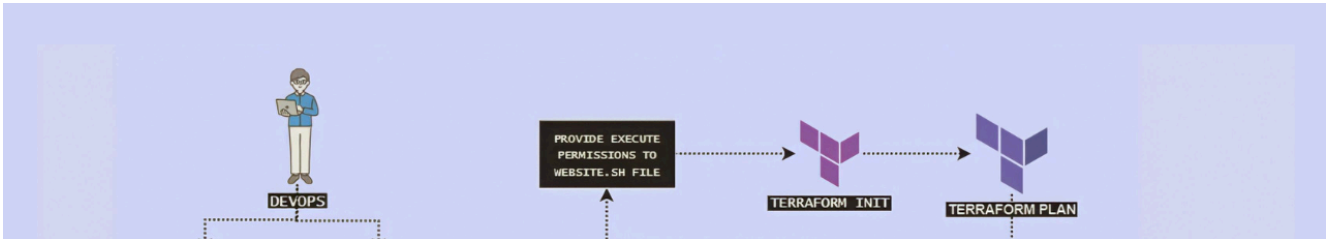
DevOps

AWS Resources with Terraform, Jenkins ci-cd, and Hosting a static website in s3

mrcloudbook.com · 8 January 2024



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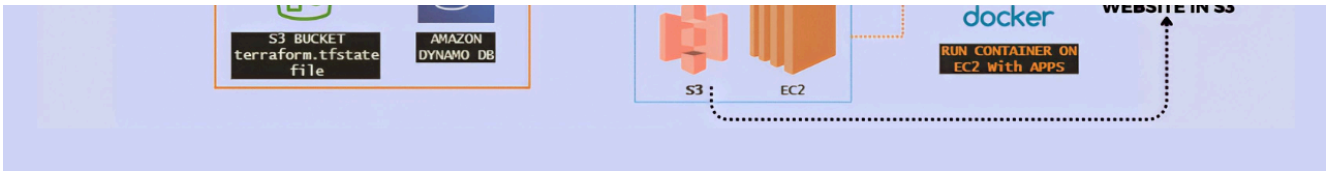
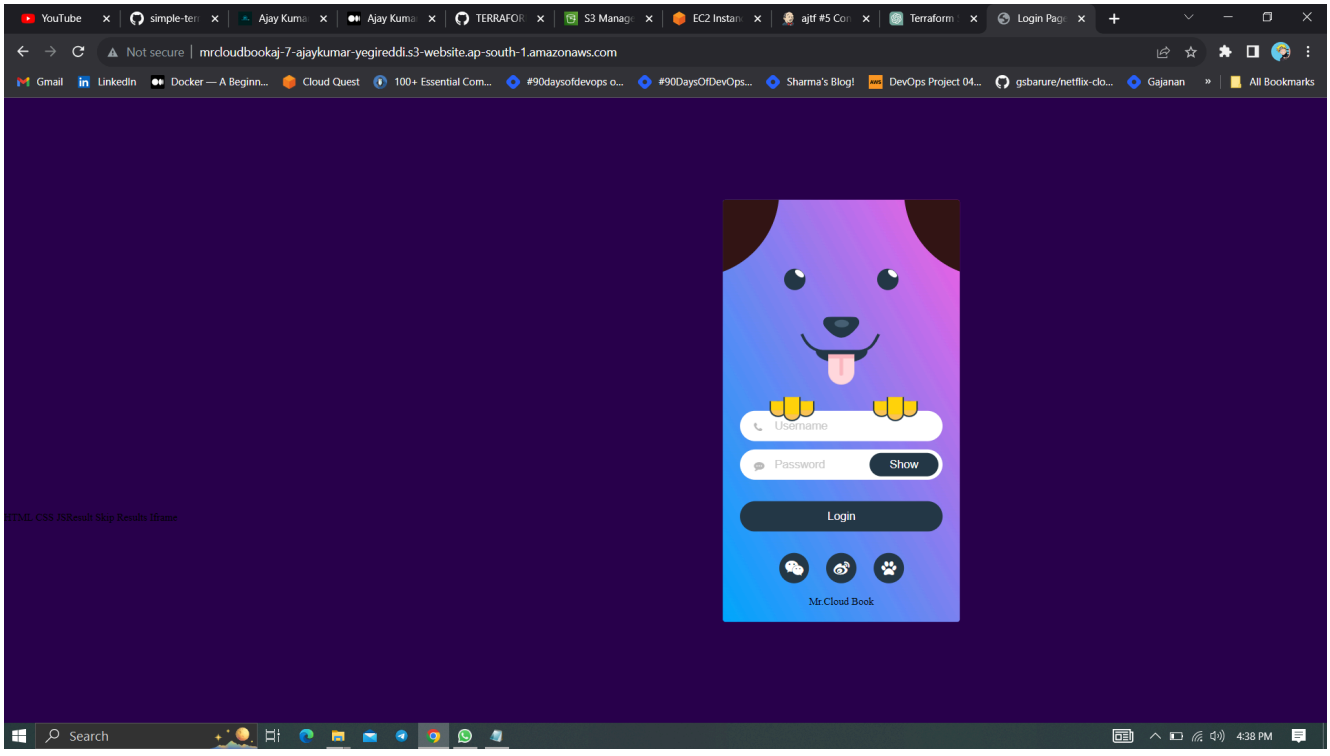


Contents [hide]

STATIC WEBSITE USING S3 FROM TERRAFORM



In today's fast-paced world of cloud computing, the ability to rapidly and efficiently provision infrastructure is a game-changer. This is where Infrastructure as Code (IaC) comes into play, allowing us to define and manage our infrastructure in a code-based manner. In this blog post, we will explore how to harness the power of IaC by using two essential tools: Terraform and Jenkins, in conjunction with Amazon Web Services (AWS).

Terraform is an open-source IaC tool that enables us to define, create, and manage our infrastructure using declarative configuration files. Jenkins, on the other hand, is a widely adopted automation server that helps streamline the software development and deployment process.

Our journey will encompass several key objectives:

1. **Setting up Terraform and Jenkins**: We'll start by ensuring you have all the prerequisites in place, including an AWS account, Terraform, Jenkins, and Docker. We'll walk you through the installation and configuration of these essential tools.

2. **Creating the Terraform Scripts**: We'll delve into the heart of IaC by crafting Terraform scripts to provision AWS resources. Along the way, we'll introduce the concept of user data, a powerful feature that allows us to automate tasks like launching containers within our instances.

3. **Running Two Application Containers with User Data**: To demonstrate the practical application of user data, we'll guide you through launching not just one but two application containers within your AWS instances. This step showcases the versatility and automation capabilities of IaC.

4. DevOps project we will be using Terraform and AWS Cloud to set up static website hosting fully automated in seconds. This Terraform project will help beginners understand the concept and working of Terraform with AWS and how you can create a one-click automated solution using Terraform in DevOps

5. **Setting up Infrastructure State Management**:

    - **S3 Bucket for Terraform State**: We'll create an AWS S3 bucket dedicated to securely storing your Terraform state files. This is essential for maintaining the state of your infrastructure in a central location.

    - **DynamoDB Table for Locking**: In addition to the S3 bucket, we'll set up an AWS DynamoDB table to enable locking capabilities. This ensures that your infrastructure remains in a consistent state when multiple users are working concurrently.

6. **Integrating Jenkins and Terraform**: To tie it all together, we'll demonstrate how to integrate Jenkins with Terraform. This integration will empower you to automate the provisioning process, enhance the efficiency of your infrastructure management, and ensure that your Terraform state is securely stored and locked when needed.

Prerequisites:

Before you embark on the journey of provisioning AWS resources using Terraform and Jenkins, it's crucial to ensure that you have all the necessary components and configurations in place. Here are the prerequisites you should have before starting this tutorial:

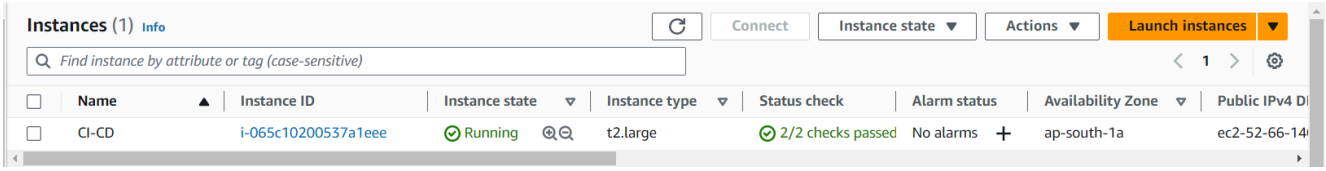
1. **AWS Account**: You must have an active AWS account with administrative privileges or the necessary permissions to create and manage AWS resources.
2. **S3 Bucket for Terraform State**:
    - **Purpose**: To securely store your Terraform state files remotely.
    - **Steps**:
        - Log in to your AWS Management Console.
        - Navigate to the S3 service.
        - Create an S3 bucket with a unique name in the desired AWS region.
        - Note down the bucket name as you'll use it in your Terraform scripts.
3. **DynamoDB Table for Locking Capability**:
    - **Purpose**: To enable locking for Terraform state management.
    - **Steps**:
        - Access the AWS Management Console.
        - Go to the DynamoDB service.
        - Create a DynamoDB table with a unique name and primary key.
        - Configure the table's read and write capacity settings as needed.
        - Note down the table name for reference.
4. **Jenkins Setup**:
    - Ensure that Jenkins is up and running in your environment.
    - Configure Jenkins with the necessary plugins for AWS and Terraform integration.

5. **Terraform Installation in Jenkins**:
    - Terraform should be installed on the Jenkins server to execute Terraform scripts as part of your CI/CD pipeline.
6. **Terraform Files in Source Code Management (SCM)**:
    - Your Terraform configuration files should already be available in your Source Code Management system (e.g., Git). Make sure you have the necessary access rights to the repository.
7. **IAM Role for Jenkins EC2 Instance**:
    - **Purpose**: To grant the Jenkins EC2 instance the necessary permissions to interact with AWS resources.
    - **Steps**:
        - Create an IAM role in AWS.
        - Attach the appropriate policy that grants permissions for AWS resource provisioning, DynamoDB access, S3 bucket operations, and any other required permissions.
        - Associate the IAM role with the Jenkins EC2 instance.
8. **GitHub Repository (Optional)**:
    - If you're using a public repository as an example, you can fork the repository and start making changes in your own forked repository. Ensure that you have the necessary access to the repository.

With these prerequisites in place, you'll be well-prepared to dive into the tutorial and learn how to leverage Terraform, Jenkins, AWS S3, and DynamoDB to automate the provisioning and state management of your AWS resources. These foundational components are key to a successful IaC implementation and CI/CD pipeline for infrastructure.

Launch an Ubuntu(22.04) T2 Large Instance

Launch an AWS T2 Large Instance. Use the image as Ubuntu. You can create a new key pair or use an existing one. Enable HTTP and HTTPS settings in the Security Group and open all ports (not best case to open all ports but just for learning purposes it's okay).



Install Jenkins, Docker and Trivy

To Install Jenkins

Connect to your console, and enter these commands to Install Jenkins

```
vi jenkins.sh
```

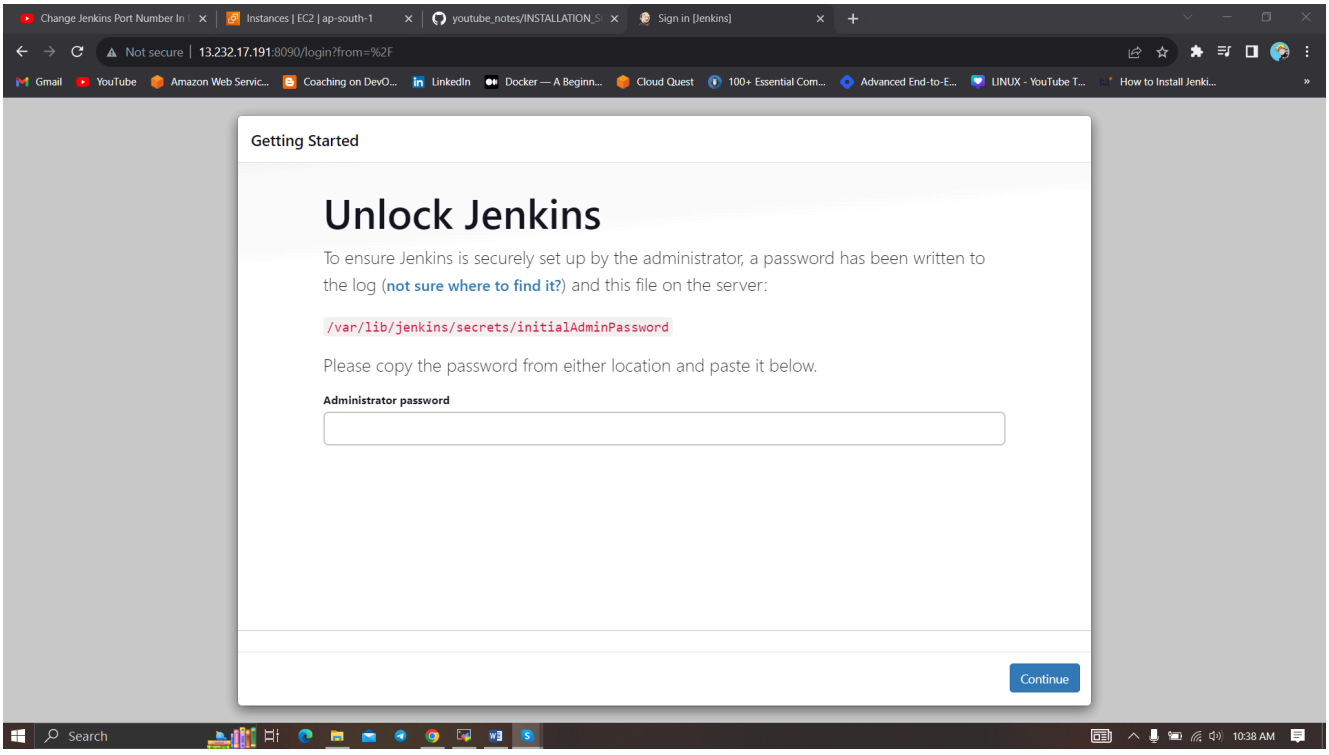
```
#!/bin/bash
sudo apt update -y
wget -O - https://packages.adoptium.net/artifactory/api/gpg/key/public
echo "deb [signed-by=/etc/apt/keyrings/adoptium.asc] https://packages.ad
sudo apt update -y
sudo apt install temurin-17-jdk -y
/usr/bin/java --version
curl -fsSL https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key | su
                  /usr/share/keyrings/jenkins-keyring.asc > /dev/null
echo deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] \
                  https://pkg.jenkins.io/debian-stable binary/ | sudo te
                              /etc/apt/sources.list.d/jenkins.list > /de
sudo apt-get update -y
sudo apt-get install jenkins -y
sudo systemctl start jenkins
sudo systemctl status jenkins
```

```
sudo chmod 777 jenkins.sh
./jenkins.sh    # this will installl jenkins
```

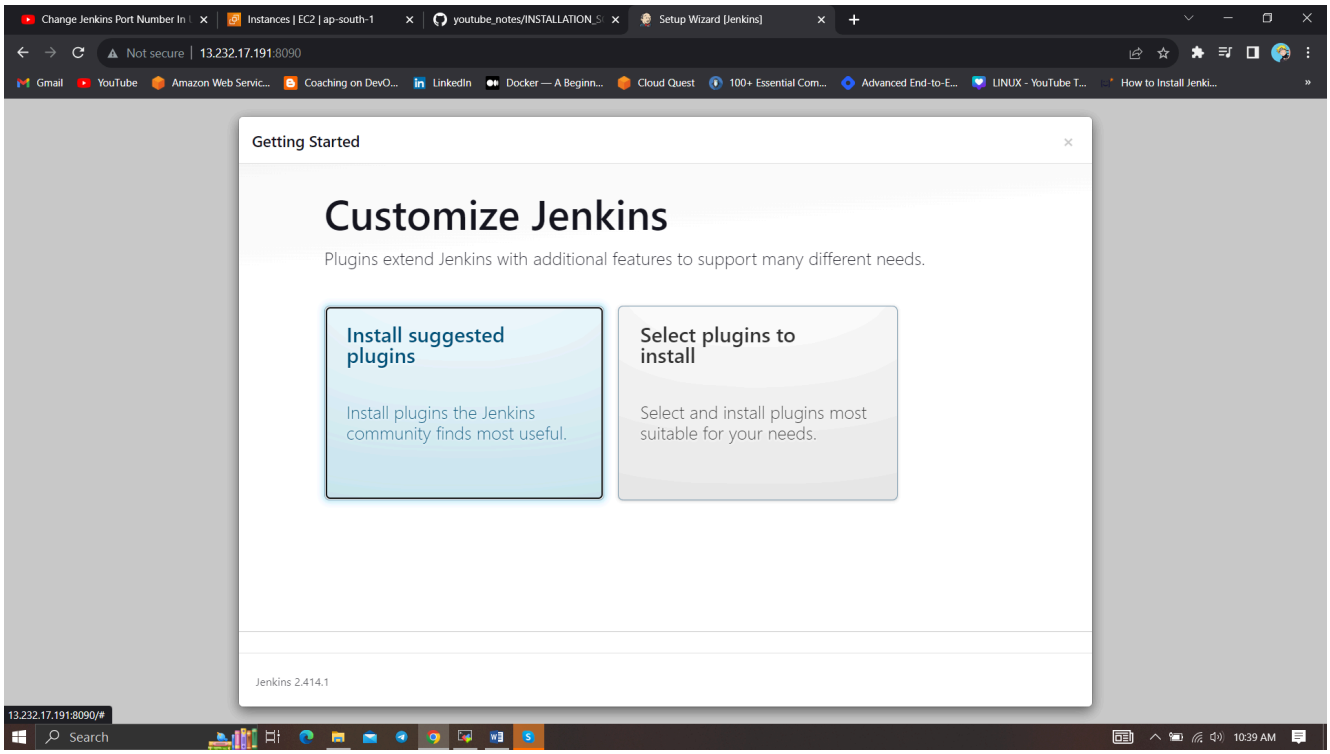
Once Jenkins is installed, you will need to go to your AWS EC2 Security Group and open Inbound Port 8080, since Jenkins works on Port 8080.

Now, grab your Public IP Address

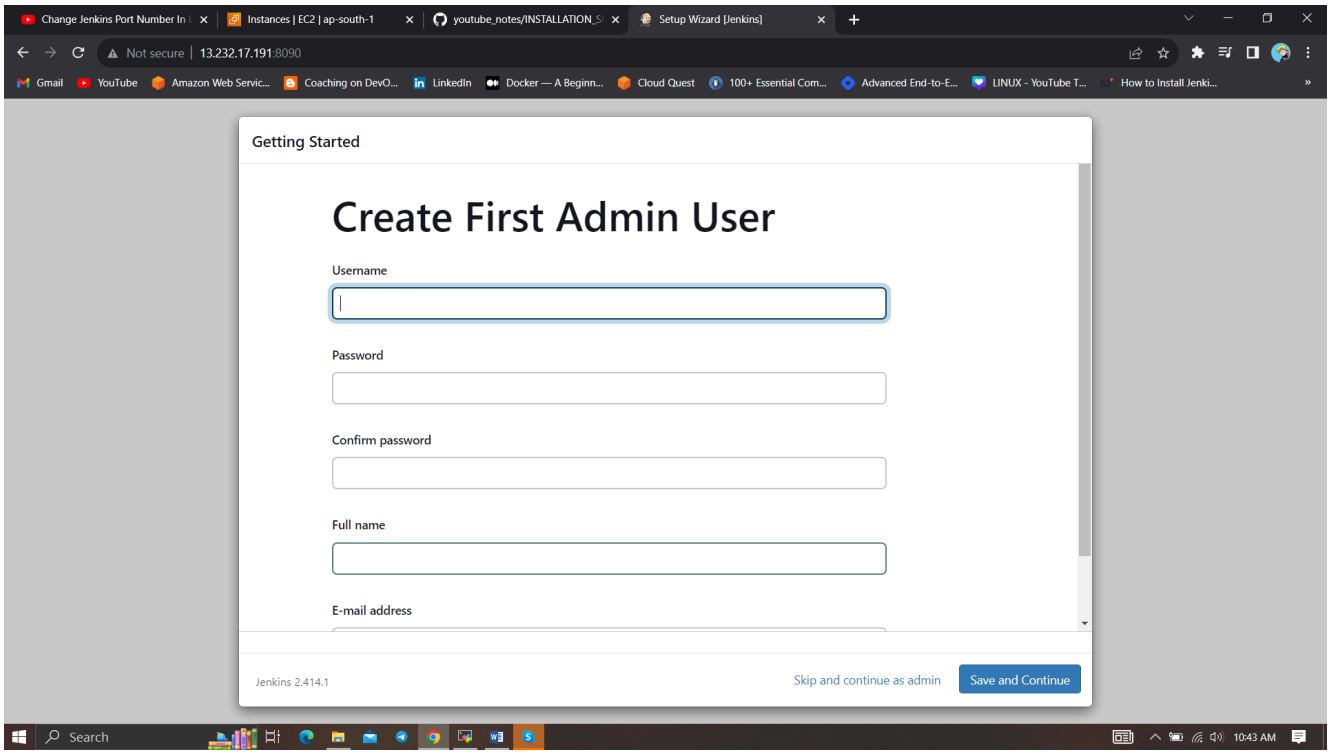
```
<EC2 Public IP Address:8080>
sudo cat /var/lib/jenkins/secrets/initialAdminPassword
```



Unlock Jenkins using an administrative password and install the suggested plugins.

