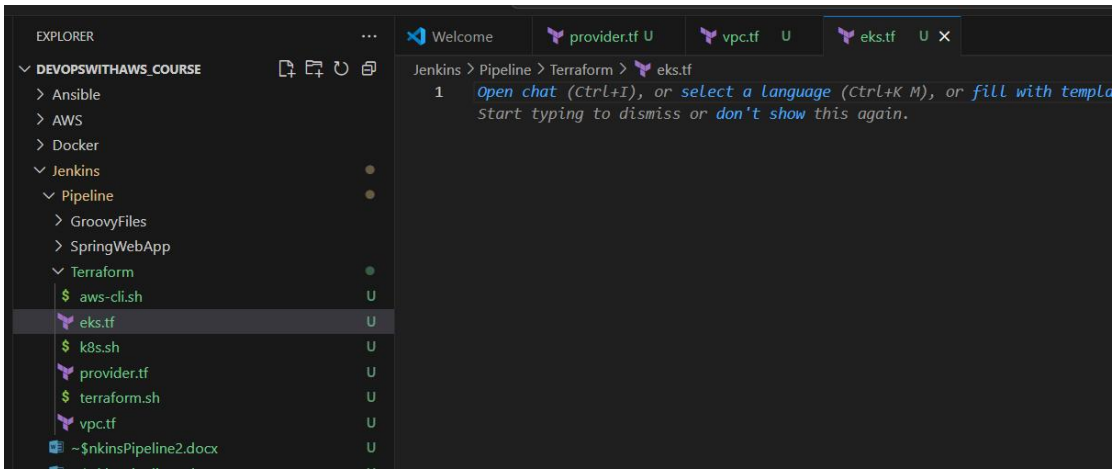
```
# Install unzip (adjust for your package manager)
# For Debian/Ubuntu
$ sudo apt update && sudo apt install -y unzip

# For RHEL/CentOS
# sudo yum install -y unzip
# Download and install AWS CLI v2

$ curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"
 unzip awscliv2.zip
```

```
 sudo ./aws/install

# Clean up
$ rm -rf awscliv2.zip aws

# Verify installation
$ aws --version

ubuntu@ip-172-31-11-18:~$ sudo chmod +x eksctl.sh
Install eksctl

# Download and extract the latest eksctl
curl --silent --location
"https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz"
| tar xz -C /tmp

# Verify installation
eksctl version
#!/bin/bash

set -e

echo "   Updating system packages..."
sudo apt-get update -y
sudo apt-get install -y curl tar

echo "   Fetching latest eksctl version..."
LATEST_VERSION=$(curl -s https://api.github.com/repos/eksctl-io/eksctl/releases/latest | grep
tag_name | cut -d '"' -f 4)

if [[ -z "$LATEST_VERSION" ]]; then
  echo "❌ Failed to retrieve eksctl version. Check your network or GitHub rate limits."
  exit 1
fi

echo "   Latest version is $LATEST_VERSION"

TAR_NAME="eksctl_Linux_amd64.tar.gz"
DOWNLOAD_URL="https://github.com/eksctl-
io/eksctl/releases/download/${LATEST_VERSION}/${TAR_NAME}"

echo "   Downloading from: $DOWNLOAD_URL"
curl -LO "$DOWNLOAD_URL"

echo "   Extracting..."
tar -xzf "$TAR_NAME"

echo "   Installing eksctl to /usr/local/bin..."
sudo mv eksctl /usr/local/bin/

echo "   Cleaning up..."
rm -f "$TAR_NAME"

echo "✅ Verifying installation..."
eksctl version

echo "   eksctl installed successfully!"
```

```
➡ Latest version is v0.210.0
📥 Downloading from: https://github.com/eksctl-io/eksctl/releases/download/v0.210.0/eksctl_Linux_amd64.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100 33.3M  100 33.3M    0     0  2950k      0  0:00:11  0:00:11 --:--:-- 3508k
📦 Extracting...
🚀 Installing eksctl to /usr/local/bin...
🧹 Cleaning up...
✅ Verifying installation...
0.210.0
🎉 eksctl installed successfully!
ubuntu@ip-172-31-11-18:~$
```

1:50

Go to VSCode create 3 tf files



1:51
To access resources over internet, we use Public subnets

provider.tf

```
locals {
   region = "ap-south-1"
   name   = "telusko-eks-cluster"
   vpc_cidr = "10.123.0.0/16"
   azs      = ["ap-south-1a", "ap-south-1b"]
   public_subnets  = ["10.123.1.0/24", "10.123.2.0/24"]
   private_subnets = ["10.123.3.0/24", "10.123.4.0/24"]
   intra_subnets   = ["10.123.5.0/24", "10.123.6.0/24"]
   tags = {
     Example = local.name
  }
}

provider "aws" {
   region = "ap-south-1"
}
```

vpc.tf

```
module "vpc {
   source = "terraform-aws-modules/vpc/aws"
   version = "~> 4.0"                    # Latest 4.x version of VPC to be used

   name = local.name
   cidr = local.vpc_cidr
```

```
  azs             = local.azs
  private_subnets     = local.private_subnets
  public_subnets      = local.public_subnets
  intra.intra_subnets = local.intra_subnets

  enable_nat_gateway = true    # if Private subnets require internet access to access external APIs or
resources then we need to enable the NAT Gateway

  public_subnets_tags = {
    "kubernetes.io/role/elb" = 1
  }

  private_subnets_tags = {
    "kubernetes.io/role/internal-elb" = 1
  }
}
```

eks.tf

```
module "eks" {
 source  = "terraform-aws-modules/eks/aws"   # specifies location of module from Terraform AWS
registry
 version = "19.15.1"

 cluster_name                  = local.name
 cluster_endpoint_public_access = true   # to enable public access to all cluster endpoints

 cluster_addons = {
  coredns = {
   most_recent = true
  }
  kube-proxy = {  # for kubernetes API communication within the cluster for networking purpose,
kube-proxy is required
   most_recent = true
  }
  vpc-cni = {
   most_recent = true
  }
 }

 # for networking
 vpc_id                   = module.vpc.vpc_id
 subnet_ids               = module.vpc.private_subnets
 control_plane_subnet_ids = module.vpc.intra_subnets

 # what type of machines you want
 eks_managed_node_group_defaults = {
  ami_type       = "AL2_x86_64"
  instance_types = ["t2.medium"]
  attach_cluster_primary_security_group = true
 }

 eks_managed_node_groups = {
  pipeline-cluster-wg = {
   min_size     = 2
   max_size     = 2
```

```
    desired_size = 2

    instance_types = ["t2.medium"]
    capacity_type  = "SPOT"

    tags = {
      ExtraTag = "full_pipeline"
    }
  }
 }

 tags = local.tags
}
```

Next class building the pipeline