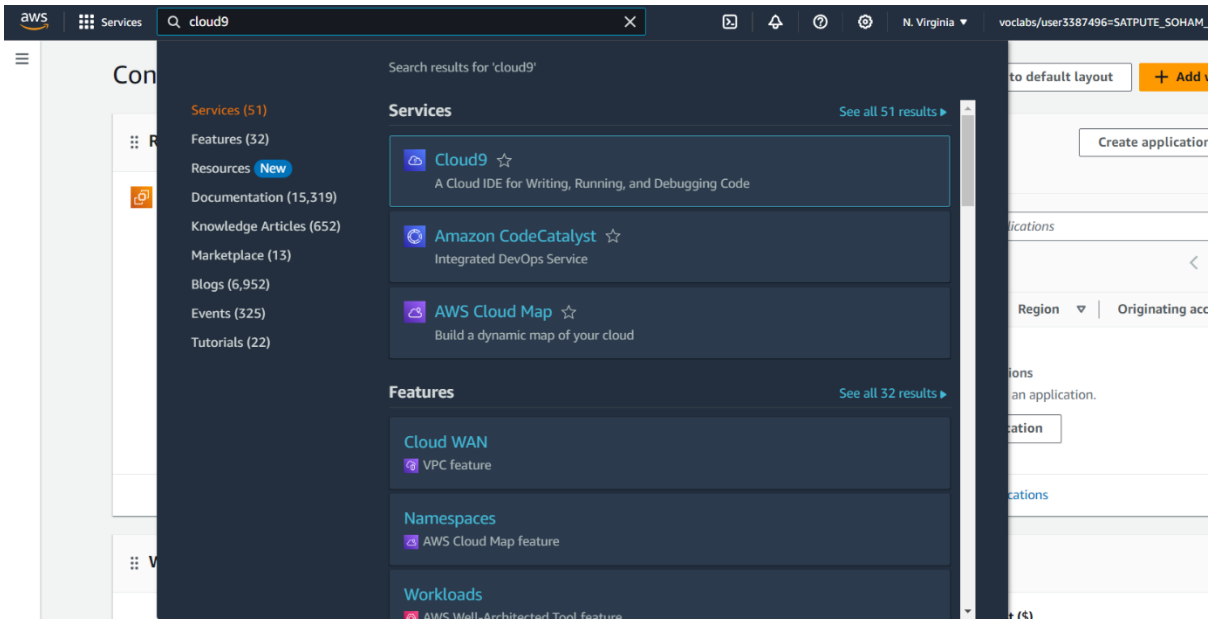
EXPERIMENT NO.1

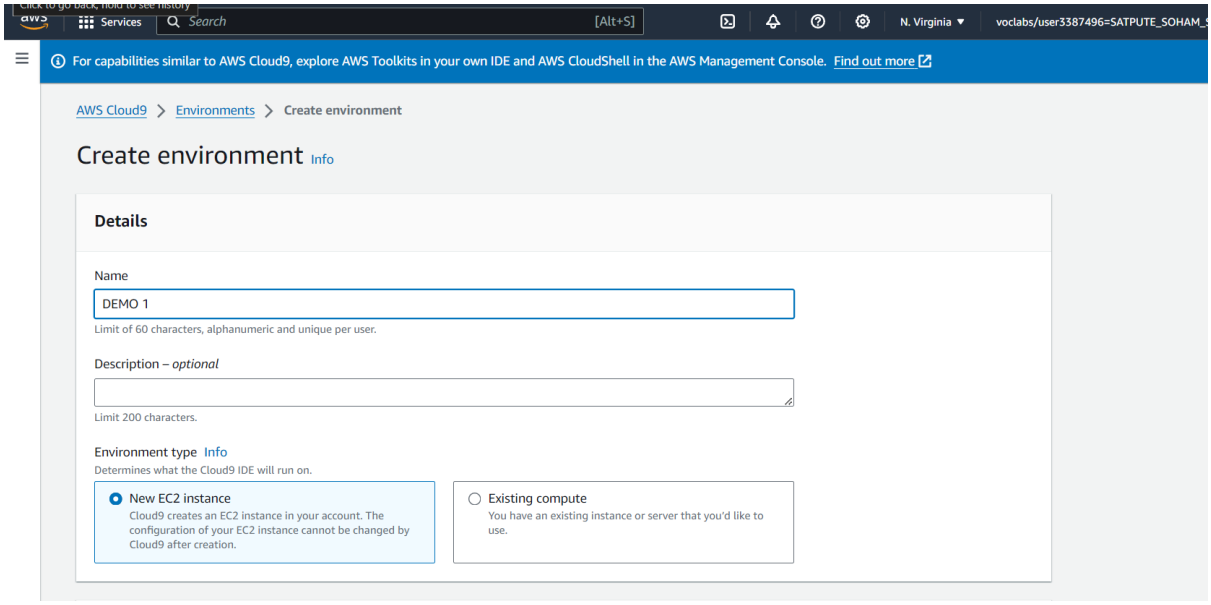
Name: Soham Satpute

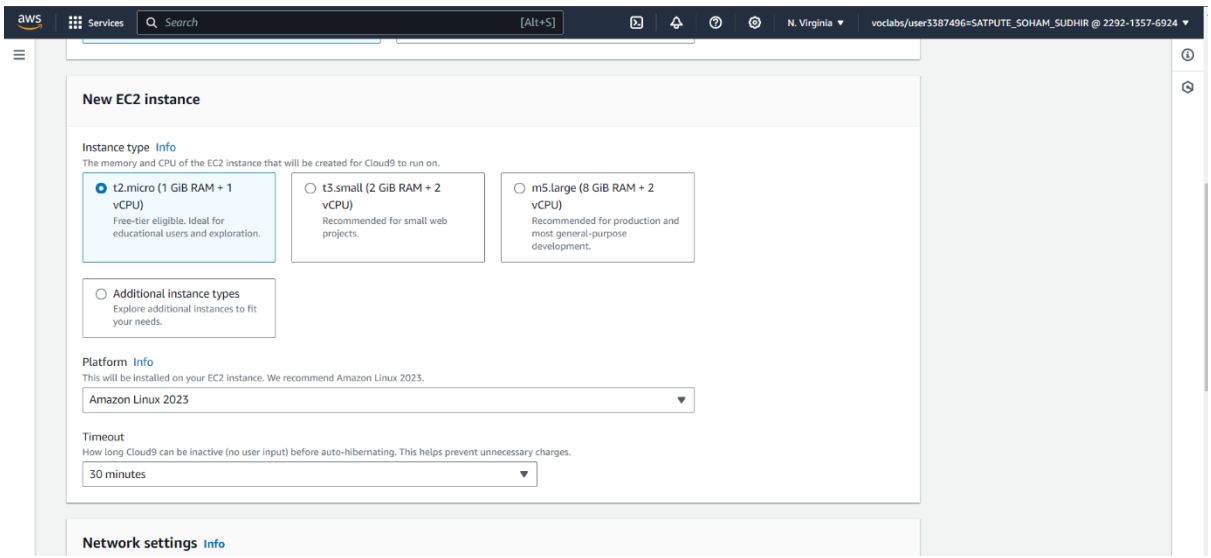
Class:D15A Roll No:52

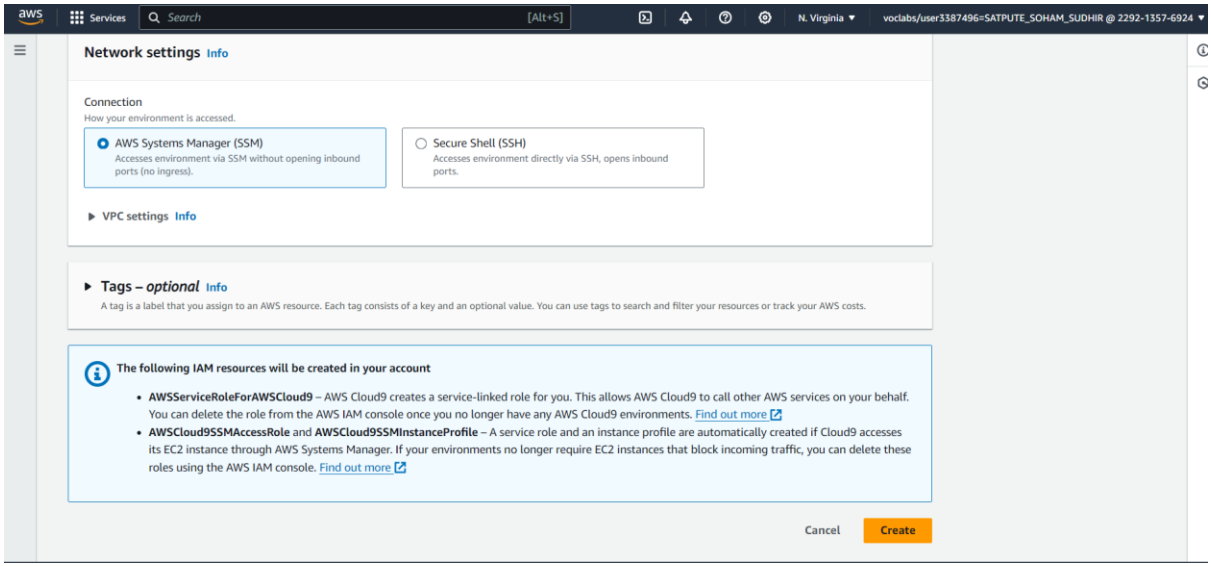
Aim: To understand the benefits of Cloud Infrastructure and Setup AWS Cloud9 IDE, Launch AWS Cloud9 IDE and Perform Collaboration Demonstration

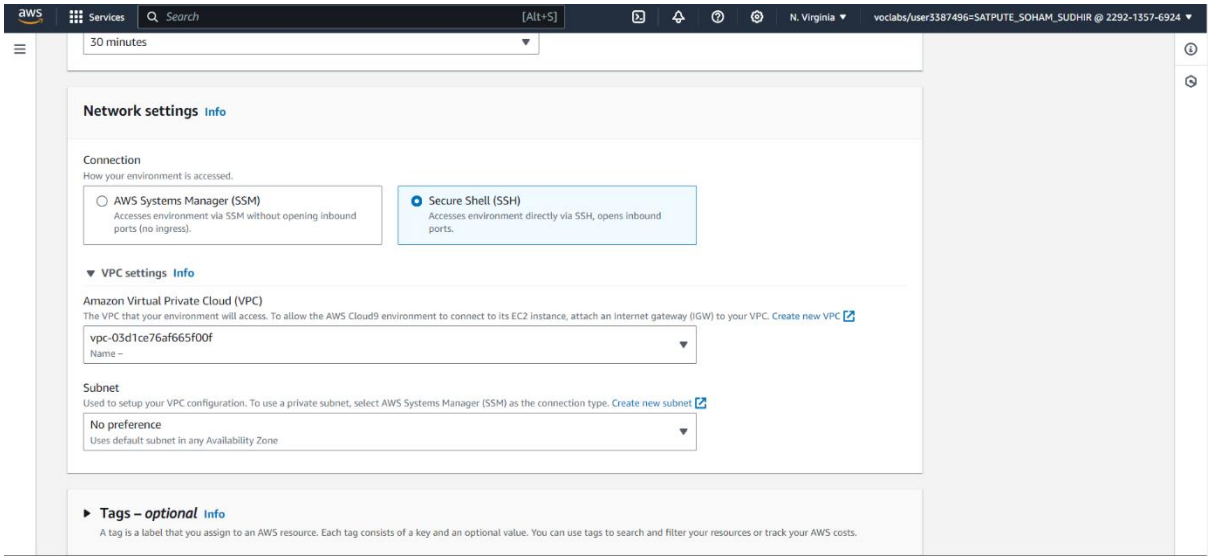
1. Hosting using Cloud 9:

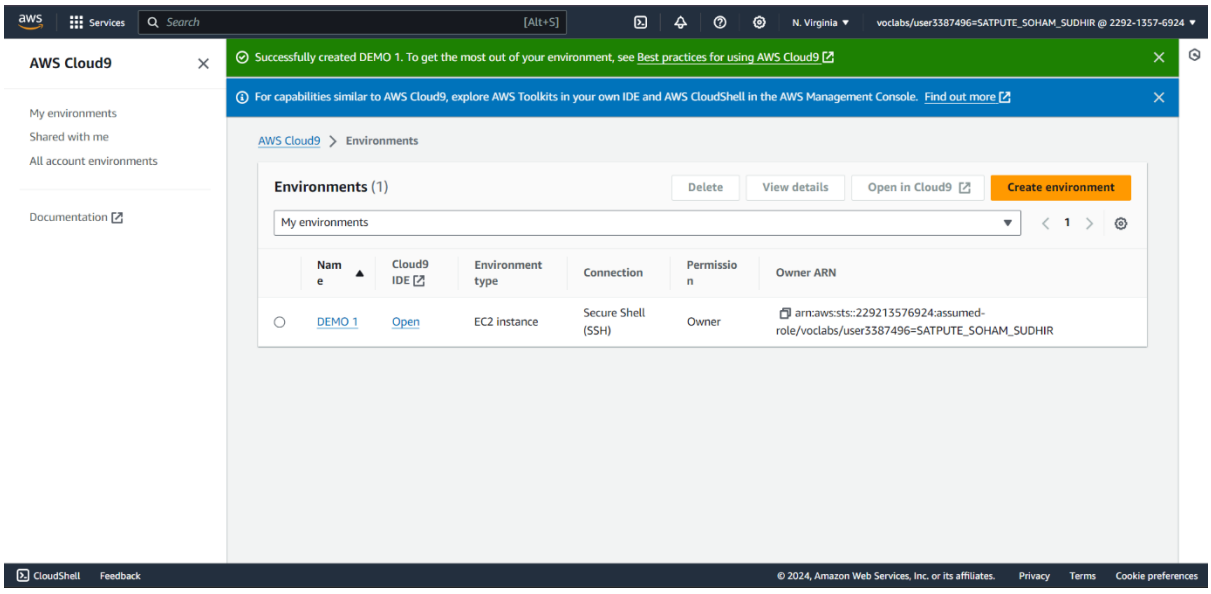



Services
Search
[Alt+S]
N. Virginia
For capabilities similar to AWS Cloud9, explore AWS Toolkits in your own IDE and AWS CloudShell in the AWS Management Console. Find out more
AWS Cloud9 > Environments > Create environment
Create environment Info
Details
Name
DEMO 1
Limit of 60 characters, alphanumeric and unique per user.
Description – optional
Limit 200 characters.
Environment type Info
Determines what the Cloud9 IDE will run on.
New EC2 instance