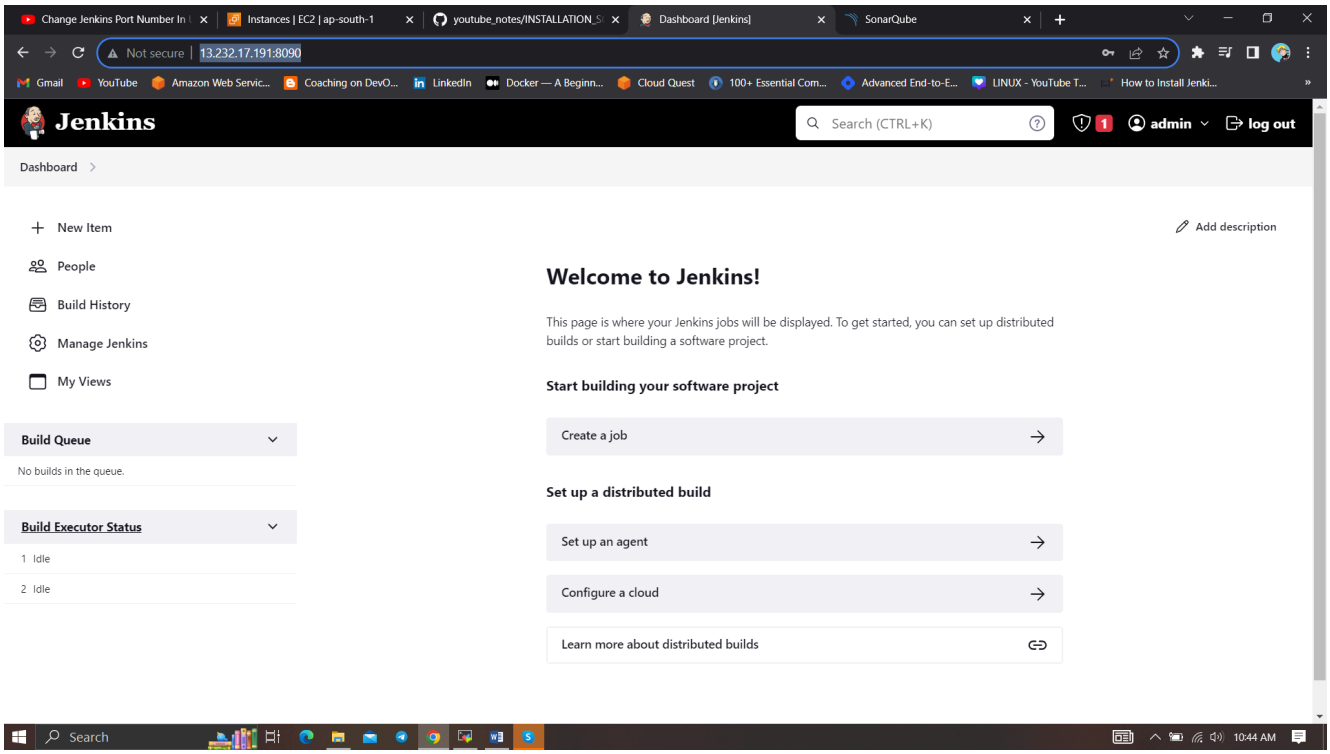


Jenkins will now get installed and install all the libraries.



Create a user click on save and continue.

Jenkins Getting Started Screen.



Install Docker

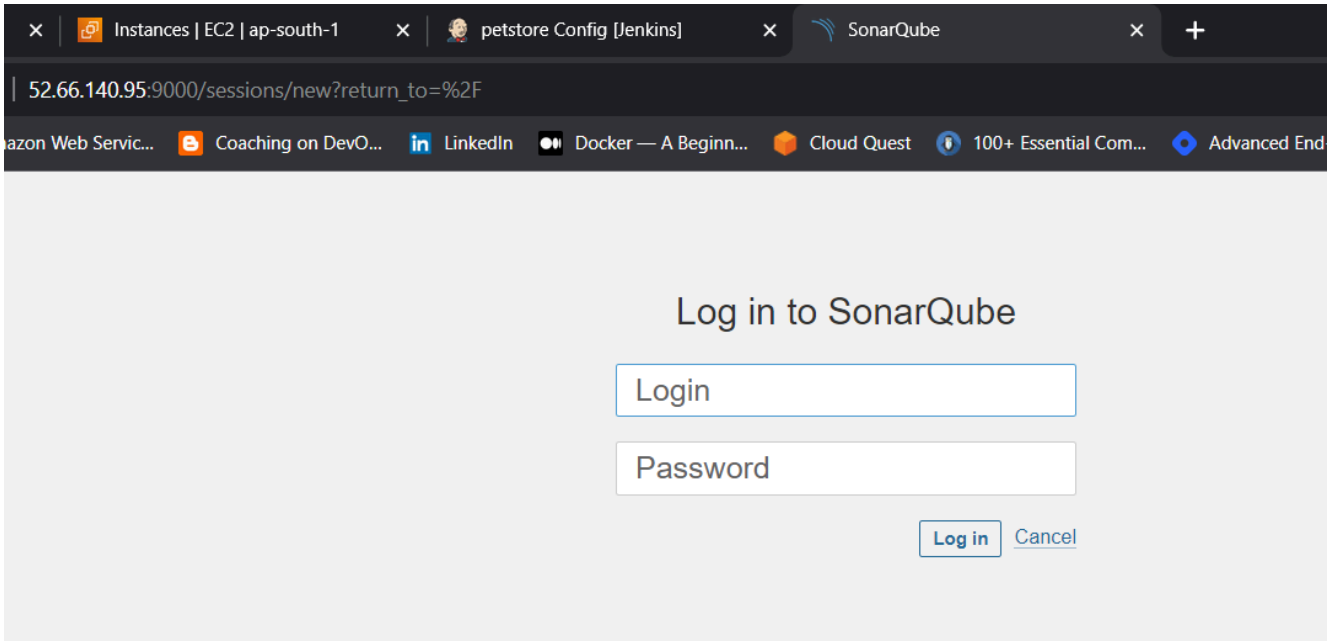
```
sudo apt-get update
sudo apt-get install docker.io -y
sudo usermod -aG docker $USER   #my case is ubuntu
newgrp docker
sudo chmod 777 /var/run/docker.sock
```

After the docker installation, we create a sonarqube container (Remember to add 9000 ports in the security group).

```
docker run -d --name sonar -p 9000:9000 sonarqube:lts-community
```

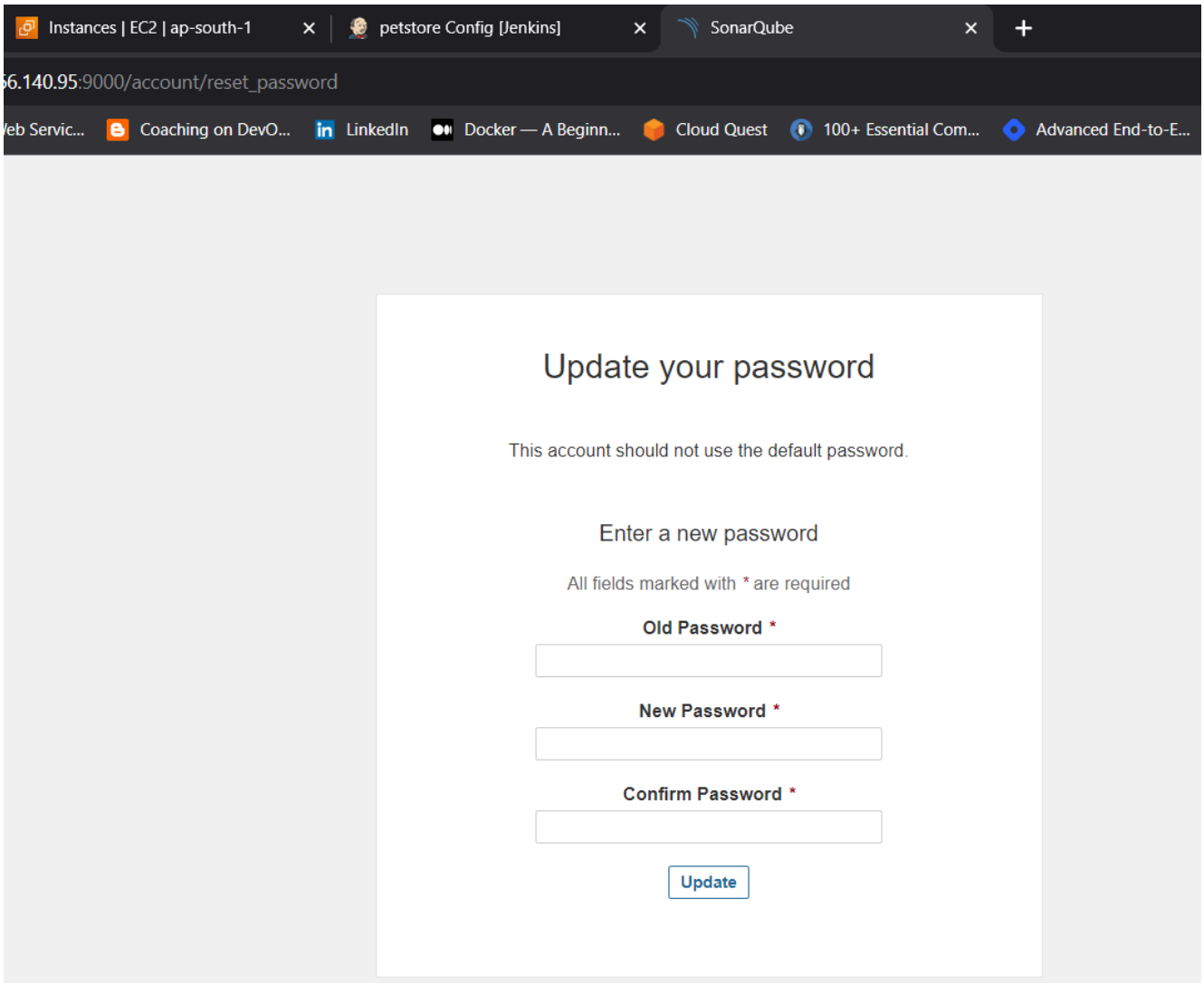
```
ubuntu@ip-172-31-42-253:~$ sudo chmod 777 /var/run/docker.sock
ubuntu@ip-172-31-42-253:~$ docker run -d --name sonar -p 9000:9000 sonarqube:lts-community
Unable to find image 'sonarqube:lts-community' locally
lts-community: Pulling from library/sonarqube
44ba2882f8eb: Pull complete
2cabec57fa36: Pull complete
c20481384b6a: Pull complete
bf7b17ee74f8: Pull complete
38617faac714: Pull complete
706f20f58f5e: Pull complete
65a29568c257: Pull complete
Digest: sha256:1a118f8ab960d6c3d4ea8b4455a5a6560654511c88a6816f1603f764d5dcc77c
Status: Downloaded newer image for sonarqube:lts-community
4b60c96bf9ad3d62289436af7f752fdb04993092d0ca3065e2f2e32301b50139
ubuntu@ip-172-31-42-253:~$ docker ps
CONTAINER ID   IMAGE                    COMMAND                  CREATED         STATUS         PORTS                                       NAMES
4b60c96bf9ad   sonarqube:lts-community   "/opt/sonarqube/dock…"   9 seconds ago   Up 5 seconds   0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   sonar
ubuntu@ip-172-31-42-253:~$
```

Now our sonarqube is up and running

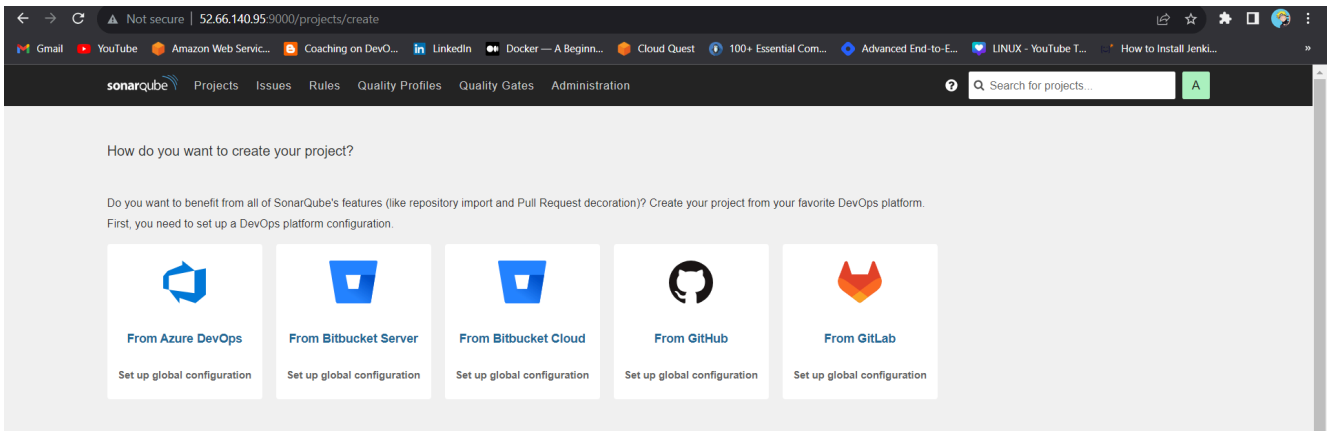


Enter username and password, click on login and change password

```
username admin
password admin
```



Update New password, This is Sonar Dashboard.



2C – Install Trivy

```
vi trivy.sh
```

```
sudo apt-get install wget apt-transport-https gnupg lsb-release -y
wget -qO - https://aquasecurity.github.io/trivy-repo/deb/public.key | gp
echo "deb [signed-by=/usr/share/keyrings/trivy.gpg] https://aquasecurity
sudo apt-get update
sudo apt-get install trivy -y
```

Next, we will log in to Jenkins and start to configure our Pipeline in Jenkins

Install Plugins like JDK, Sonarqube Scanner,Terraform

Install Plugin

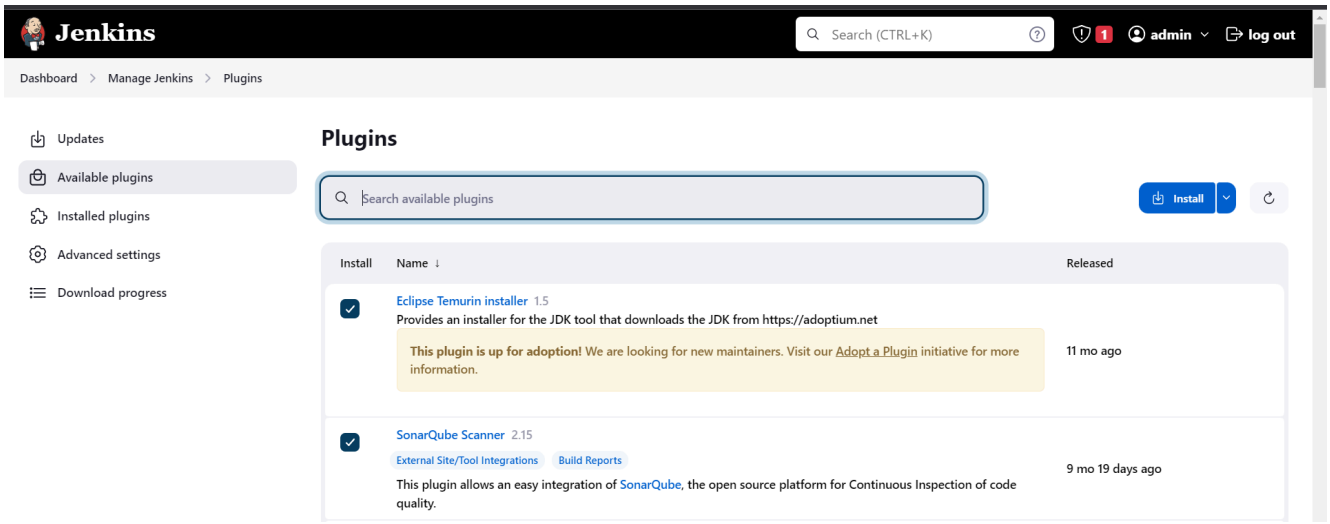
Goto Manage Jenkins →Plugins → Available Plugins →

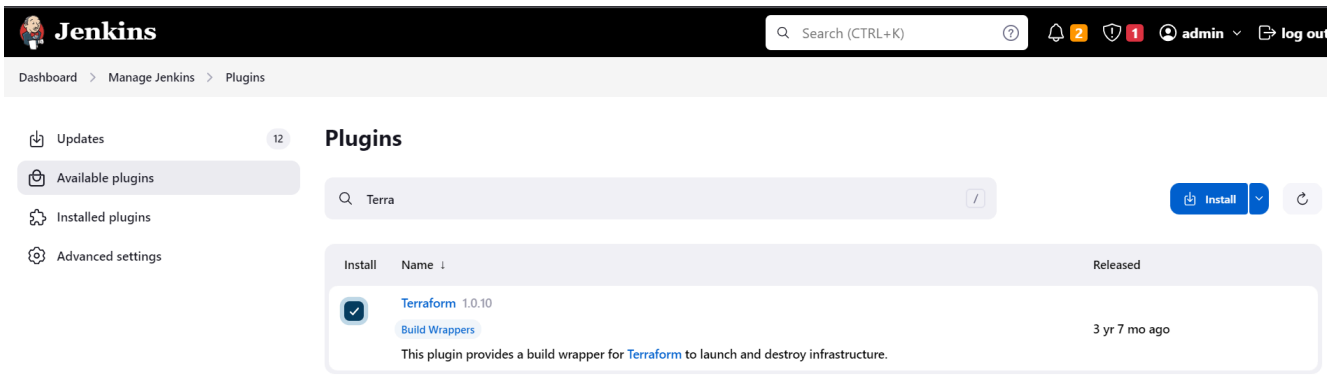
Install below plugins

1 → Eclipse Temurin Installer (Install without restart)

2 → SonarQube Scanner (Install without restart)

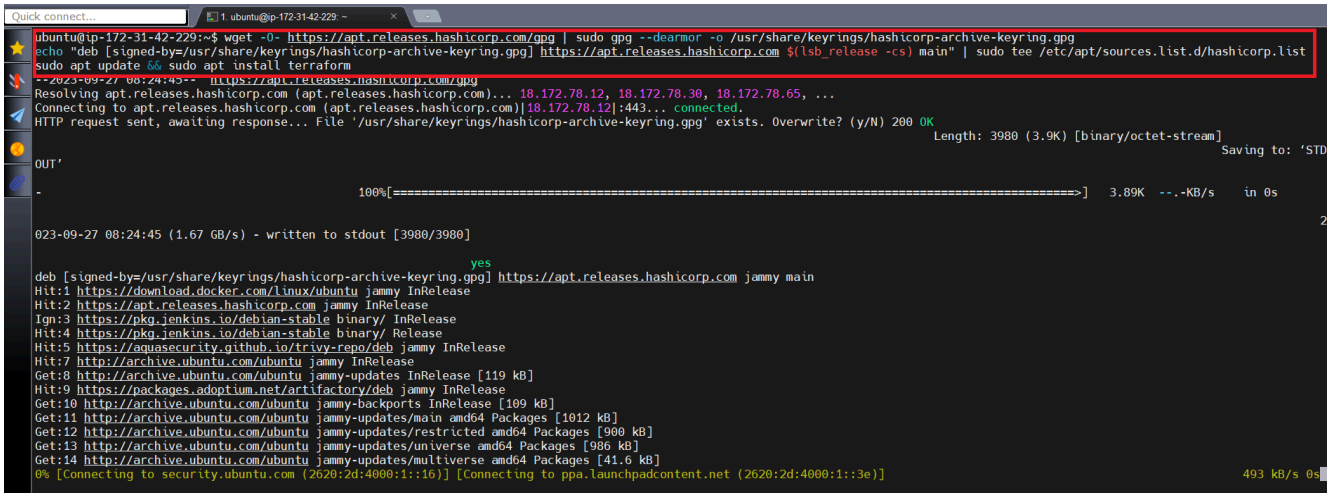
3 → Terraform





let's install Terraform on our Jenkins machine

```
wget -O- https://apt.releases.hashicorp.com/gpg | sudo gpg --dearmor -o
echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg]
sudo apt update && sudo apt install terraform
```

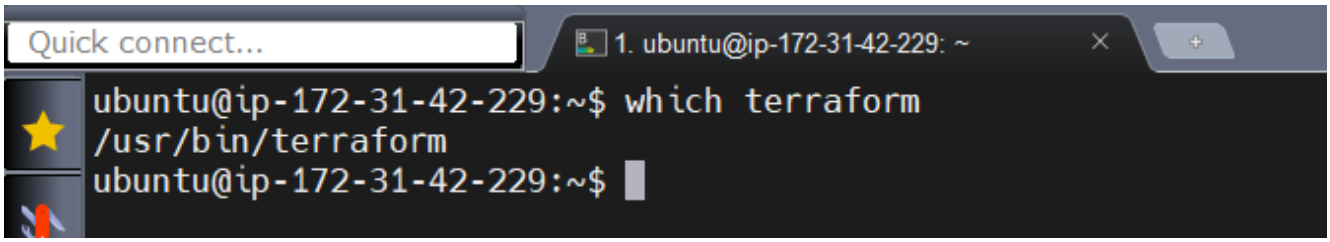


check terraform version

```
terraform --version
```

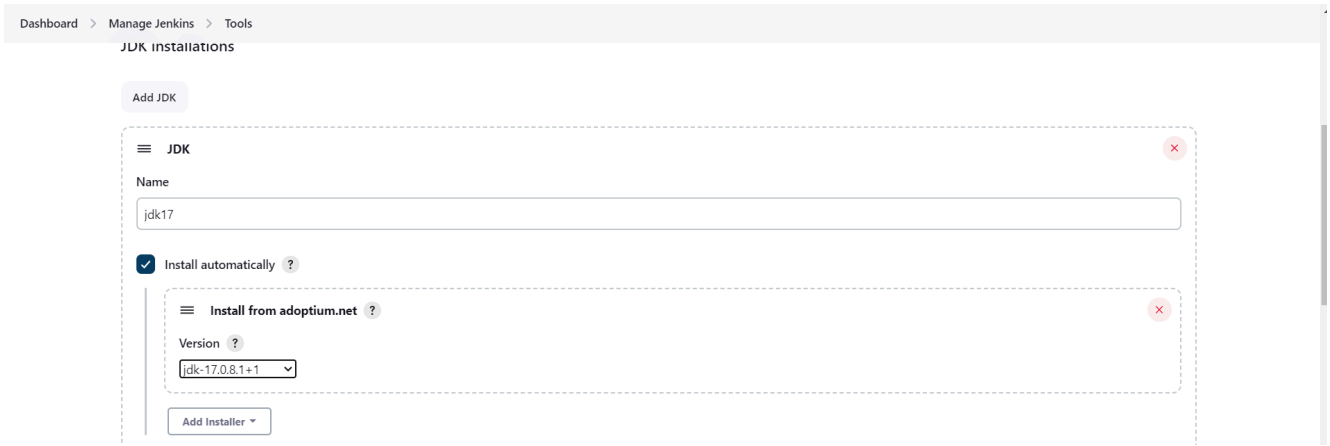
let's find the path to our terraform (we will use it in the tools section of Terraform)

```
which terraform
```

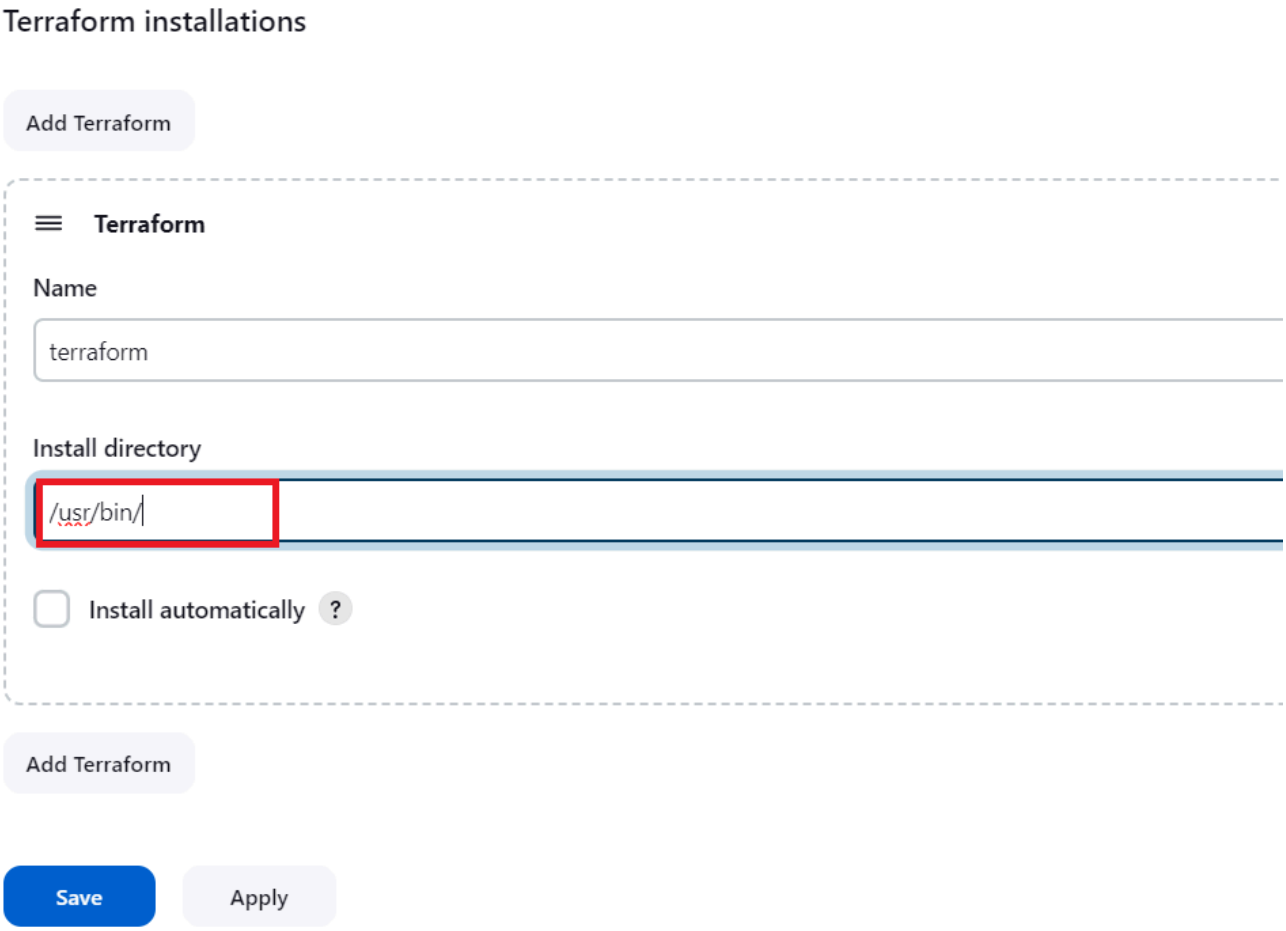


Configure Java and Terraform in Global Tool Configuration

Goto Manage Jenkins → Tools → Install JDK(17) → Click on Apply and Save



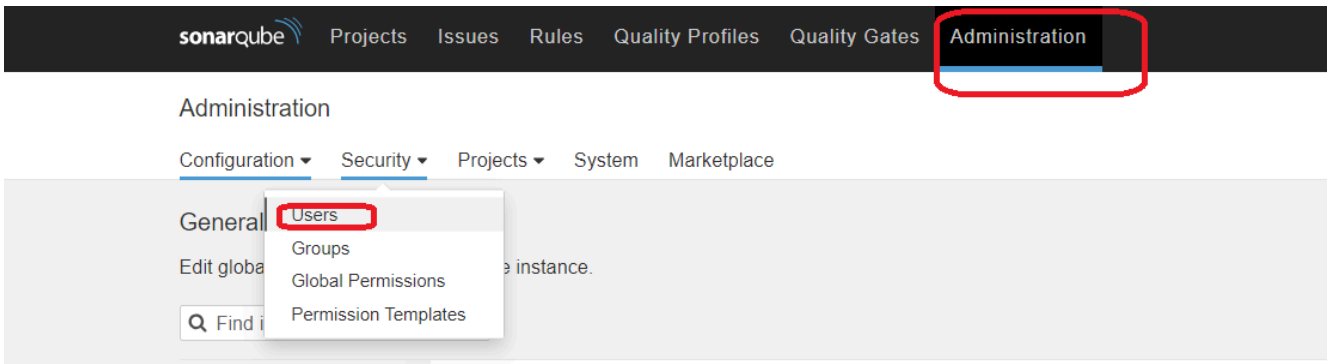
Tools –> Terraform



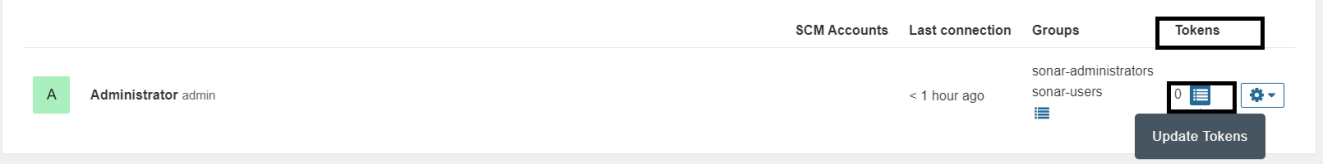
Apply and save.

Configure Sonar Server in Manage Jenkins

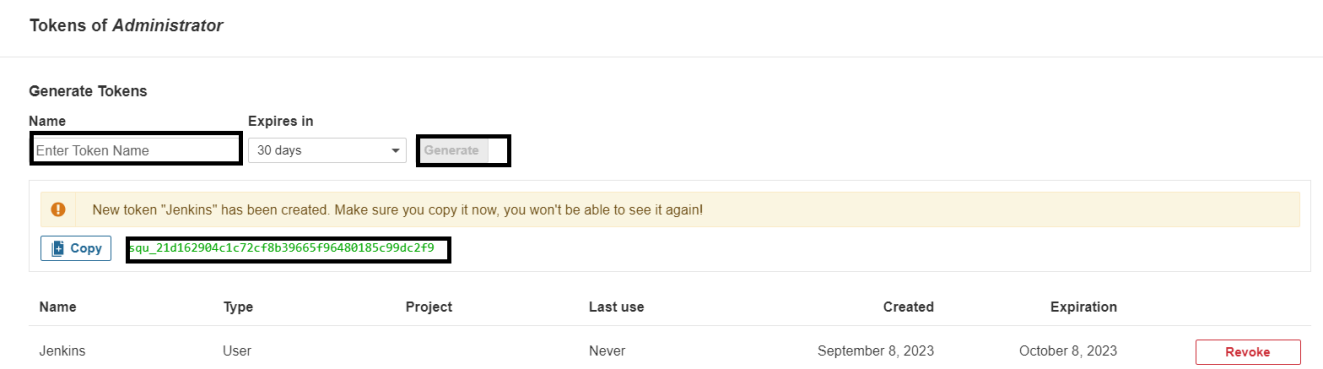
Grab the Public IP Address of your EC2 Instance, Sonarqube works on Port 9000, so <Public IP>:9000. Goto your Sonarqube Server. Click on Administration → Security → Users → Click on Tokens and Update Token → Give it a name → and click on Generate Token



click on update Token

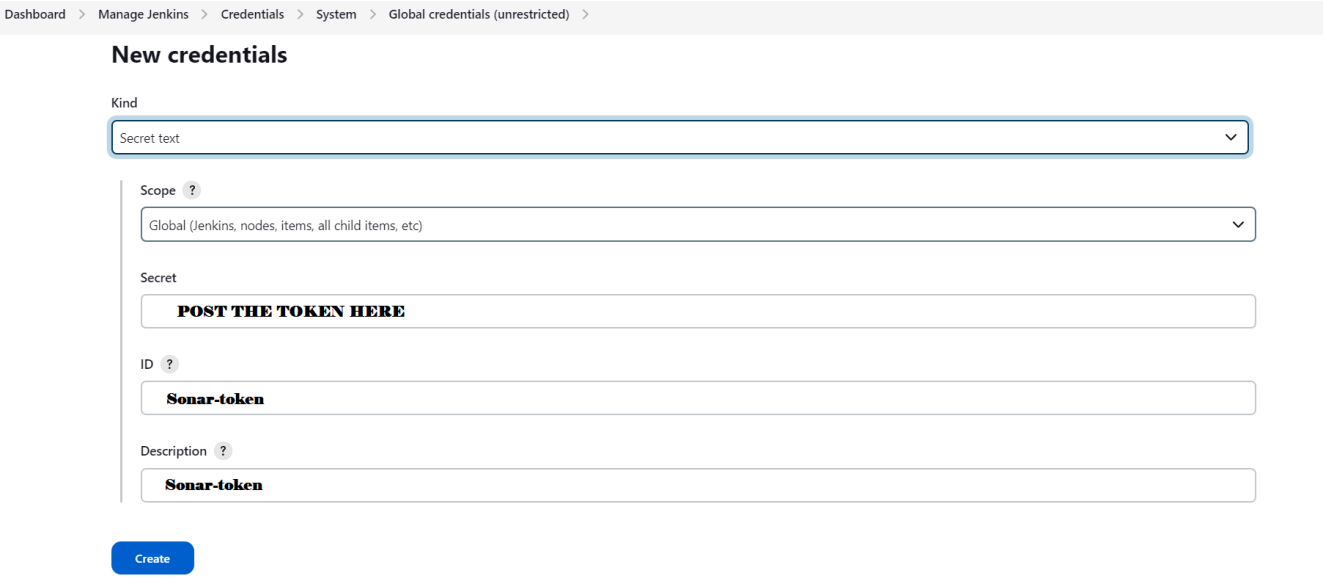


Create a token with a name and generate

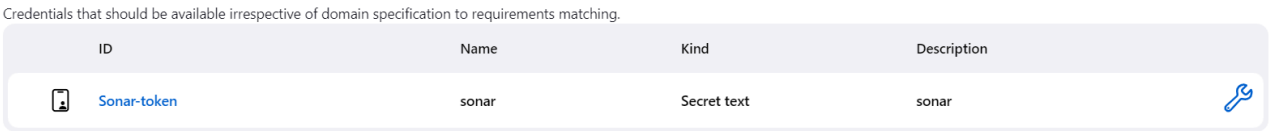


copy Token

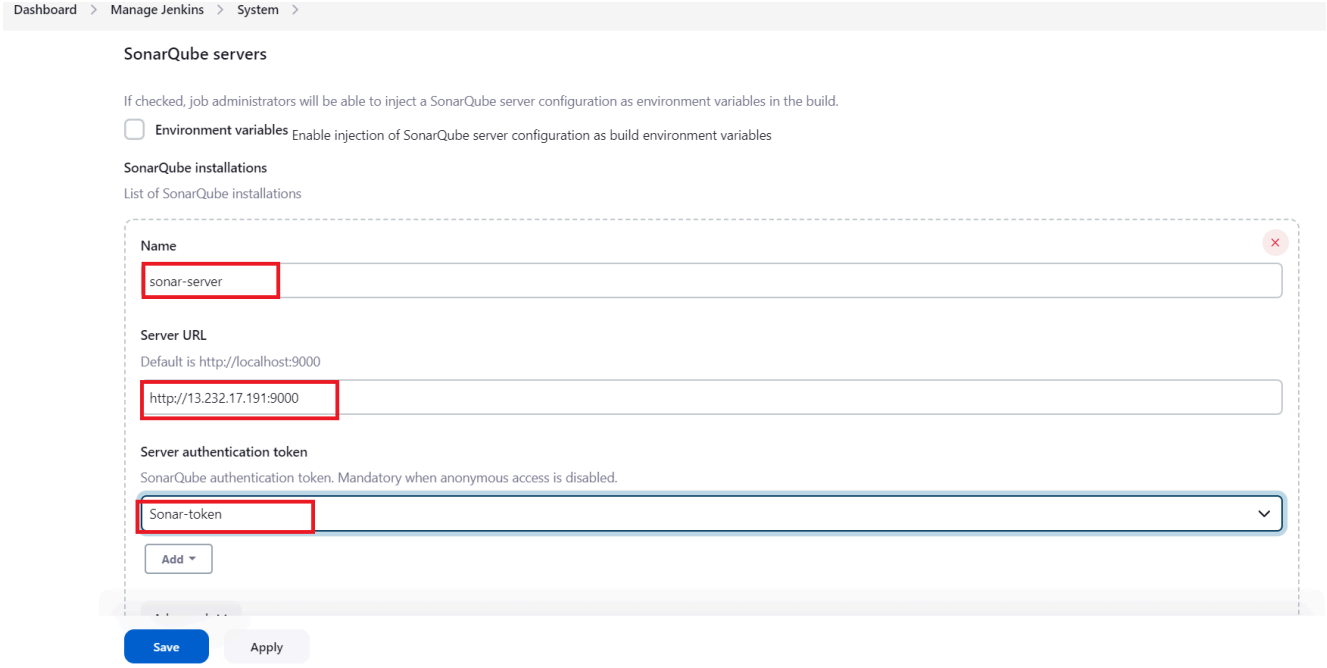
Goto Jenkins Dashboard → Manage Jenkins → Credentials → Add Secret Text. It should look like this



You will this page once you click on create



Now, go to Dashboard → Manage Jenkins → System and Add like the below image.

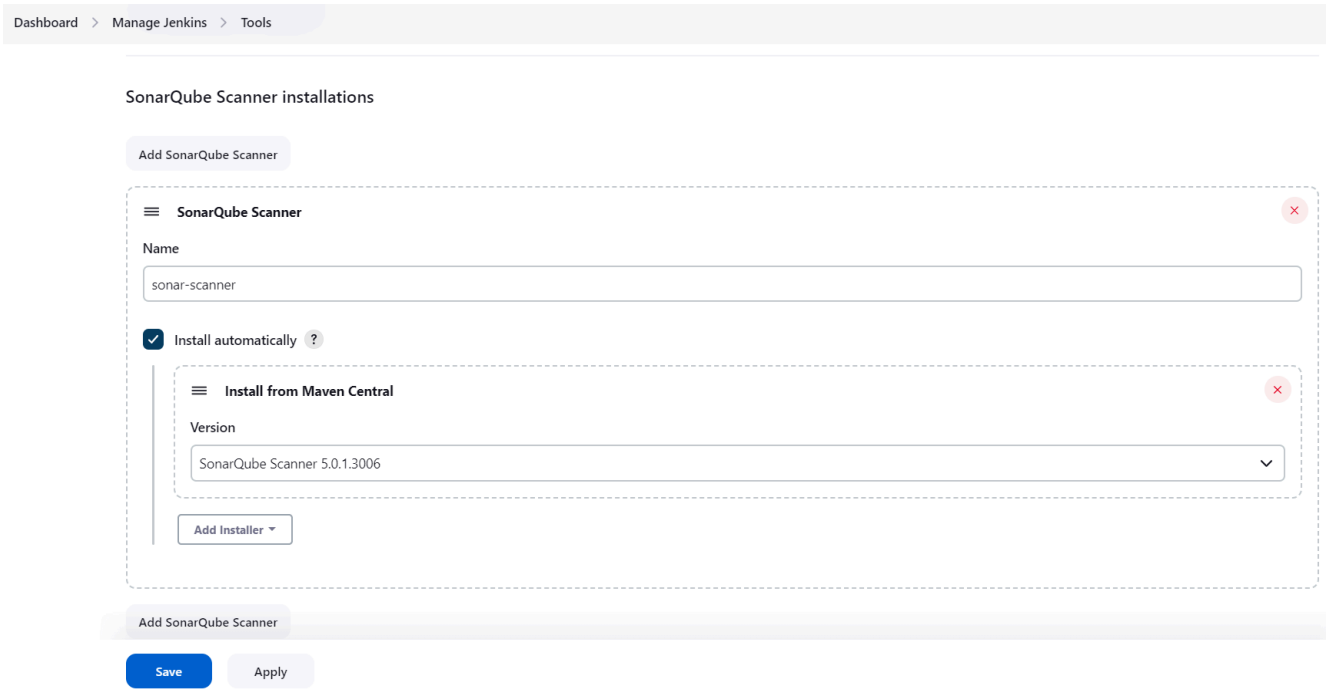


Click on Apply and Save

The Configure System option is used in Jenkins to configure different server

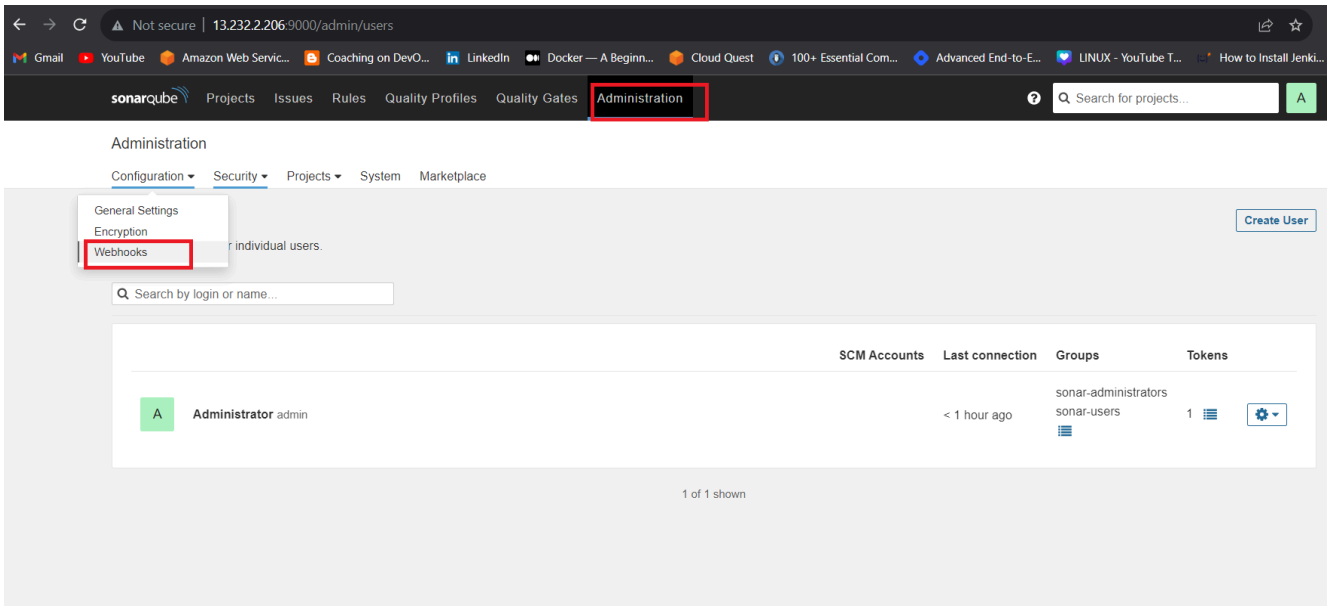
Global Tool Configuration is used to configure different tools that we install using Plugins

We will install a sonar scanner in the tools.