Cloud9 creates an EC2 instance in your account. The configuration of your EC2 instance cannot be changed by Cloud9 after creation.
Existing compute
You have an existing instance or server that you'd like to use.


Services
Search
[Alt+S]
N. Virginia
New EC2 instance
Instance type Info
The memory and CPU of the EC2 instance that will be created for Cloud9 to run on.
t2.micro (1 GiB RAM + 1 vCPU)
Free-tier eligible. Ideal for educational users and exploration.
t3.small (2 GiB RAM + 2 vCPU)
Recommended for small web projects.
m5.large (8 GiB RAM + 2 vCPU)
Recommended for production and most general-purpose development.
Additional instance types
Explore additional instances to fit your needs.
Platform Info
This will be installed on your EC2 instance. We recommend Amazon Linux 2023.
Amazon Linux 2023
Timeout
How long Cloud9 can be inactive (no user input) before auto-hibernating. This helps prevent unnecessary charges.
30 minutes
Network settings Info


Services
Search
[Alt+S]
N. Virginia
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
Network settings Info
Connection
How your environment is accessed.
AWS Systems Manager (SSM)
Accesses environment via SSM without opening inbound ports (no ingress).
Secure Shell (SSH)
Accesses environment directly via SSH, opens inbound ports.
VPC settings Info
Tags – optional Info
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.
The following IAM resources will be created in your account
AWSServiceRoleForAWSCloud9 – AWS Cloud9 creates a service-linked role for you. This allows AWS Cloud9 to call other AWS services on your behalf. You can delete the role from the AWS IAM console once you no longer have any AWS Cloud9 environments. Find out more
AWSCloud9SSMAccessRole and AWSCloud9SSMInstanceProfile – A service role and an instance profile are automatically created if Cloud9 accesses its EC2 instance through AWS Systems Manager. If your environments no longer require EC2 instances that block incoming traffic, you can delete these roles using the AWS IAM console. Find out more
Cancel
Create


Services
Search
[Alt+S]
N. Virginia
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
30 minutes
Network settings Info
Connection
How your environment is accessed.
AWS Systems Manager (SSM)
Accesses environment via SSM without opening inbound ports (no ingress).
Secure Shell (SSH)
Accesses environment directly via SSH, opens inbound ports.
VPC settings Info
Amazon Virtual Private Cloud (VPC)
The VPC that your environment will access. To allow the AWS Cloud9 environment to connect to its EC2 instance, attach an Internet gateway (IGW) to your VPC. Create new VPC
vpc-03d1ce76af665f00f
Name –
Subnet
Used to setup your VPC configuration. To use a private subnet, select AWS Systems Manager (SSM) as the connection type. Create new subnet
No preference
Uses default subnet in any Availability Zone
Tags – optional Info
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.