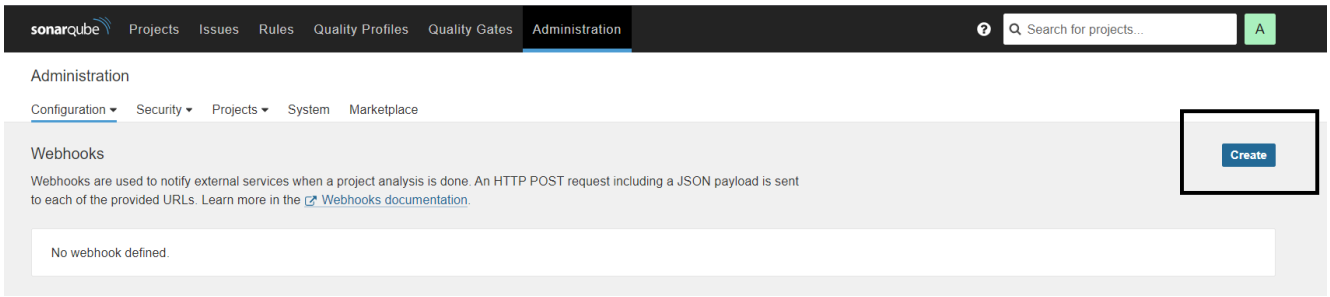


In the Sonarqube Dashboard add a quality gate also

Administration–> Configuration–>Webhooks

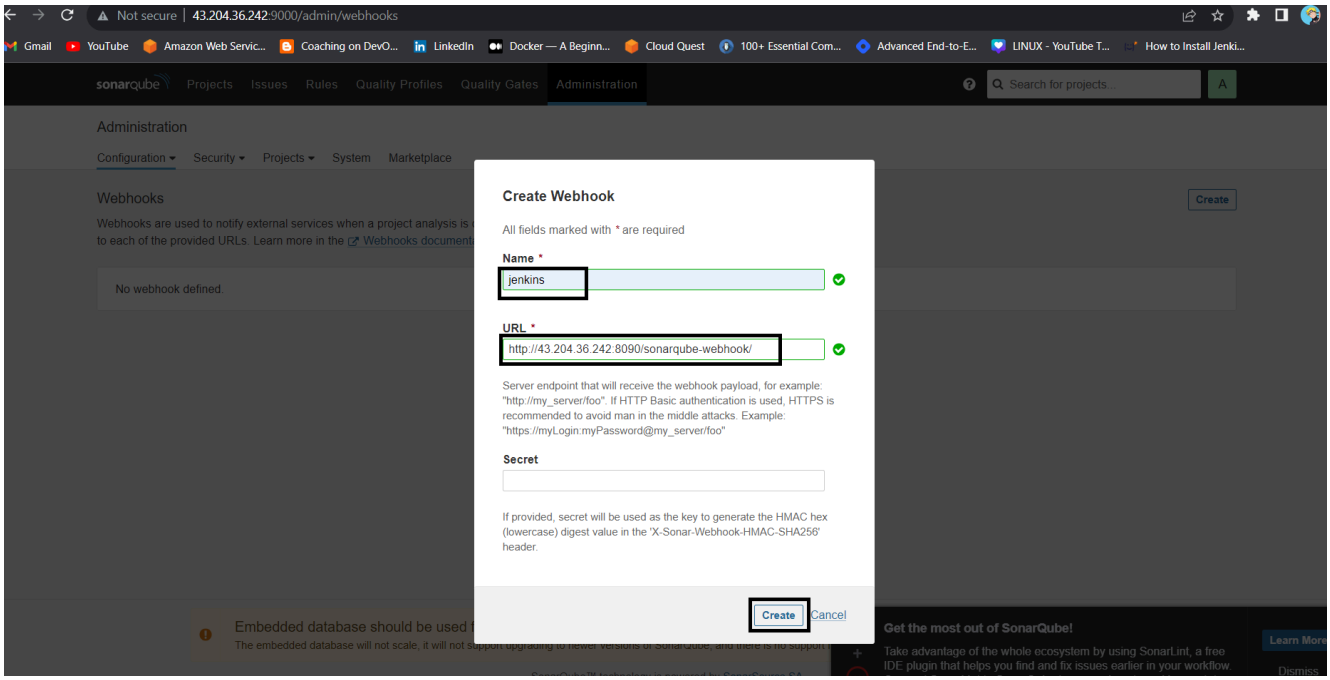


Click on Create



Add details

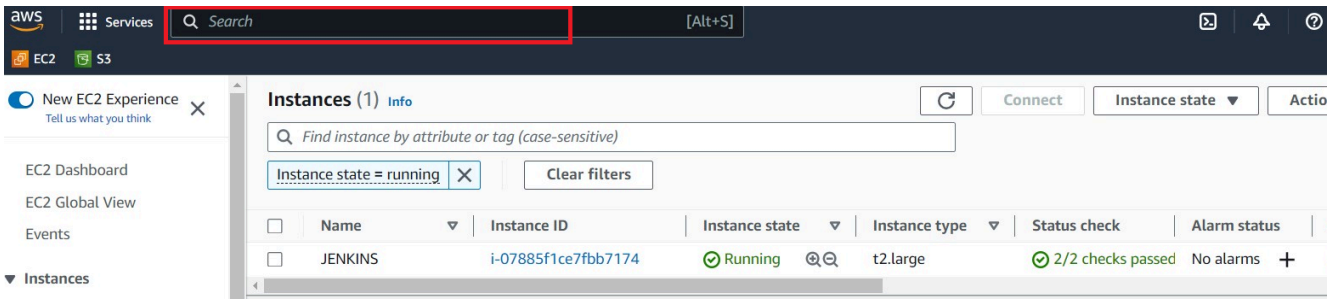
```
#in url section of quality gate
<http://jenkins-public-ip:8080>/sonarqube-webhook/
```



Create an IAM, S3 bucket and Dynamo DB table.

Navigate to **AWS CONSOLE**

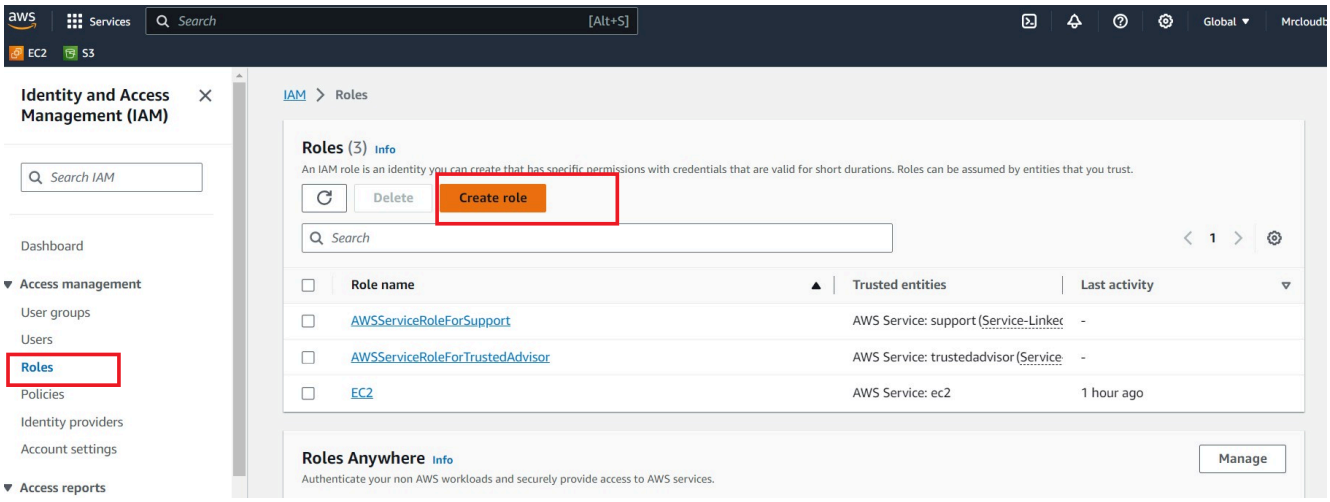
Click the “Search” field.



Type “IAM **enter**“

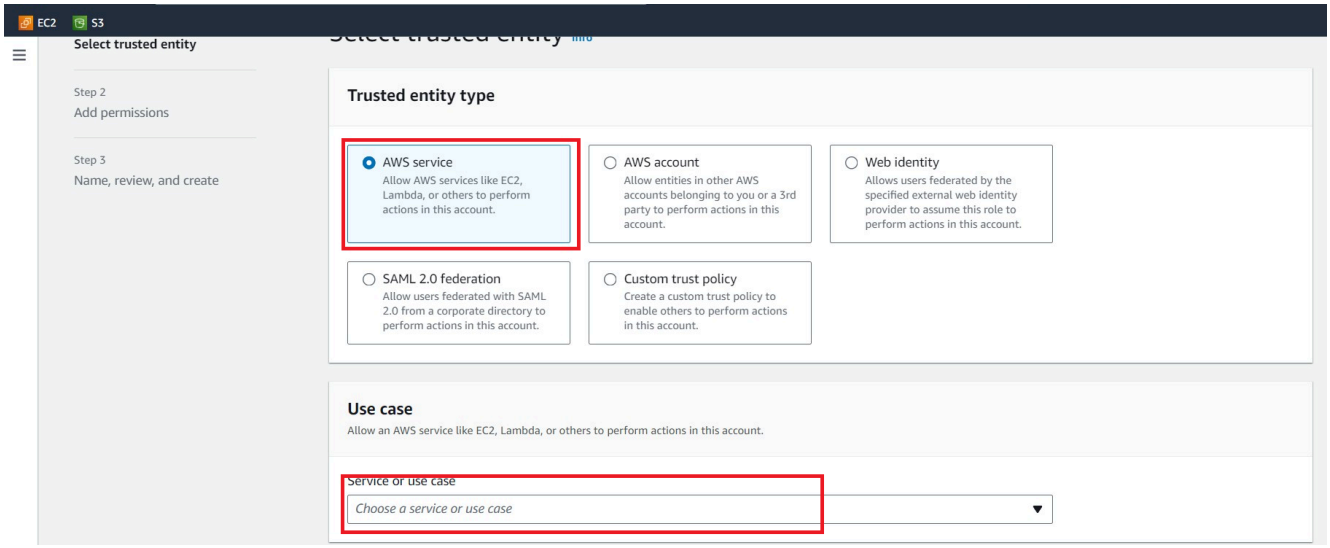
Click “Roles”

Click “Create role”



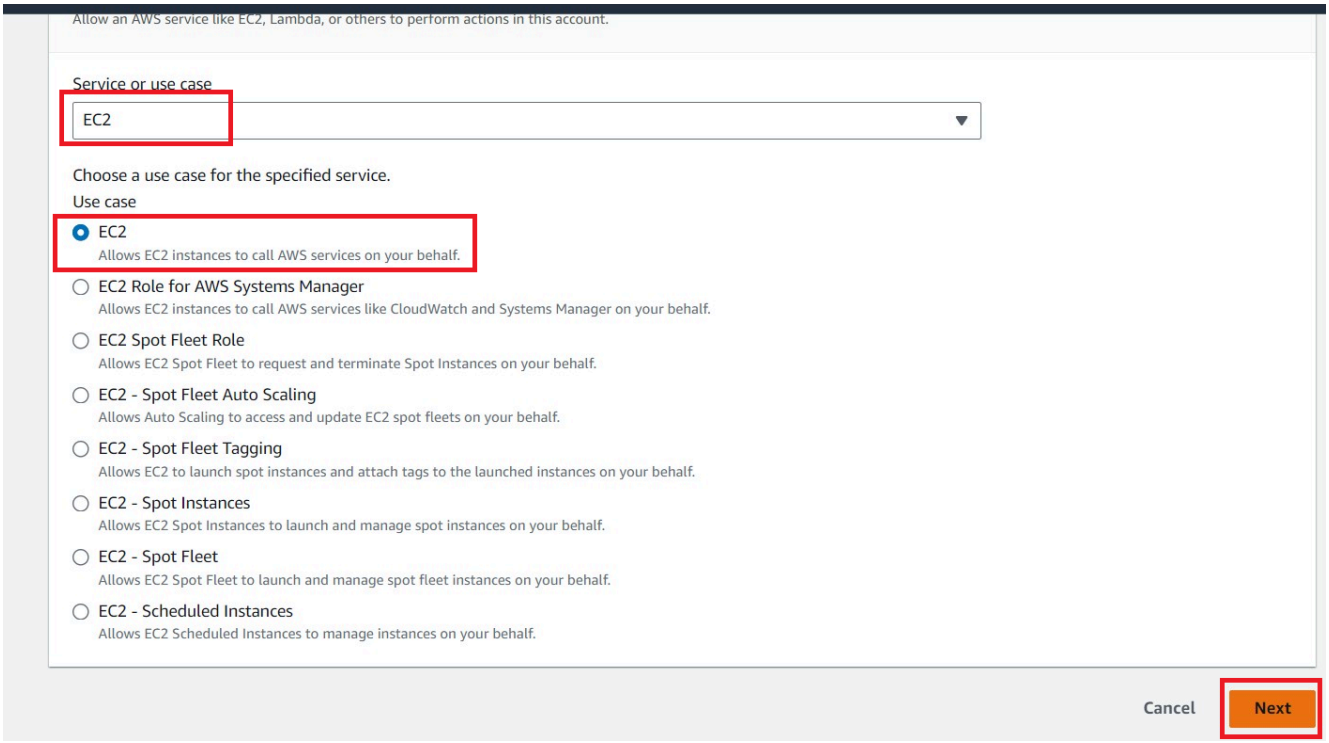
Click “AWS service”

Click “Choose a service or use case”



Click “EC2”

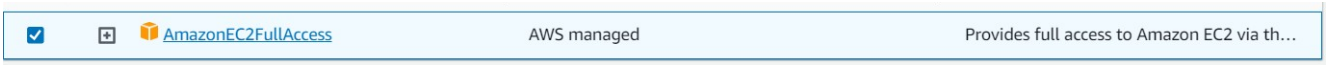
Click “Next”



Click the “Search” field.

Add permissions policies

AmazonEC2FullAccess



Click the “Search” field.

AmazonS3FullAccess

Search

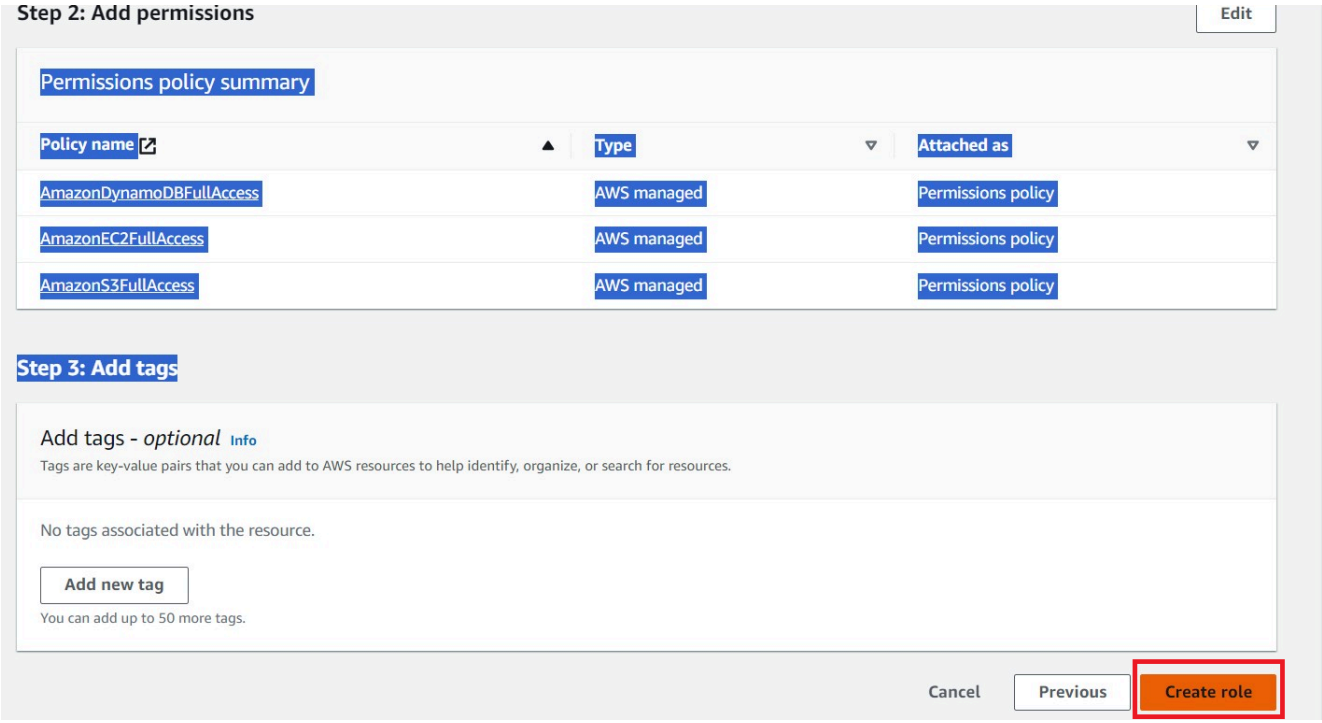
AmazonDynamoDBFullAccess

click Next

Click the “Role name” field.

Type “Jenkins-cicd”

Click “Create role”

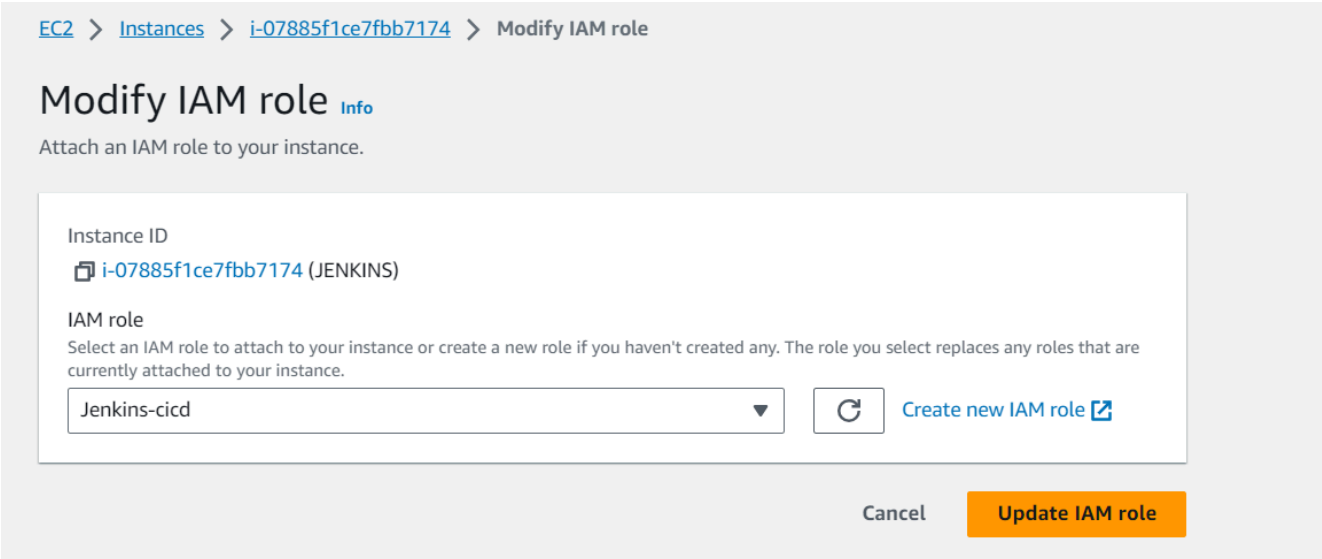


Click “EC2”

go to the Jenkins instance and add this role to the Ec2 instance.

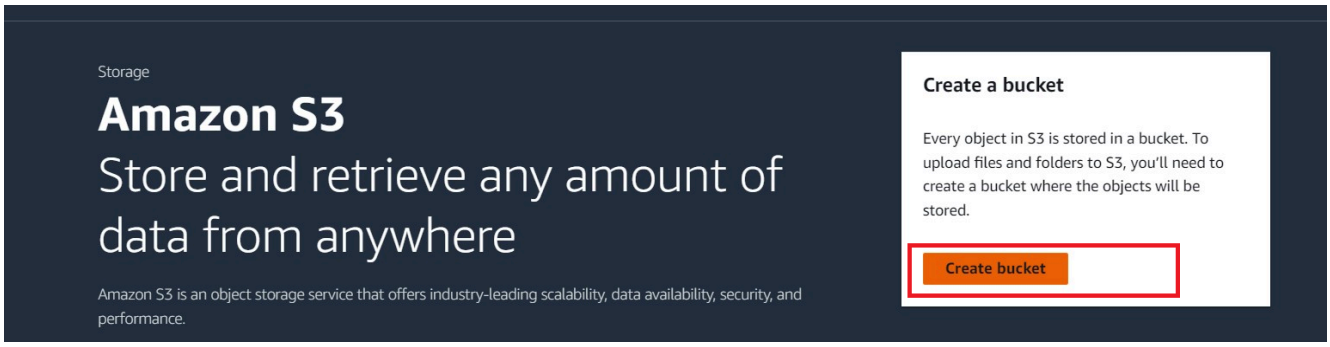
select Jenkins instance –> Actions –> Security –> Modify IAM role

Add a newly created Role and click on Update IAM role.

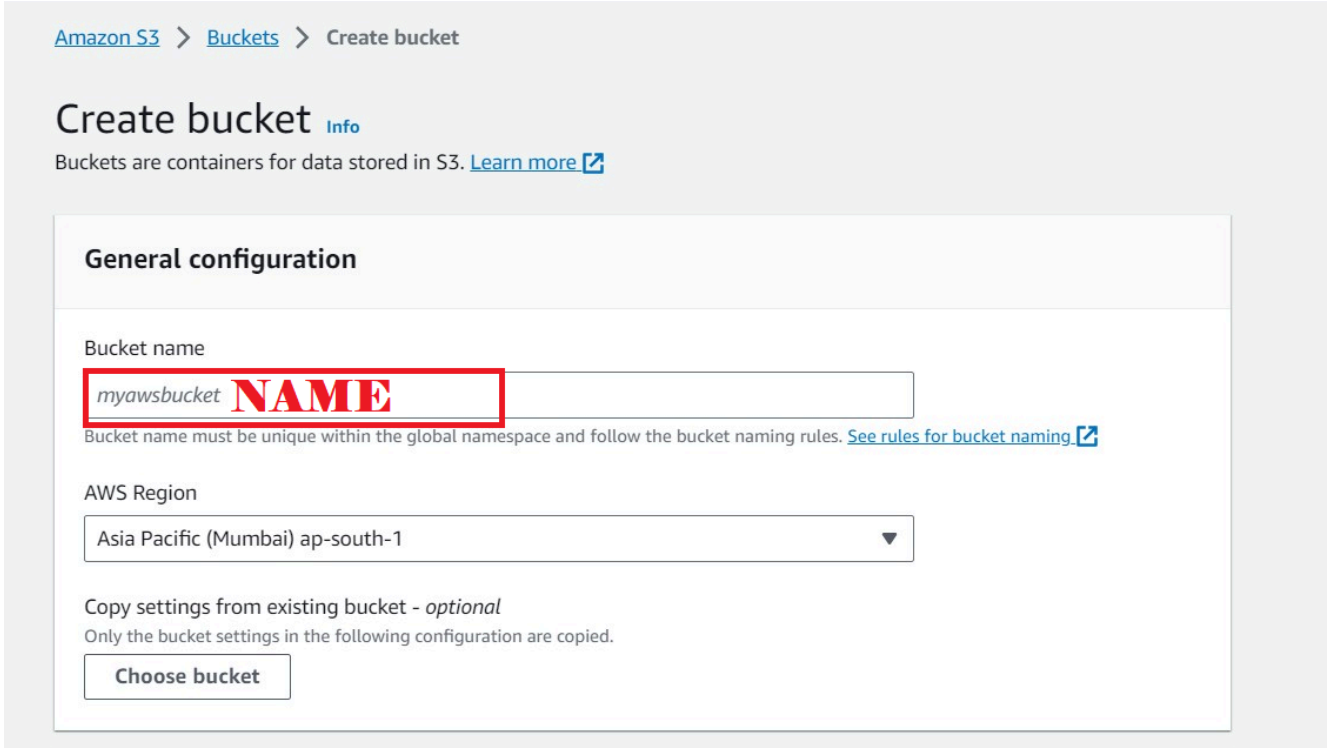


Search for S3 in console

Click “Create bucket”

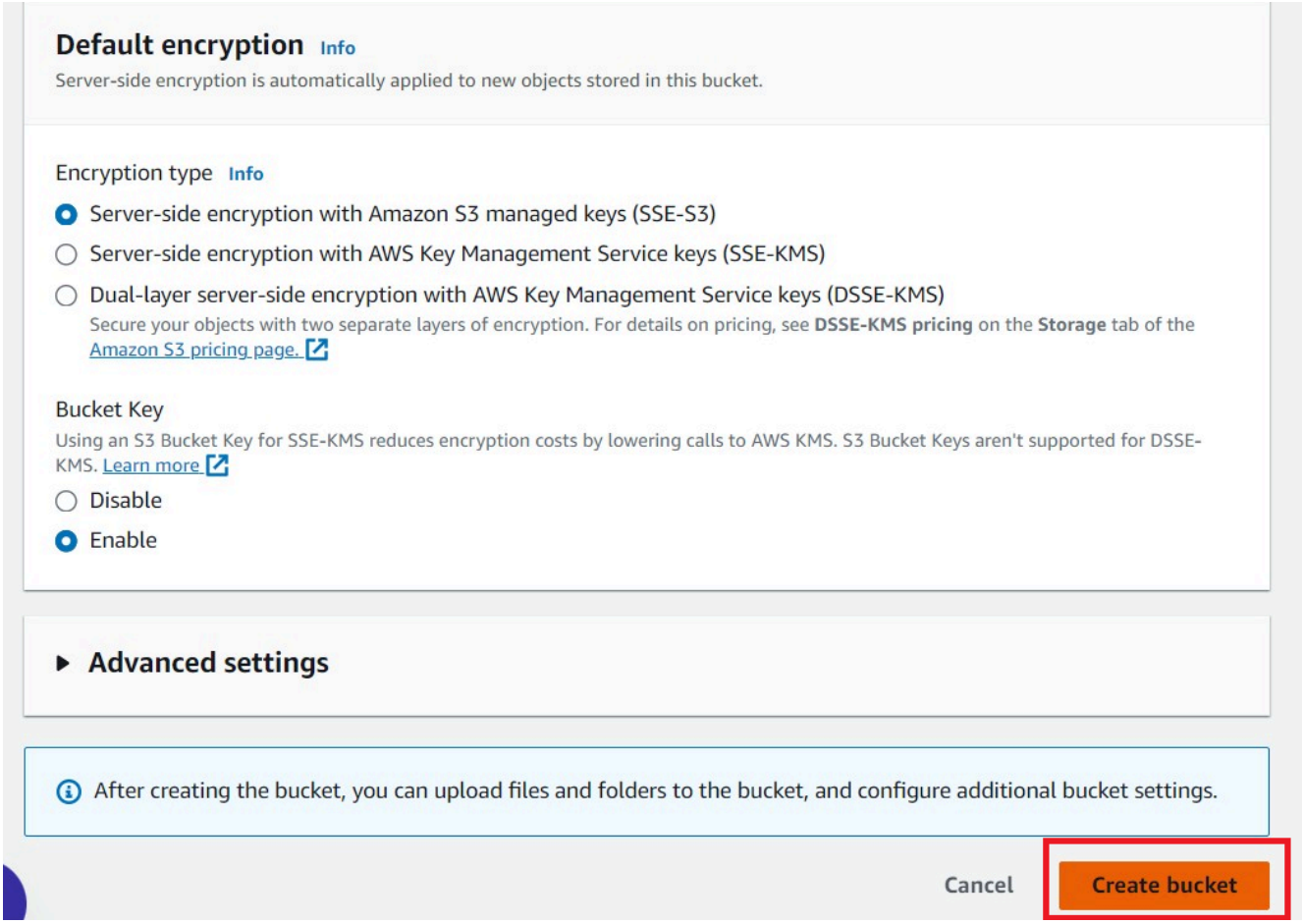


Click the “Bucket name” field.

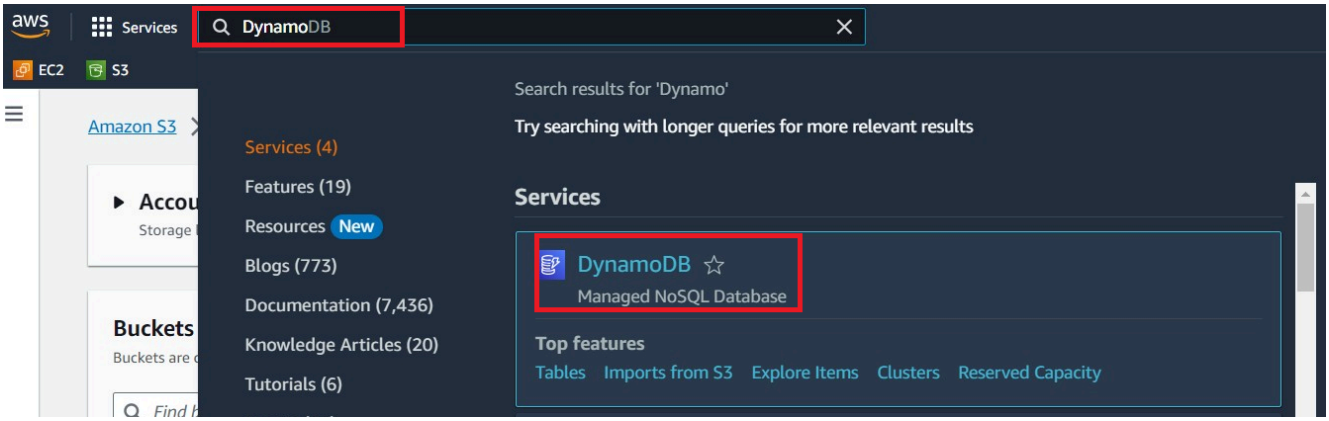


Nothing to change, keep the remaining default.

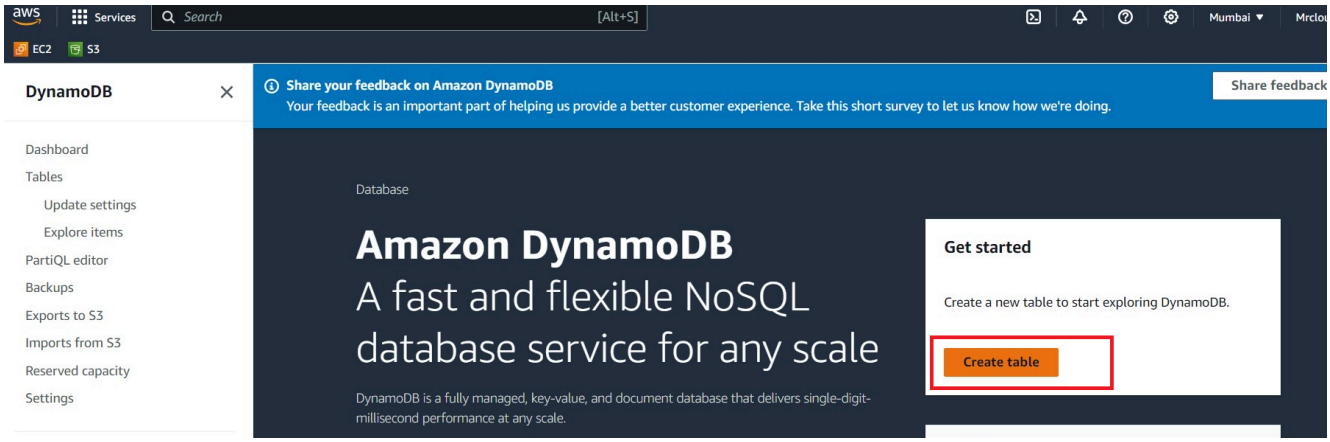
Click “Create bucket”, Bucket will be created.



Click the “Search” field. Search for DynamoDB and click on it.



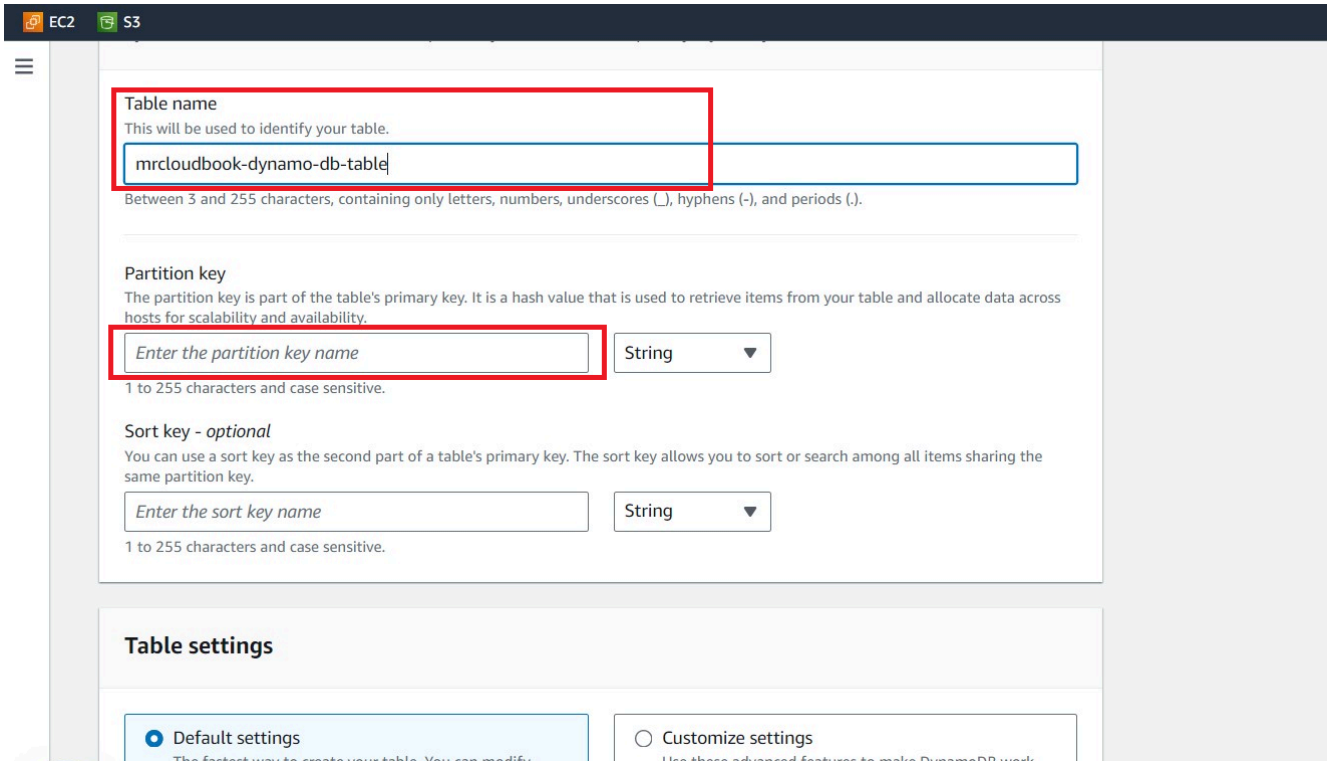
Click “Create table”



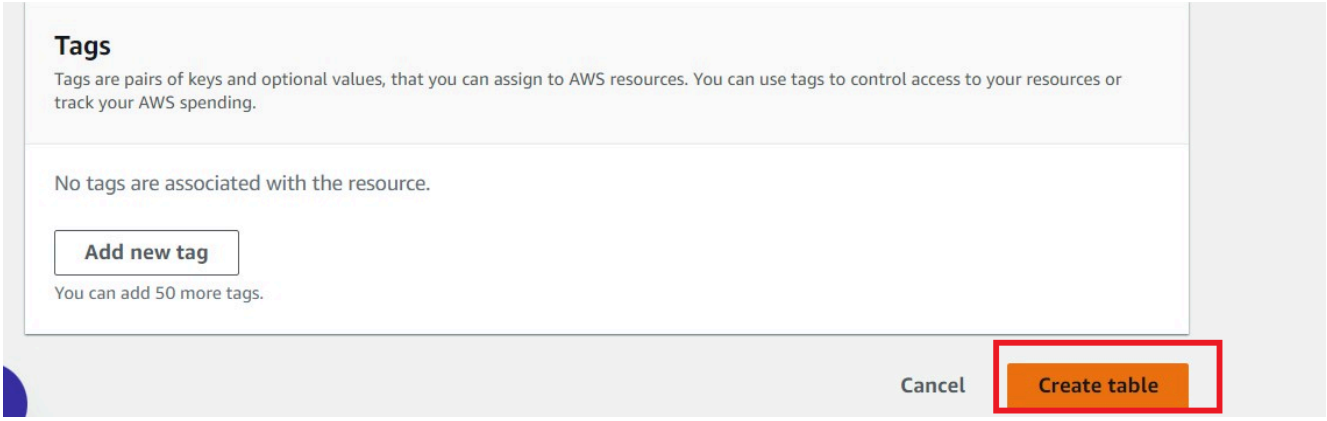
Click the “Table name” field. enter “dynamodb_table = “mrcloudbook-dynamo-db-table””

Click the “Enter the partition key name” field.

Type “LockID”



Click “Create table”



Docker Plugin setup

We need to install the Docker tool in our system, Goto Dashboard → Manage Plugins → Available plugins → Search for Docker and install these plugins

```
Docker
```

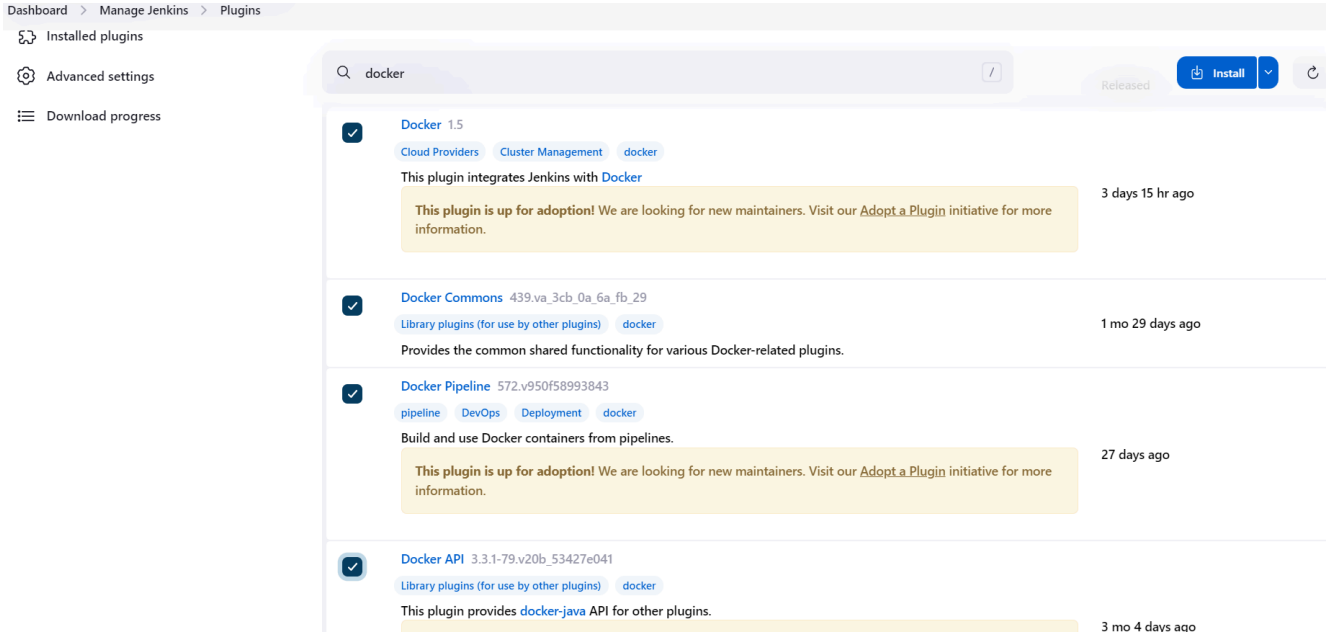
```
Docker Commons
```

```
Docker Pipeline
```

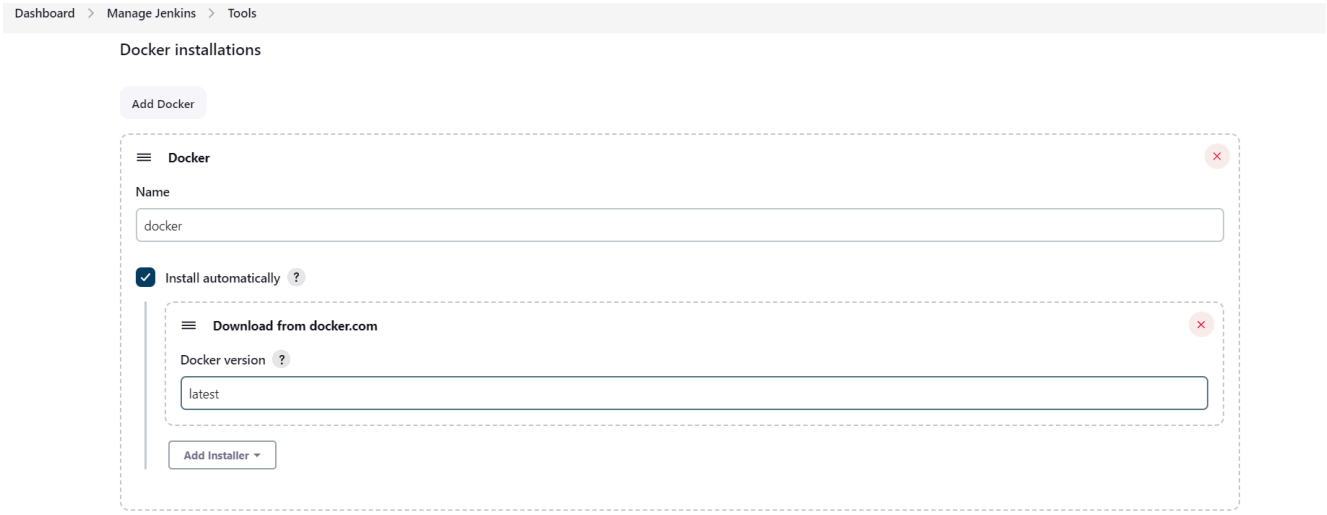
```
Docker API
```

```
docker-build-step
```

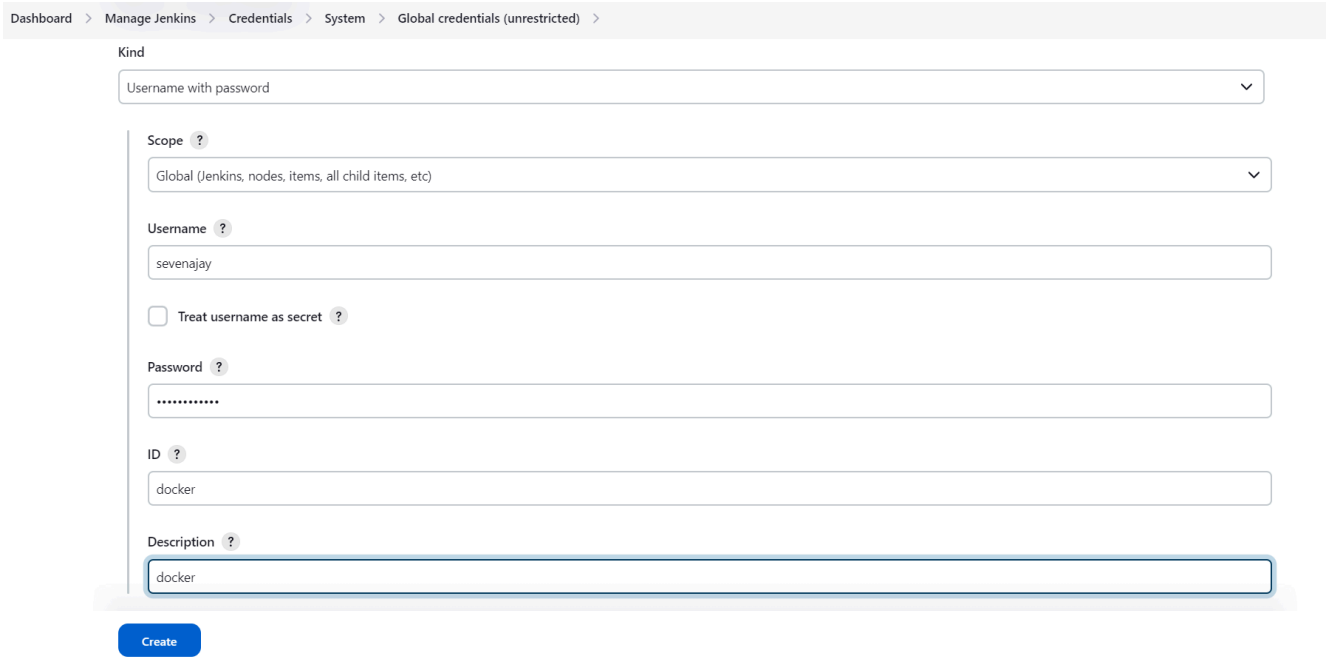
and click on install without restart



Now, goto Dashboard → Manage Jenkins → Tools →



Add DockerHub Username and Password under Global Credentials



Let's check the Terraform code Now.