Services
Search
[Alt+S]
N. Virginia
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
AWS Cloud9
My environments
Shared with me
All account environments
Documentation
Successfully created DEMO 1. To get the most out of your environment, see Best practices for using AWS Cloud9
For capabilities similar to AWS Cloud9, explore AWS Toolkits in your own IDE and AWS CloudShell in the AWS Management Console. Find out more
AWS Cloud9 > Environments
Environments (1)
Delete
View details
Open in Cloud9
Create environment
My environments
Name
Cloud9 IDE
Environment type
Connection
Permission
Owner ARN
DEMO 1
Open
EC2 instance
Secure Shell (SSH)
Owner
arn:aws:sts::229213576924:assumed-role/voclabs/user3387496=SATPUTE_SOHAM_SUDHIR
CloudShell
Feedback
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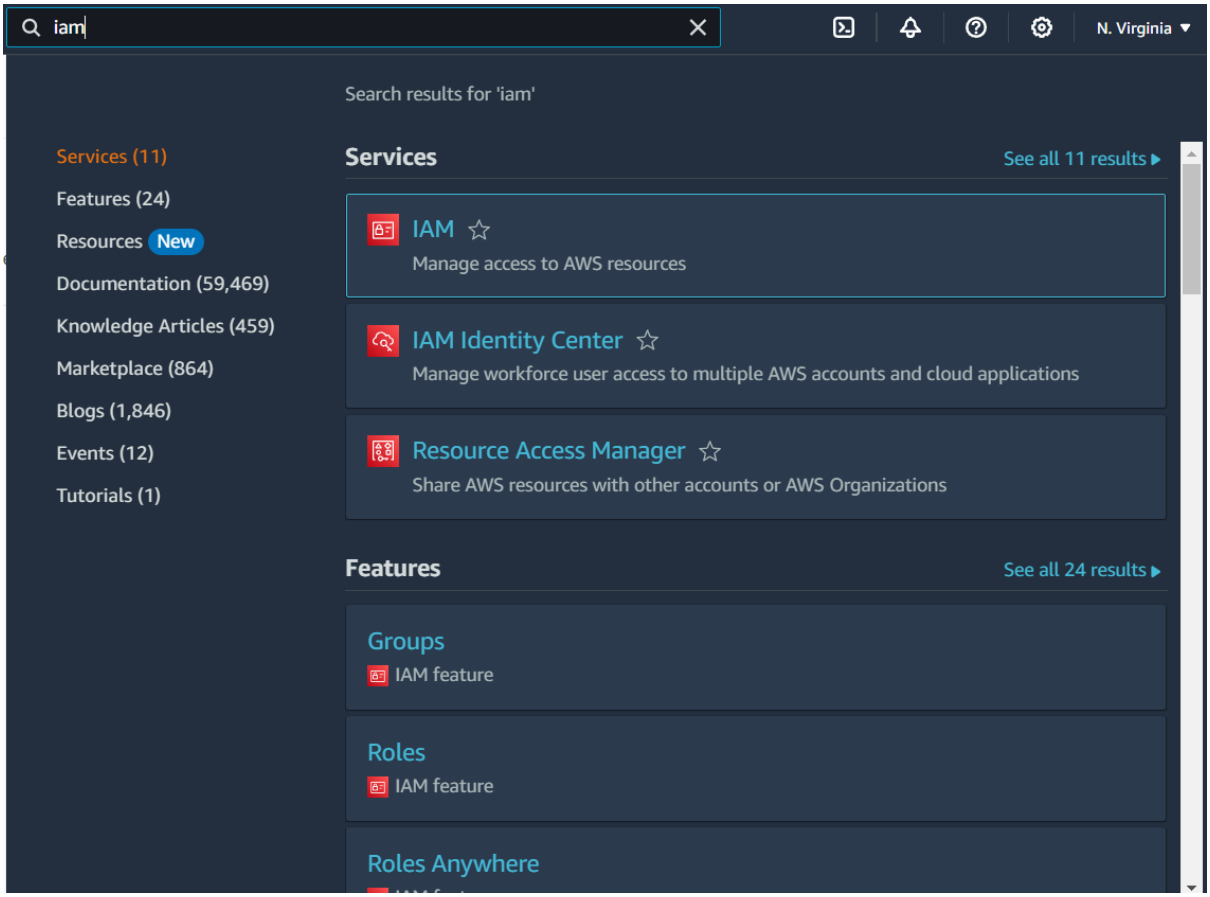