Backend.tf

```
terraform {
  backend "s3" {
    bucket         = "ajay-mrcloudbook777"   #change name
    key            = "my-terraform-environment/main"
    region         = "ap-south-1"
```

```
    dynamodb_table = "mrcloudbook-dynamo-db-table"
  }
}
```

provider.tf

```
terraform {
  required_providers {
    aws = {
      source  = "hashicorp/aws"
      version = "~> 4.16"
    }
  }
  required_version = ">= 1.2.0"
}
provider "aws" {
  region = var.aws_region
}
```

main.tf

```
resource "aws_instance" "Ajay" {
  ami                    = var.ami_id
  instance_type          = var.instance_type
  key_name               = var.key_name
  vpc_security_group_ids = [aws_security_group.ec2_security_group.id]
  user_data              = base64encode(file("website.sh"))
  tags = {
    Name = "Aj-EC2"
  }
}
resource "aws_security_group" "ec2_security_group" {
  name        = "ec2 security group"
  description = "allow access on ports 80 and 22 and 443"
```

```
  ingress {
    description      = "ssh access"
    from_port        = 22
    to_port          = 22
    protocol         = "tcp"
    cidr_blocks      = ["0.0.0.0/0"]
    ipv6_cidr_blocks = ["::/0"]
  }
  ingress {
    from_port   = 0
    to_port     = 0    # Allow all ports
    protocol    = "-1" # All protocols
    cidr_blocks = ["0.0.0.0/0"]
  }
  ingress {
    description      = "https"
    from_port        = 443
    to_port          = 443
    protocol         = "tcp"
    cidr_blocks      = ["0.0.0.0/0"]
    ipv6_cidr_blocks = ["::/0"]
  }
  ingress {
    description      = "http"
    from_port        = 80
    to_port          = 80
    protocol         = "tcp"
    cidr_blocks      = ["0.0.0.0/0"]
    ipv6_cidr_blocks = ["::/0"]
  }
  egress {
    from_port        = 0
    to_port          = 0
    protocol         = "-1"
    cidr_blocks      = ["0.0.0.0/0"]
    ipv6_cidr_blocks = ["::/0"]
  }
  tags = {
    Name = "Aj_sg"
  }
}
```

s3.tf

```
#create s3 bucket
resource "aws_s3_bucket" "mybucket" {
  bucket = var.bucketname
}
resource "aws_s3_bucket_ownership_controls" "example" {
  bucket = aws_s3_bucket.mybucket.id
  rule {
    object_ownership = "BucketOwnerPreferred"
  }
}
resource "aws_s3_bucket_public_access_block" "example" {
  bucket = aws_s3_bucket.mybucket.id
  block_public_acls       = false
  block_public_policy     = false
  ignore_public_acls      = false
  restrict_public_buckets = false
}
resource "aws_s3_bucket_acl" "example" {
  depends_on = [
    aws_s3_bucket_ownership_controls.example,
    aws_s3_bucket_public_access_block.example,
  ]
  bucket = aws_s3_bucket.mybucket.id
  acl    = "public-read"
}
resource "aws_s3_object" "index" {
  bucket = aws_s3_bucket.mybucket.id
  key = "index.html"
  source = "index.html"
  acl = "public-read"
  content_type = "text/html"
}
resource "aws_s3_object" "error" {
  bucket = aws_s3_bucket.mybucket.id
  key = "error.html"
  source = "error.html"
  acl = "public-read"
  content_type = "text/html"
}
resource "aws_s3_object" "style" {
```

```
  bucket = aws_s3_bucket.mybucket.id
  key = "style.css"
  source = "style.css"
  acl = "public-read"
  content_type = "text/css"
}
resource "aws_s3_object" "script" {
  bucket = aws_s3_bucket.mybucket.id
  key = "script.js"
  source = "script.js"
  acl = "public-read"
  content_type = "text/javascript"
}
resource "aws_s3_bucket_website_configuration" "website" {
  bucket = aws_s3_bucket.mybucket.id
  index_document {
    suffix = "index.html"
  }
  error_document {
    key = "error.html"
  }
  depends_on = [ aws_s3_bucket_acl.example.id ]
}
```

Variables.tf

```
variable "aws_region" {
  description = "The AWS region to create things in."
  default     = "ap-south-1"
}
variable "key_name" {
  description = " SSH keys to connect to ec2 instance"
  default     = "Mumbai"     #change key name here
}
variable "instance_type" {
  description = "instance type for ec2"
  default     = "t2.medium"
}
variable "ami_id" {
```

```
  description = "AMI for Ubuntu Ec2 instance"
  default     = "ami-0f5ee92e2d63afc18"
}
variable "bucketname" {
  description = "The name of the S3 bucket to create"
  type        = string
  default     = "ajaykumar-yegireddi-cloud"  #change Bucket name also
}
```

User data for Instance

website.sh

```
#!/bin/bash
# Update the package manager and install Docker
sudo apt-get update -y
sudo apt-get install -y docker.io
# Start the Docker service
sudo systemctl start docker
# Enable Docker to start on boot
sudo systemctl enable docker
# Pull and run a simple Nginx web server container
sudo docker run -d --name zomato -p 3000:3000 sevenajay/zomato:latest
sudo docker run -d --name netflix -p 8081:80 sevenajay/netflix:latest
```

index.html

```
HTML CSS JSResult Skip Results Iframe
<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="UTF-8">
  <title> Login Page Form | Nothing4us</title>
  <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/me
```

```
<link rel='stylesheet' href='https://cdnjs.cloudflare.com/ajax/libs/font
</head>
<body>
<!-- partial:index.partial.html -->
<div class="center">
  <div class="ear ear--left"></div>
  <div class="ear ear--right"></div>
  <div class="face">
    <div class="eyes">
      <div class="eye eye--left">
        <div class="glow"></div>
      </div>
      <div class="eye eye--right">
        <div class="glow"></div>
      </div>
    </div>
    <div class="nose">
      <svg width="38.161" height="22.03">
        <path d="M2.017 10.987Q-.563 7.513.157 4.754C.877 1.994 2.976.13
      </svg>
      <div class="glow"></div>
    </div>
    <div class="mouth">
      <svg class="smile" viewBox="-2 -2 84 23" width="84" height="23">
        <path d="M0 0c3.76 9.279 9.69 18.98 26.712 19.238 17.022.258 10.
      </svg>
      <div class="mouth-hole"></div>
      <div class="tongue breath">
        <div class="tongue-top"></div>
        <div class="line"></div>
        <div class="median"></div>
      </div>
    </div>
  </div>
  <div class="hands">
    <div class="hand hand--left">
      <div class="finger">
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
      <div class="finger">
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
      <div class="finger">
```

```
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
    </div>
    <div class="hand hand--right">
      <div class="finger">
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
      <div class="finger">
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
      <div class="finger">
        <div class="bone"></div>
        <div class="nail"></div>
      </div>
    </div>
  </div>
  <div class="login">
    <label>
      <div class="fa fa-phone"></div>
      <input class="username" type="text" autocomplete="on" placeholder=
    </label>
    <label>
      <div class="fa fa-commenting"></div>
      <input class="password" type="password" autocomplete="off" placeho
      <button class="password-button">Show</button>
    </label>
    <button class="login-button">Login</button>
  </div>
  <div class="social-buttons">
    <div class="social">
      <div class="fa fa-wechat"></div>
    </div>
    <div class="social">
      <div class="fa fa-weibo"></div>
    </div>
    <div class="social">
      <div class="fa fa-paw"></div>
    </div>
  </div>
  <div class="footer">Mr.Cloud Book</div>
  <script src='https://cdnjs.cloudflare.com/ajax/libs/lodash.js/4.17.5/
```

```
</body>
</html>
```

error.html

```
<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="UTF-8">
  <title> 404 page | Nothing4us </title>
  <link rel='stylesheet' href='https://cdnjs.cloudflare.com/ajax/libs/tu
<link rel='stylesheet' href='https://fonts.googleapis.com/css?family=Ar
</head>
<body>
<!-- partial:index.partial.html -->
<section class="page_404">
    <div class="container">
        <div class="row">
        <div class="col-sm-12 ">
        <div class="col-sm-10 col-sm-offset-1  text-center">
        <div class="four_zero_four_bg">
            <h1 class="text-center ">404</h1>
        </div>
        <div class="contant_box_404">
        <h3 class="h2">
        Look like you're lost
        </h3>
        <p>the page you are looking for not avaible!</p>
        <a href="" class="link_404">Go to Home</a>
    </div>
        </div>
        </div>
        </div>
    </div>
</section>
<!-- partial -->
```

```
</body>
</html>
```

style.css

```
* {
    box-sizing: border-box;
  }
  body {
    width: 100vw;
    height: 100vh;
    background-color: rgb(41, 0, 75);
    overflow: hidden;
    font-size: 12px;
  }
  .inspiration {
    position: fixed;
    bottom: 0;
    right: 0;
    padding: 10px;
    text-align: center;
    text-decoration: none;
    font-family: 'Gill Sans', sans-serif;
    font-size: 12px;
    color: #969696;
  }
  .inspiration img {
    width: 60px;
  }
  .center {
    position: relative;
    top: 50%;
    left: 50%;
    display: inline-block;
    width: 275px;
    height: 490px;
    border-radius: 3px;
    transform: translate(-50%, -50%);
    overflow: hidden;
```

```
  background-image: linear-gradient(to top right, rgb(0 168 255), rgb
}
@media screen and (max-height: 500px) {
  .center {
    transition: transform 0.5s;
    transform: translate(-50%, -50%) scale(0.8);
  }
}
.center .ear {
  position: absolute;
  top: -110px;
  width: 200px;
  height: 200px;
  border-radius: 50%;
  background-color: rgb(50 22 22);
}
.center .ear.ear--left {
  left: -135px;
}
.center .ear.ear--right {
  right: -135px;
}
.center .face {
  display: flex;
  flex-direction: column;
  align-items: center;
  width: 200px;
  height: 150px;
  margin: 80px auto 10px;
  --rotate-head: 0deg;
  transform: rotate(var(--rotate-head));
  transition: transform 0.2s;
  transform-origin: center 20px;
}
.center .eye {
  display: inline-block;
  width: 25px;
  height: 25px;
  border-radius: 50%;
  background-color: #243946;
}
.center .eye.eye--left {
  margin-right: 40px;
}
.center .eye.eye--right {
```

```
    margin-left: 40px;
  }
  .center .eye .glow {
    position: relative;
    top: 3px;
    right: -12px;
    width: 12px;
    height: 6px;
    border-radius: 50%;
    background-color: #fff;
    transform: rotate(38deg);
  }
  .center .nose {
    position: relative;
    top: 30px;
    transform: scale(1.1);
  }
  .center .nose .glow {
    position: absolute;
    top: 3px;
    left: 32%;
    width: 15px;
    height: 8px;
    border-radius: 50%;
    background-color: #476375;
  }
  .center .mouth {
    position: relative;
    margin-top: 45px;
  }
  .center svg.smile {
    position: absolute;
    left: -28px;
    top: -19px;
    transform: scaleX(1.1);
    stroke: #243946;
  }
  .center .mouth-hole {
    position: absolute;
    top: 0;
    left: -50%;
    width: 60px;
    height: 15px;
    border-radius: 50%/100% 100% 0% 0;
    transform: rotate(180deg);
```

```
    background-color: #243946;
    z-index: -1;
  }
  .center .tongue {
    position: relative;
    top: 5px;
    width: 30px;
    height: 20px;
    background-color: #ffd7dd;
    transform-origin: top;
    transform: rotateX(60deg);
  }
  .center .tongue.breath {
    -webkit-animation: breath 0.3s infinite linear;
            animation: breath 0.3s infinite linear;
  }
  .center .tongue-top {
    position: absolute;
    bottom: -15px;
    width: 30px;
    height: 30px;
    border-radius: 15px;
    background-color: #ffd7dd;
  }
  .center .line {
    position: absolute;
    top: 0;
    width: 30px;
    height: 5px;
    background-color: #fcb7bf;
  }
  .center .median {
    position: absolute;
    top: 0;
    left: 50%;
    transform: translateX(-50%);
    width: 4px;
    height: 25px;
    border-radius: 5px;
    background-color: #fcb7bf;
  }
  .center .hands {
    position: relative;
  }
  .center .hands .hand {
```

```
  position: absolute;
  top: -6px;
  display: flex;
  transition: transform 0.5s ease-in-out;
  z-index: 1;
}
.center .hands .hand--left {
  left: 50px;
}
.center .hands .hand--left.hide {
  transform: translate(2px, -155px) rotate(-160deg);
}
.center .hands .hand--left.peek {
  transform: translate(0px, -120px) rotate(-160deg);
}
.center .hands .hand--right {
  left: 170px;
}
.center .hands .hand--right.hide {
  transform: translate(-6px, -155px) rotate(160deg);
}
.center .hands .hand--right.peek {
  transform: translate(-4px, -120px) rotate(160deg);
}
.center .hands .finger {
  position: relative;
  z-index: 0;
}
.center .hands .finger .bone {
  width: 20px;
  height: 20px;
  border: 2px solid #243946;
  border-bottom: none;
  border-top: none;
  background-color: rgb(255 211 11);
}
.center .hands .finger .nail {
  position: absolute;
  left: 0;
  top: 10px;
  width: 20px;
  height: 18px;
  border-radius: 50%;
  border: 2px solid #243946;
  background-color: #fac555;
```

```
  z-index: -1;
}
.center .hands .finger:nth-child(1),
.center .hands .finger:nth-child(3) {
  left: 4px;
  z-index: 1;
}
.center .hands .finger:nth-child(1) .bone,
.center .hands .finger:nth-child(3) .bone {
  height: 10px;
}
.center .hands .finger:nth-child(3) {
  left: -4px;
}
.center .hands .finger:nth-child(2) {
  top: -5px;
  z-index: 2;
}
.center .hands .finger:nth-child(1) .nail,
.center .hands .finger:nth-child(3) .nail {
  top: 0px;
}
.center .login {
  position: relative;
  display: flex;
  flex-direction: column;
}
.center .login label {
  position: relative;
  padding: 0 20px;
}
.center .login label .fa {
  position: absolute;
  top: 40%;
  left: 35px;
  color: #bbb;
}
.center .login label .fa:before {
  position: relative;
  left: 1px;
}
.center .login input,
.center .login .login-button {
  width: 100%;
  height: 35px;
```

```
    border: none;
    border-radius: 30px;
  }
  .center .login input {
    padding: 0 20px 0 40px;
    margin: 5px 0;
    box-shadow: none;
    outline: none;
  }
  .center .login input::-moz-placeholder {
    color: #ccc;
  }
  .center .login input:-ms-input-placeholder {
    color: #ccc;
  }
  .center .login input::placeholder {
    color: #ccc;
  }
  .center .login input.password {
    padding: 0 90px 0 40px;
  }
  .center .login .password-button {
    position: absolute;
    top: 9px;
    right: 25px;
    display: flex;
    justify-content: center;
    align-items: center;
    width: 80px;
    height: 27px;
    border-radius: 30px;
    border: none;
    outline: none;
    background-color: #243946;
    color: #fff;
  }
  .center .login .password-button:active {
    transform: scale(0.95);
  }
  .center .login .login-button {
    width: calc(100% - 40px);
    margin: 20px 20px 0;
    outline: none;
    background-color: #243946;
    color: #fff;
```

```
  transition: transform 0.1s;
}
.center .login .login-button:active {
  transform: scale(0.95);
}
.center .social-buttons {
  display: flex;
  justify-content: center;
  margin-top: 25px;
}
.center .social-buttons .social {
  display: flex;
  justify-content: center;
  align-items: center;
  width: 35px;
  height: 35px;
  margin: 0 10px;
  border-radius: 50%;
  background-color: #243946;
  color: #fff;
  font-size: 18px;
}
.center .social-buttons .social:active {
  transform: scale(0.95);
}
.center .footer {
  text-align: center;
  margin-top: 15px;
}
@-webkit-keyframes breath {
  0%, 100% {
    transform: rotateX(0deg);
  }
  50% {
    transform: rotateX(60deg);
  }
}
@keyframes breath {
  0%, 100% {
    transform: rotateX(0deg);
  }
  50% {
    transform: rotateX(60deg);
```

```
    }
  }
```

script.js

```
let usernameInput = document.querySelector('.username');
let passwordInput = document.querySelector('.password');
let showPasswordButton = document.querySelector('.password-button');
let face = document.querySelector('.face');
passwordInput.addEventListener('focus', event => {
  document.querySelectorAll('.hand').forEach(hand => {
    hand.classList.add('hide');
  });
  document.querySelector('.tongue').classList.remove('breath');
});
passwordInput.addEventListener('blur', event => {
  document.querySelectorAll('.hand').forEach(hand => {
    hand.classList.remove('hide');
    hand.classList.remove('peek');
  });
  document.querySelector('.tongue').classList.add('breath');
});
usernameInput.addEventListener('focus', event => {
  let length = Math.min(usernameInput.value.length - 16, 19);
  document.querySelectorAll('.hand').forEach(hand => {
    hand.classList.remove('hide');
    hand.classList.remove('peek');
  });
  face.style.setProperty('--rotate-head', `${-length}deg`);
});
usernameInput.addEventListener('blur', event => {
  face.style.setProperty('--rotate-head', '0deg');
});
usernameInput.addEventListener('input', _.throttle(event => {
  let length = Math.min(event.target.value.length - 16, 19);
  face.style.setProperty('--rotate-head', `${-length}deg`);
}, 100));
showPasswordButton.addEventListener('click', event => {
  if (passwordInput.type === 'text') {
```

```
      passwordInput.type = 'password';
      document.querySelectorAll('.hand').forEach(hand => {
        hand.classList.remove('peek');
        hand.classList.add('hide');
      });
    } else {
      passwordInput.type = 'text';
      document.querySelectorAll('.hand').forEach(hand => {
        hand.classList.remove('hide');
        hand.classList.add('peek');
      });
    }
  });
```

Let's create a Job now in Jenkins

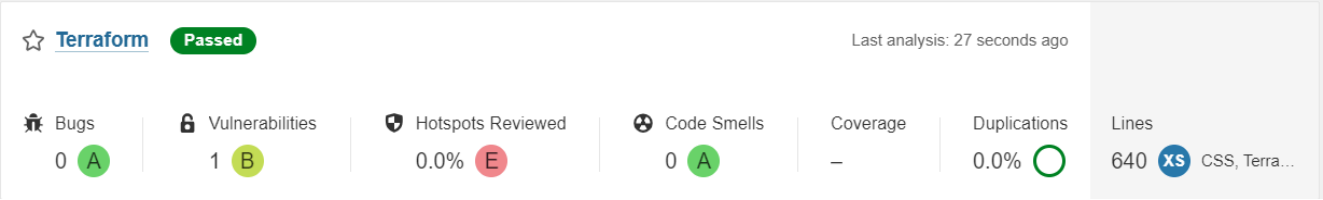
set a job name and add this pipeline

```
aform'

ol 'sonar-scanner'

rkspace'){

()

 from Git'){

nch: 'main', url: 'https://github.com/Aj7Ay/TERRAFORM-JENKINS-CICD.git'

m version'){
```

```
erraform --version'


be Analysis "){

arQubeEnv('sonar-server') {
''' $SCANNER_HOME/bin/sonar-scanner -Dsonar.projectName=Terraform \
sonar.projectKey=Terraform '''



gate"){

{
tForQualityGate abortPipeline: false, credentialsId: 'Sonar-token'



 SCAN') {

ivy fs . > trivyfs.txt"
```

stage view

Declarative: Tool Install	checkout from Git	check terraform version	Sonarqube Analysis	quality gate	TRIVY FS SCAN
76ms	1s	420ms	8s	253ms	1s
70ms	1s	422ms	8s	241ms (paused for 2s)	1s



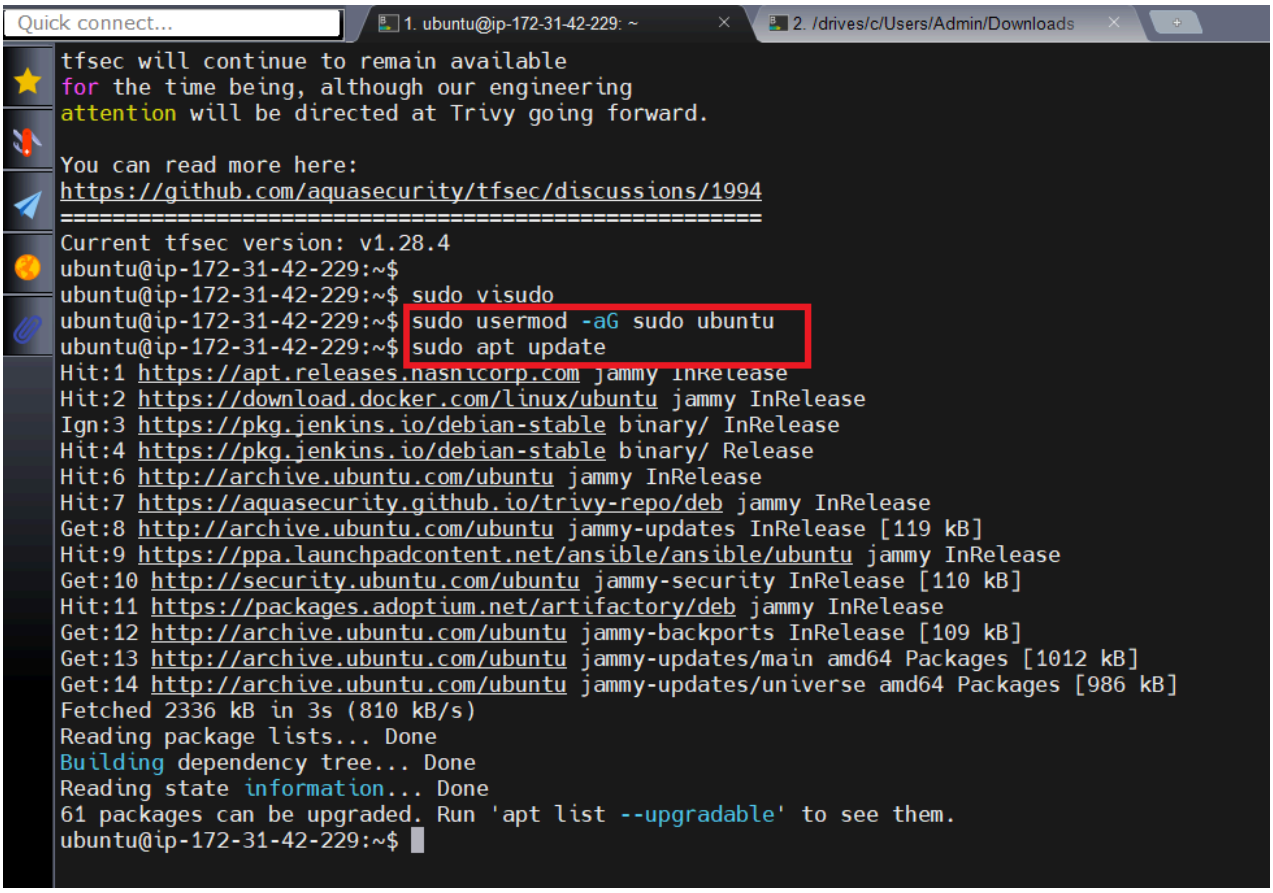
we have to provide Executable permissions for our user data otherwise it won't run.

If we run with sudo directly we will get the error

To give a user sudo permissions on an Ubuntu system, you need to add the user to the `sudo` group or grant them specific sudo access by editing the sudoers file. Here are two common ways to give a user sudo permissions:

Method 1: Add User to the sudo Group

1. Log in to your Ubuntu system as a user with sudo privileges, or log in as the root user.
2. Open a terminal.
3. Run the following command to add a user (replace `<username>` with the actual username) to the `sudo` group
4. After running the command, the user will have sudo privileges. They can now execute commands with superuser privileges using `sudo` .




```
sudo usermod -aG sudo ubuntu
sudo apt update
```

Method 2: Edit the sudoers File

In some cases, you may want more fine-grained control over a user's sudo permissions. To do this, you can edit the sudoers file using the `visudo` command:

1. Log in to your Ubuntu system as a user with sudo privileges, or log in as the root user.
2. Open a terminal.
3. Run the following command to edit the sudoers file:
4.

```
sudo visudo
```

```
 # User privilege specification
<username> ALL=(ALL:ALL) ALL
```

If you want to limit their sudo access to specific commands, you can specify those commands instead of `ALL`.

Save and exit the text editor. On most systems, you can save and exit `visudo` by pressing `Ctrl + X`, followed by `Y`, and then `Enter`.

After completing one of these methods, the user should have sudo permissions and can run commands with superuser privileges using `sudo`. Make sure to exercise caution when granting sudo access to users, as it can provide them with significant control over the system.

After granting sudo permissions to a user on a Ubuntu system, you do not need to restart the system for the changes to take effect. The user can immediately start using `sudo` to run commands with superuser privileges.

To test whether the user can use `sudo`, you can simply open a terminal and have the user run a command with `sudo`. For example:

```
sudo apt update
```

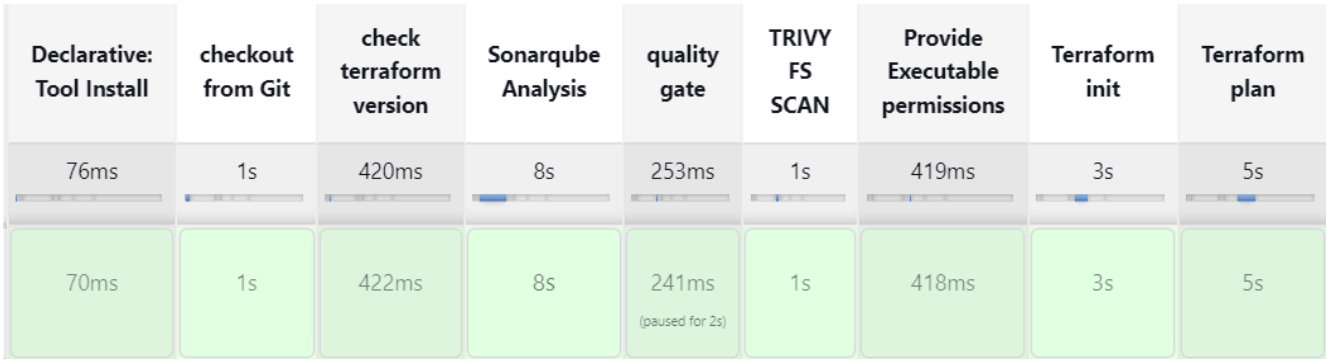
If the user is prompted for their password and the command executes without errors, it means that the sudo permissions have been successfully granted and applied.

There is no need to restart the system to apply changes to sudo permissions.

Now add the below stages to your pipeline

```
stage('Excutable permission to userdata'){
            steps{
                sh 'chmod 777 website.sh'
            }
        }
        stage('Terraform init'){
            steps{
                sh 'terraform init'
            }
        }
        stage('Terraform plan'){
            steps{
                sh 'terraform plan'
            }
        }
```

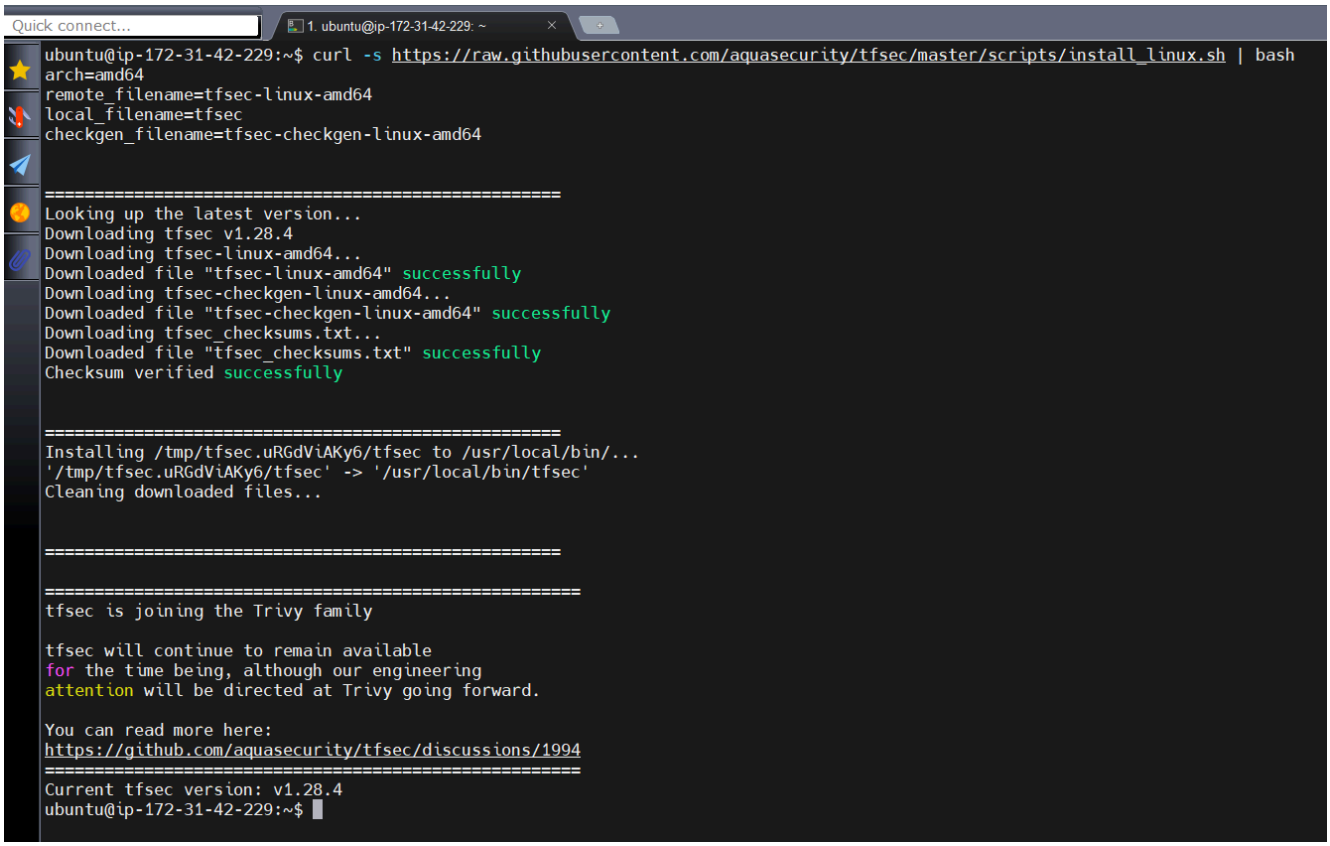
stage view



if you want to add a security check for terraform files that also works fine but if we use that now we will get so many errors. coz we just wrote simple terraform files that's why it throws errors. we have `aqua tfsec` and `checkov` for terraform scan.

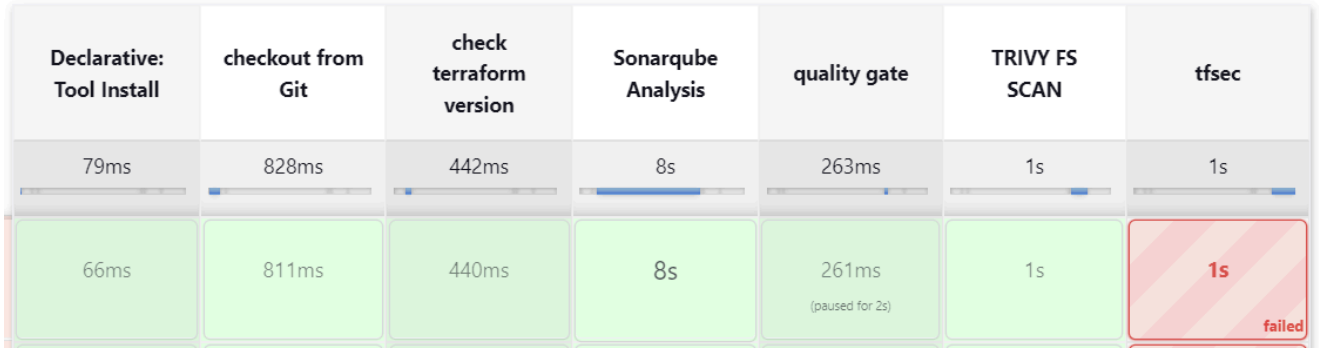
install aqua security `tfsec`

```
curl -s https://raw.githubusercontent.com/aquasecurity/tfsec/master/scr
```



Add this stage. For this project, our learning purpose isn't recommended.

```
stage('Trivy terraform scan'){
    steps{
        sh 'tfsec . --no-color'
       }
   }
```



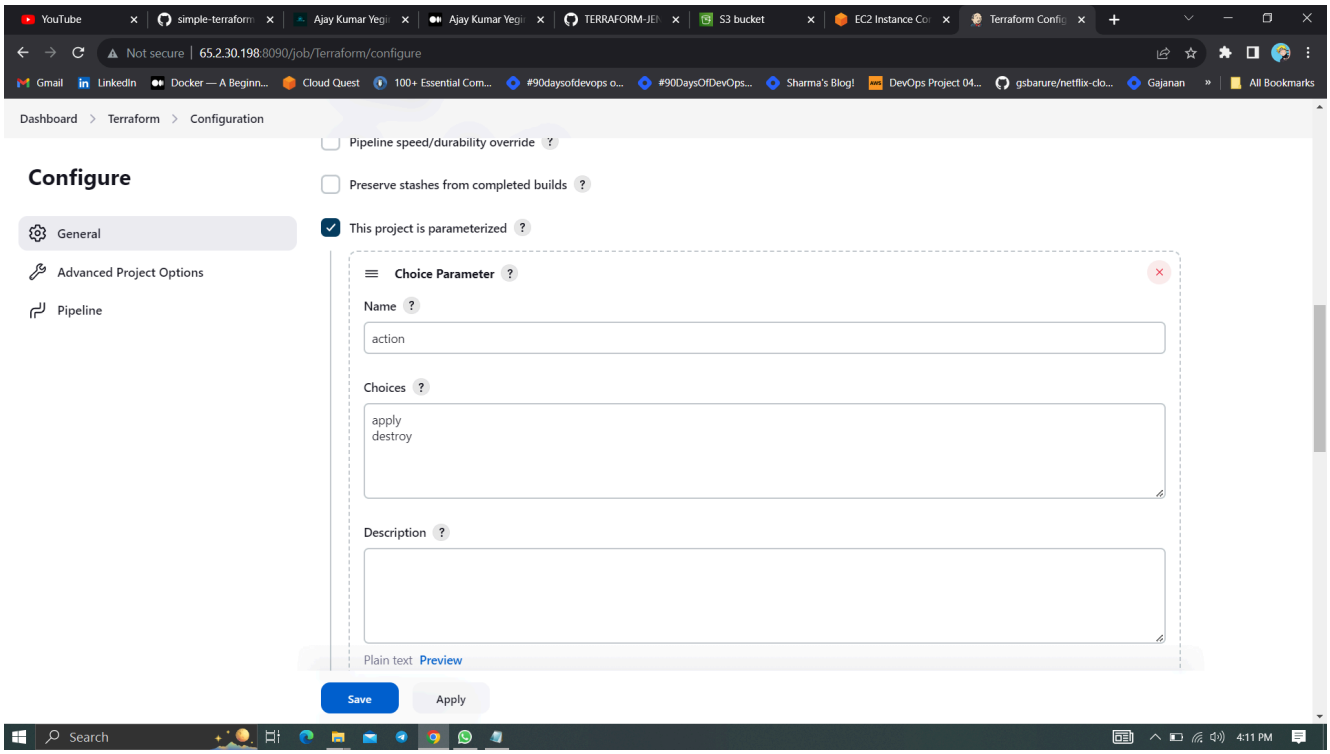
Let's continue without that step.

Add this stage to the pipeline

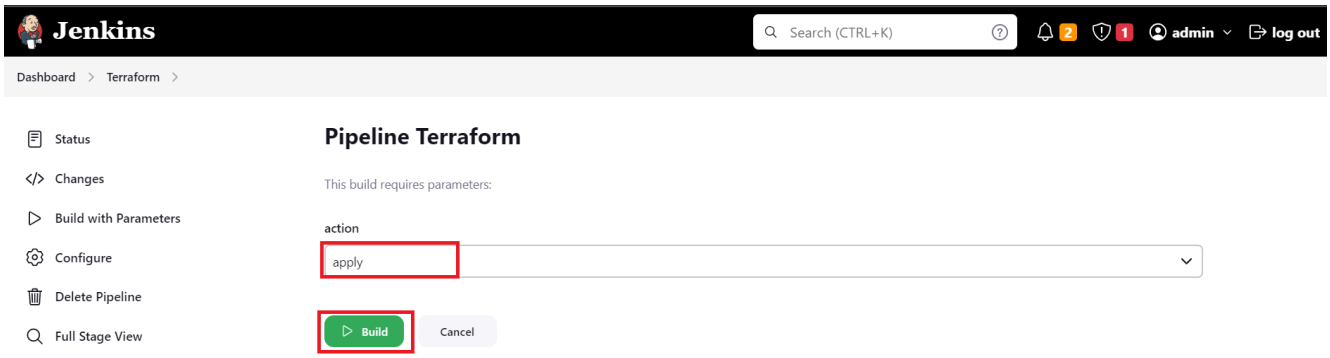
```
stage('Terraform apply'){
            steps{
                sh 'terraform apply --auto-approve'
            }
        }
```

you will succeed but I want to do this with build parameters to apply and destroy while building only.

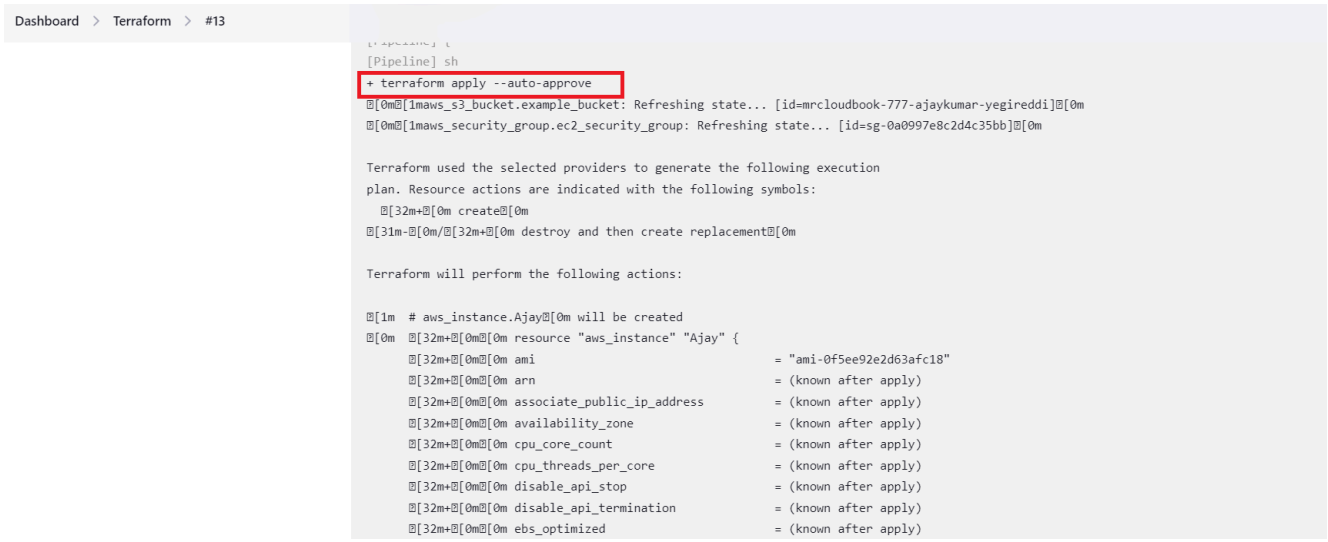
you have to add this inside job like below image




```
stage('Terraform apply'){
            steps{
                sh 'terraform ${action} --auto-approve'
            }
        }
```