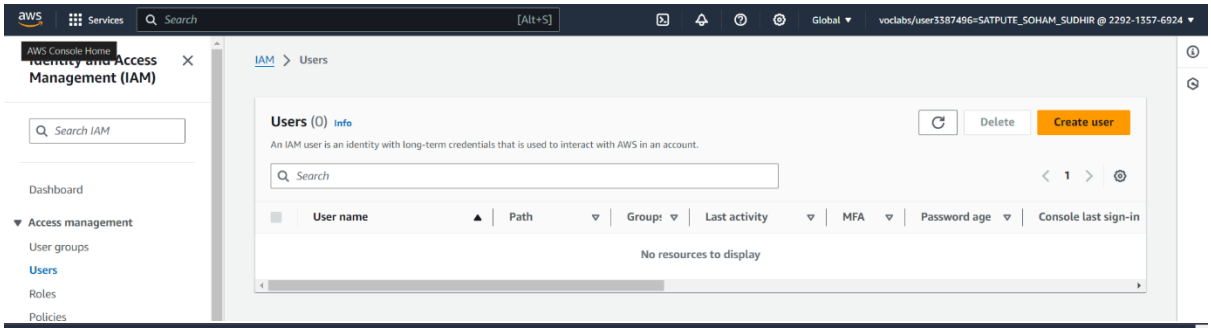
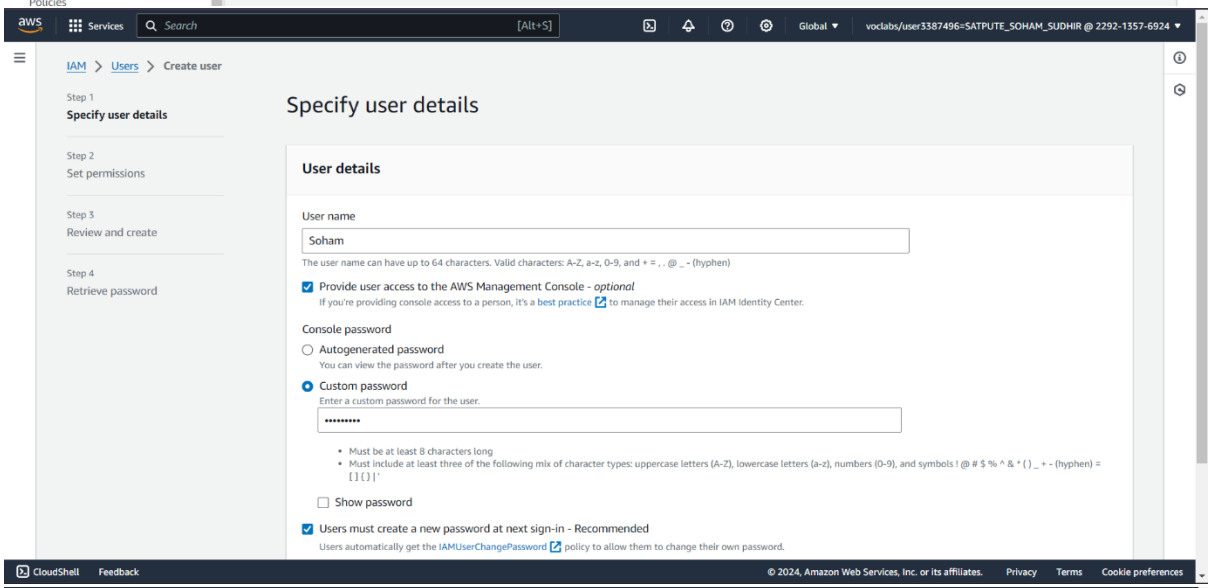
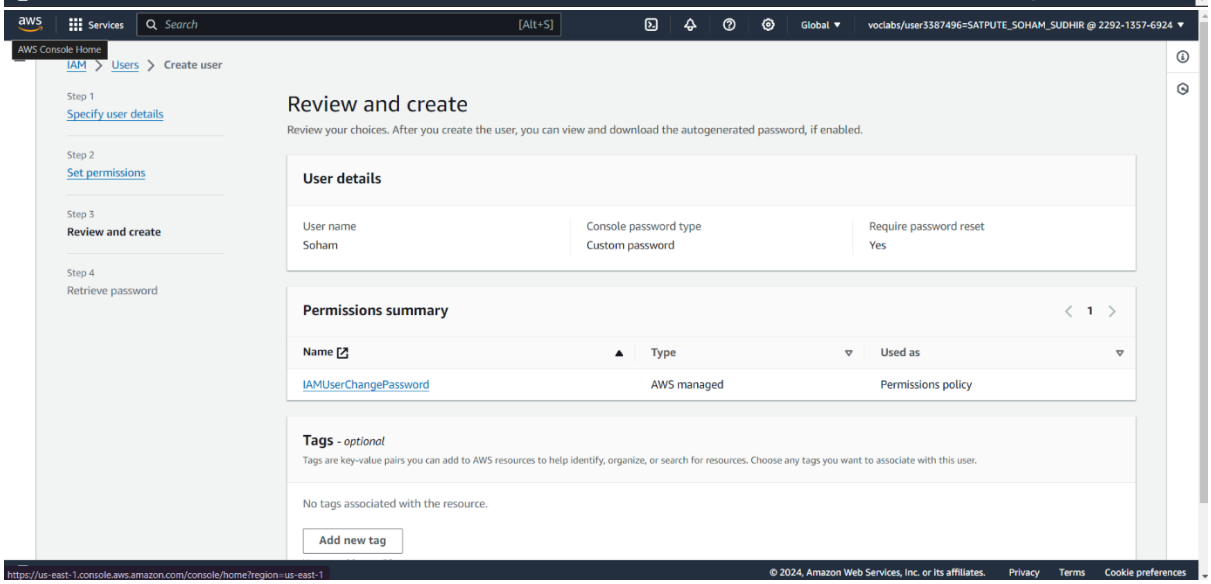
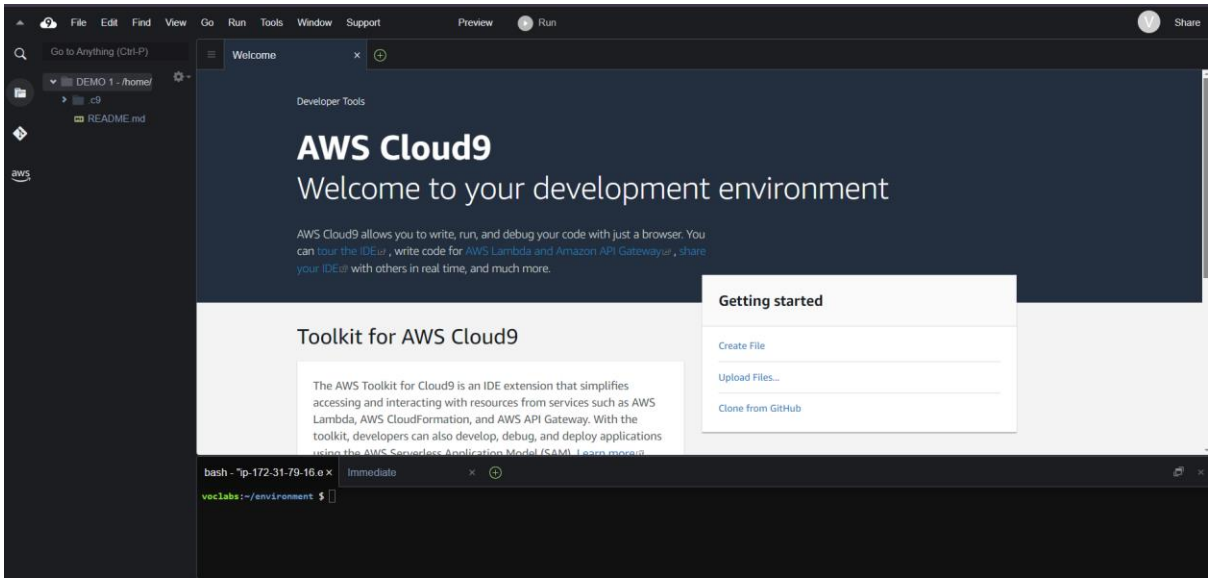
Privacy
Terms
Cookie preferences

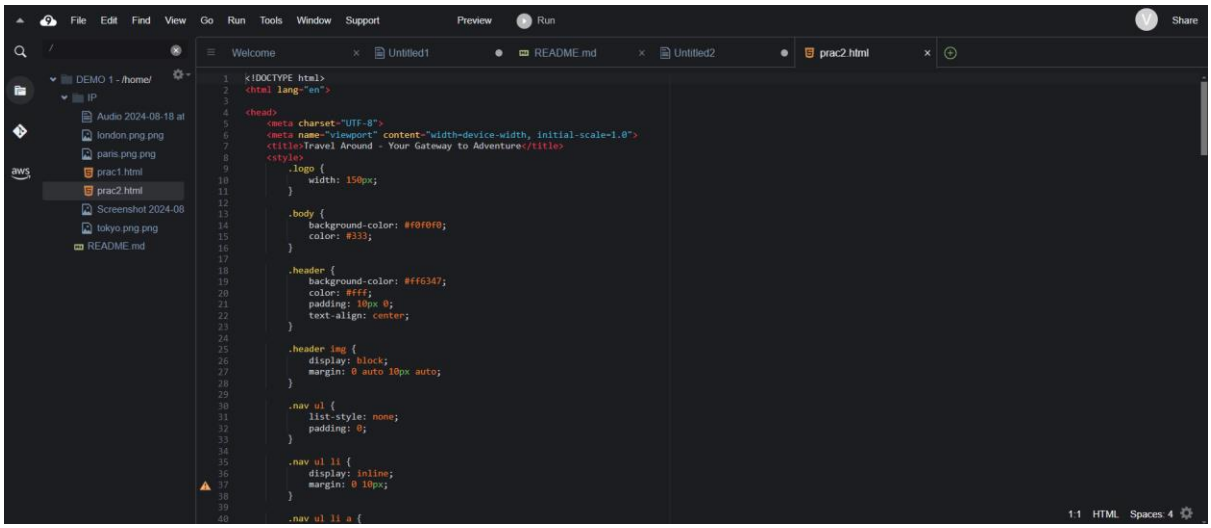

iam
N. Virginia
Search results for 'iam'
Services (11)
Features (24)
Resources New
Documentation (59,469)
Knowledge Articles (459)
Marketplace (864)
Blogs (1,846)
Events (12)