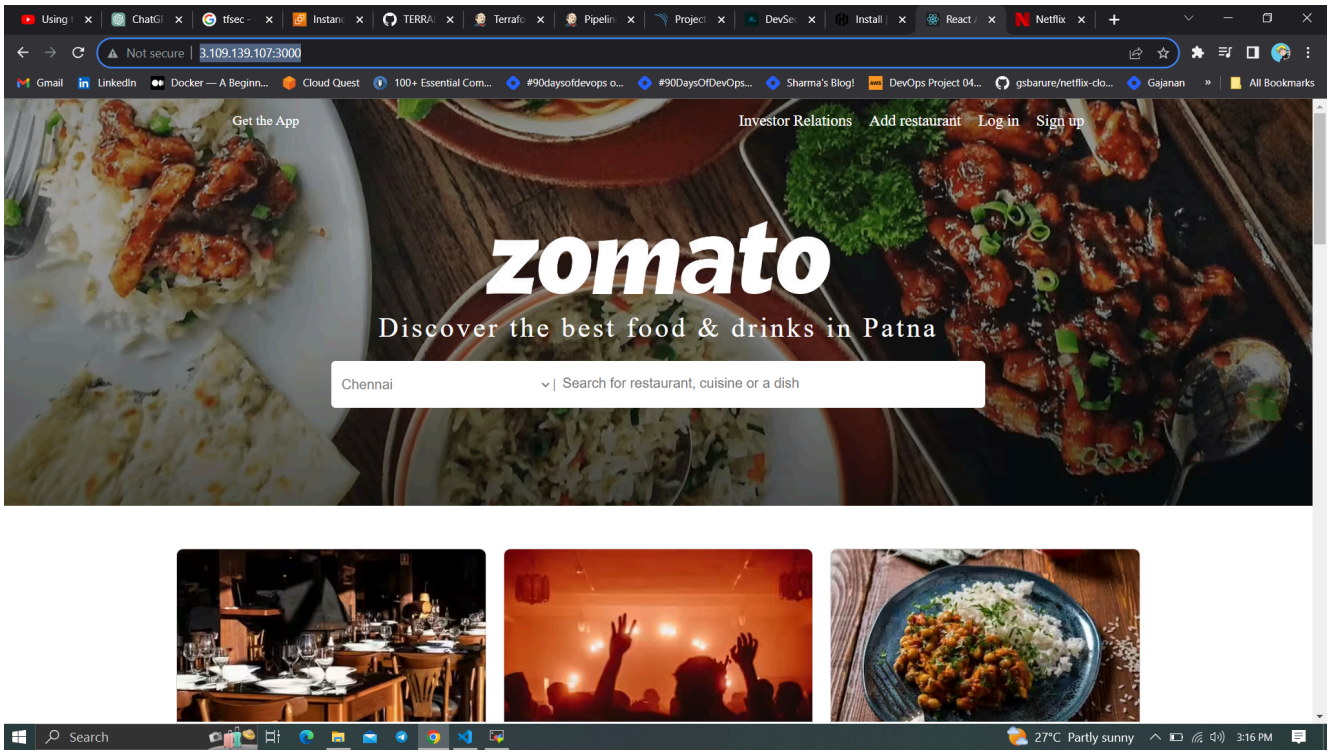


While at apply stage it automatically takes apply option and creates infrastructure in AWS and runs containers

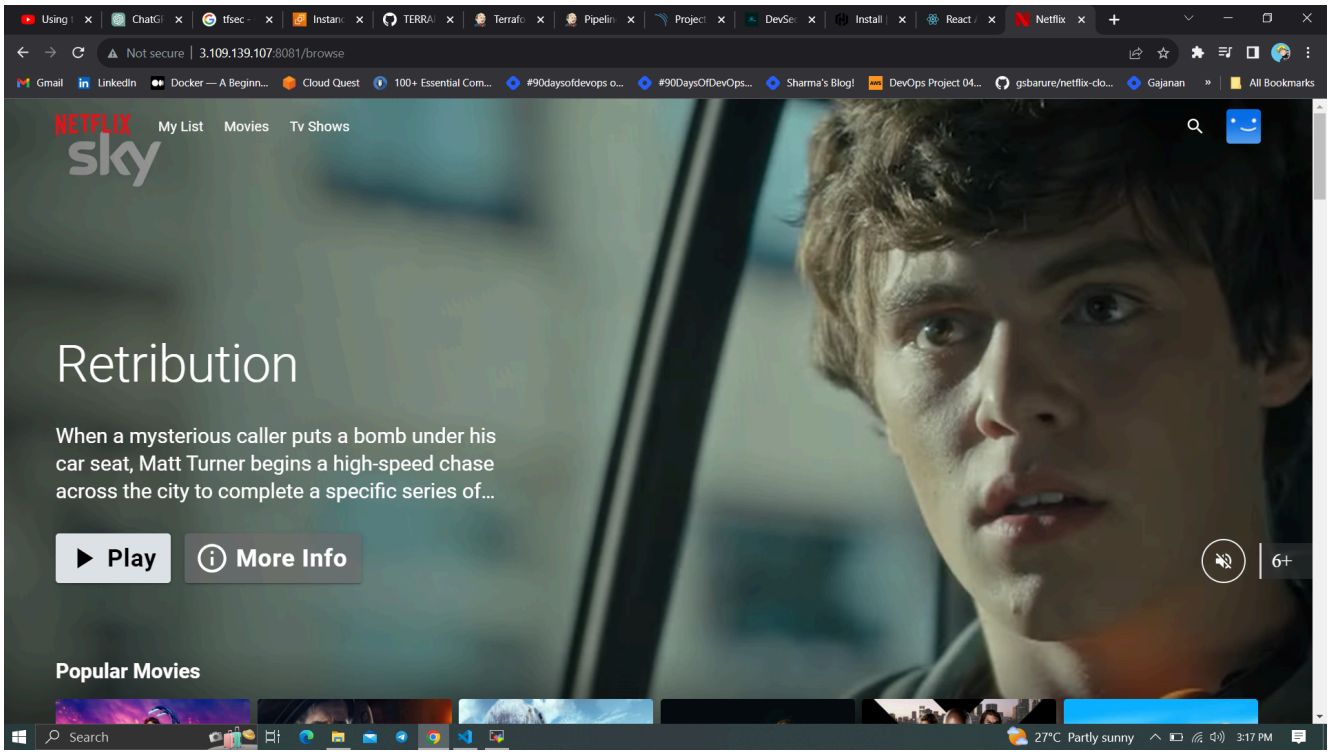


Now copy the newly created Instance Ip address

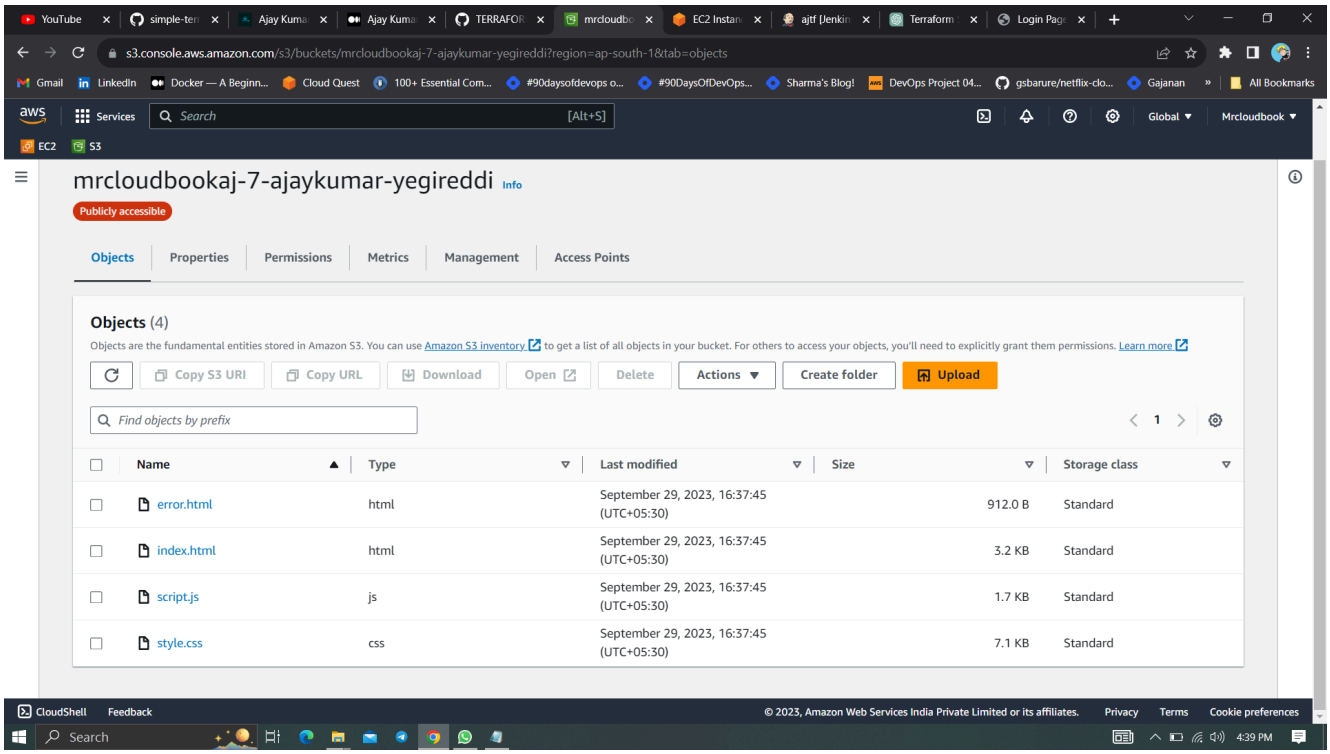
```
<instance-ip:3000> #zomato app container
```

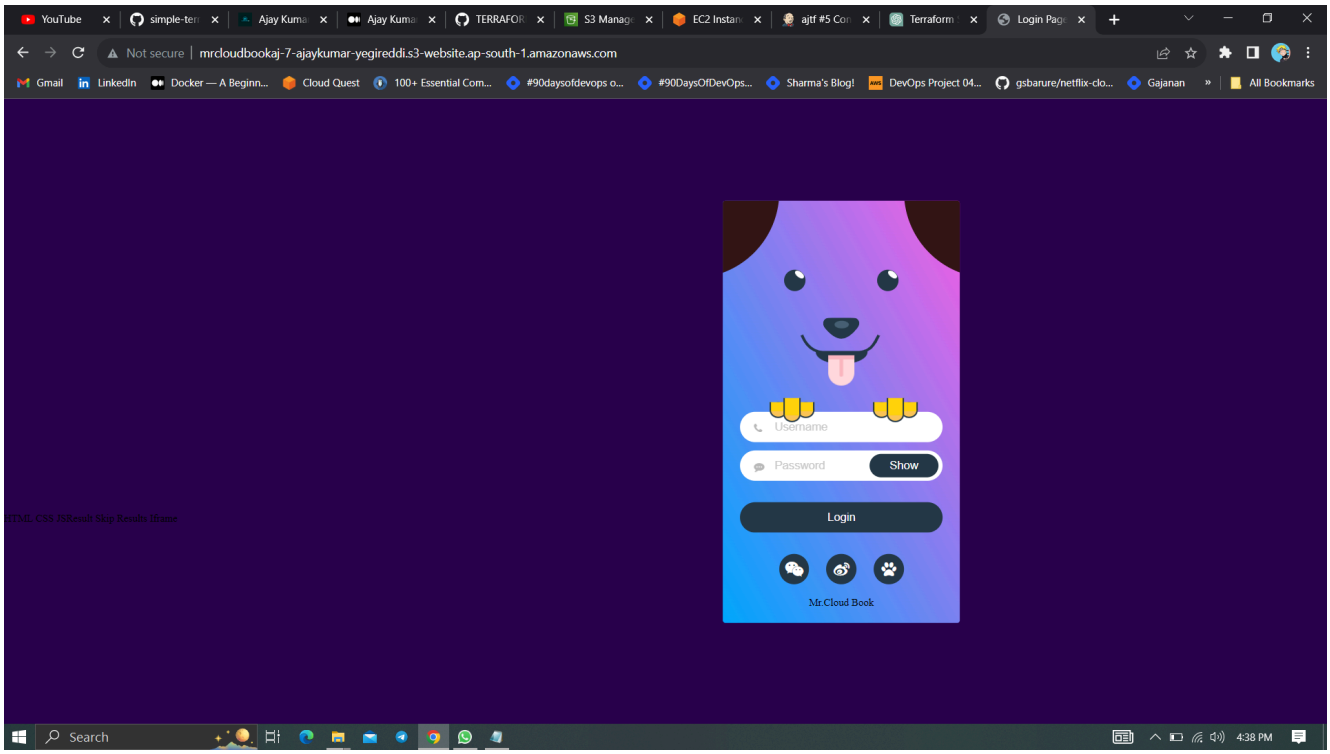



```
<instance-ip:8081> #netflix container
```

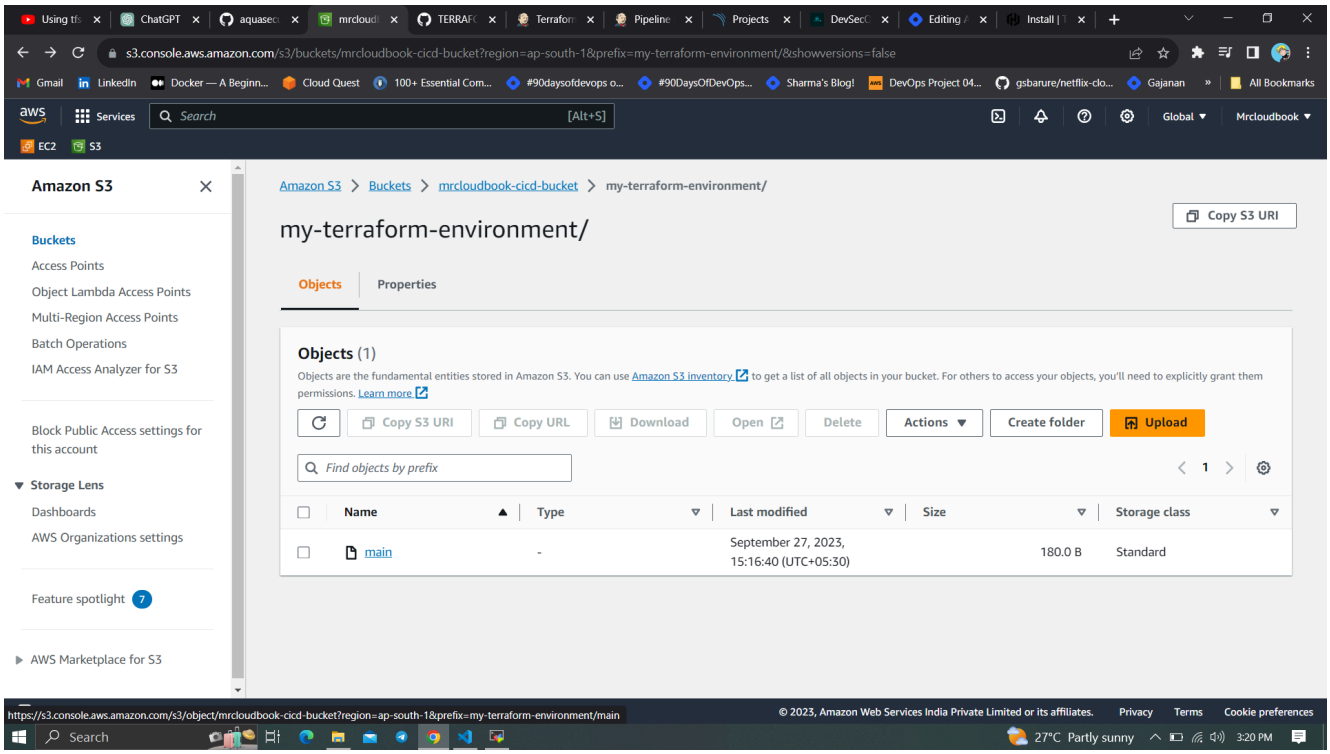


check s3 bucket is created or not

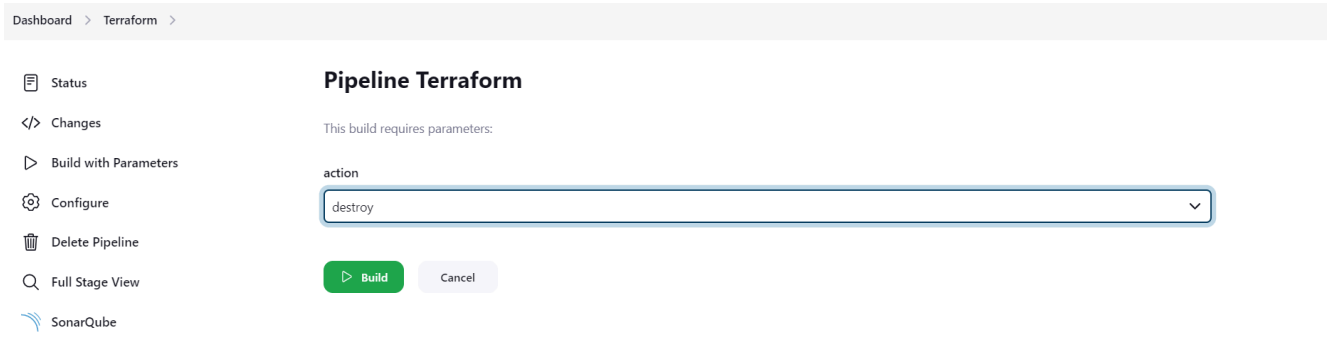




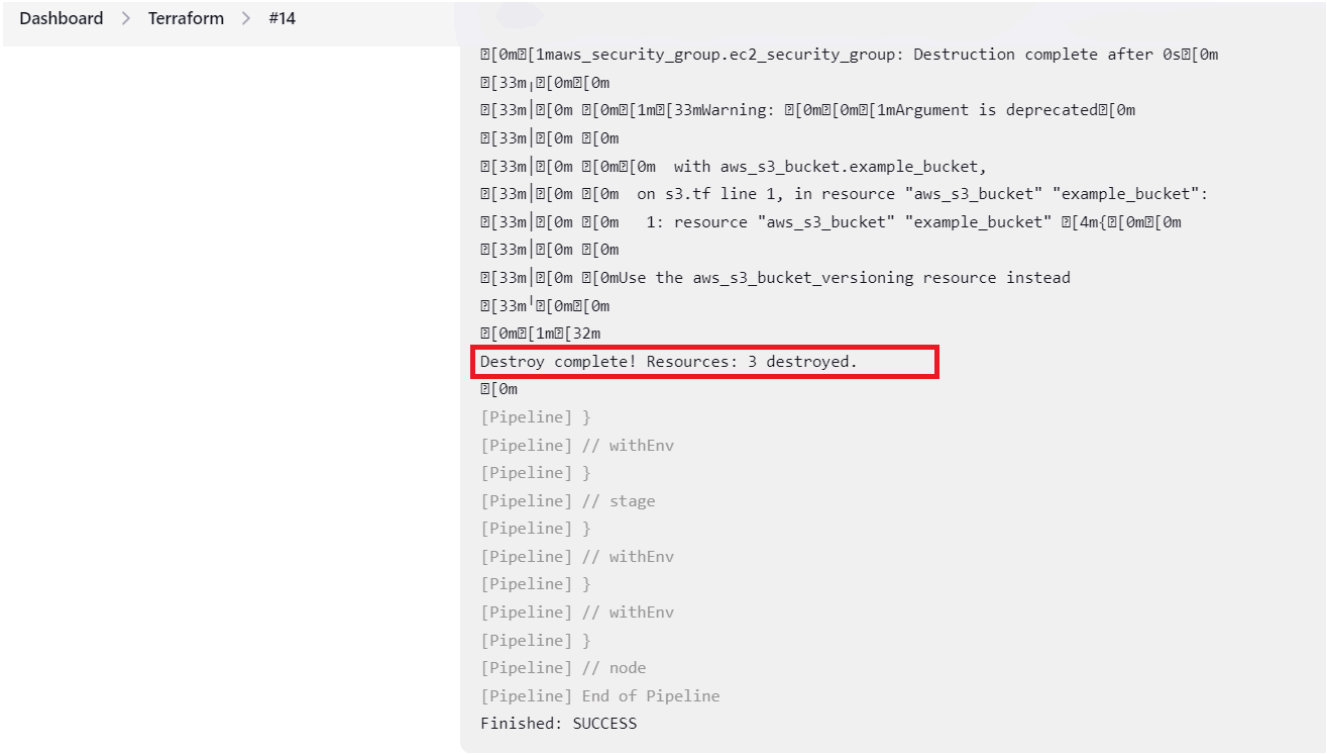
Check your s3 bucket for the tf state file with the name main



Let's Destroy everything



while at the apply stage, it automatically takes the destroy option and deletes everything that we created till now.



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complete pipeline

```
pipeline{
    agent any
    tools{
        jdk 'jdk17'
        terraform 'terraform'
    }
    environment {
        SCANNER_HOME=tool 'sonar-scanner'
    }
    stages {
        stage('clean workspace'){
            steps{
                cleanWs()
            }
        }
        stage('Checkout from Git'){
            steps{
                git branch: 'main', url: 'https://github.com/Aj7Ay/TERRA
            }
        }
```

```
stage('Terraform version'){
     steps{
         sh 'terraform --version'
        }
}
stage("Sonarqube Analysis "){
    steps{
        withSonarQubeEnv('sonar-server') {
            sh ''' $SCANNER_HOME/bin/sonar-scanner -Dsonar.proje
            -Dsonar.projectKey=Terraform '''
        }
    }
}
stage("quality gate"){
   steps {
        script {
            waitForQualityGate abortPipeline: false, credentials
        }
    }
}
stage('TRIVY FS SCAN') {
    steps {
        sh "trivy fs . > trivyfs.txt"
    }
}
stage('Excutable permission to userdata'){
    steps{
        sh 'chmod 777 website.sh'
    }
}
stage('Terraform init'){
    steps{
        sh 'terraform init'
    }
}
stage('Terraform plan'){
    steps{
        sh 'terraform plan'
    }
}
stage('Terraform apply'){
    steps{
        sh 'terraform ${action} --auto-approve'
    }
}
```

```
        }
    }
```

Ajay Kumar Yegireddi is a DevSecOps Engineer and System Administrator, with a passion for sharing real-world DevSecOps projects and tasks. **Mr. Cloud Book**, provides hands-on tutorials and practical insights to help others master DevSecOps tools and workflows. Content is designed to bridge the gap between development, security, and operations, making complex concepts easy to understand for both beginners and professionals.

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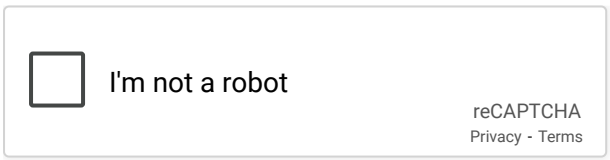

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