Tutorials (1)
Services
See all 11 results
IAM
Manage access to AWS resources
IAM Identity Center
Manage workforce user access to multiple AWS accounts and cloud applications
Resource Access Manager
Share AWS resources with other accounts or AWS Organizations
Features
See all 24 results
Groups
IAM feature
Roles
IAM feature
Roles Anywhere

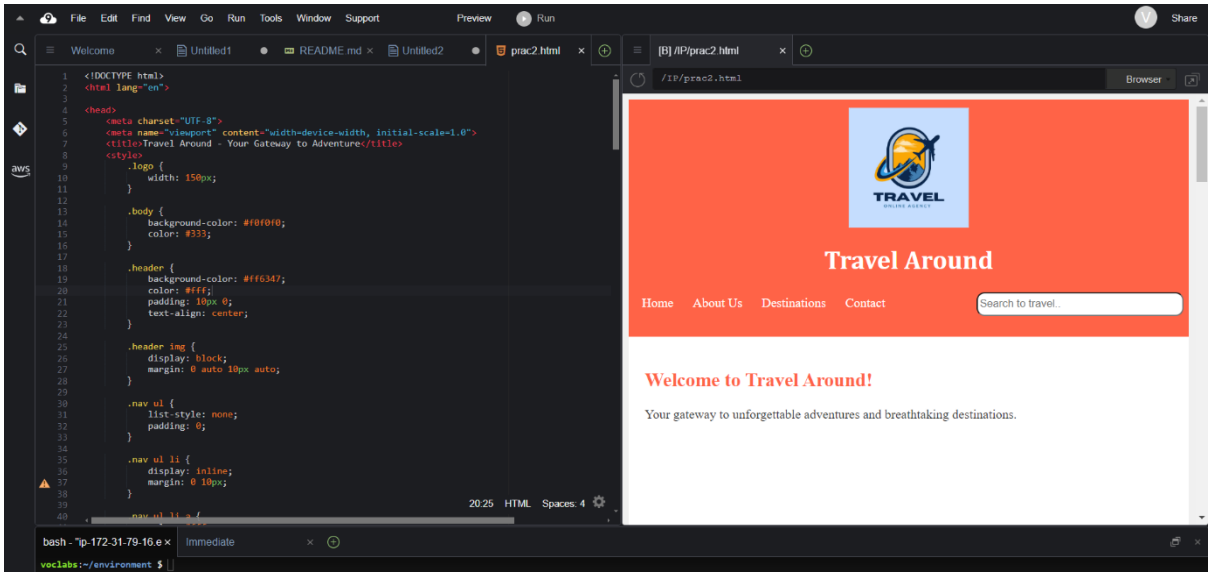

Services
Search
[Alt+S]
Global
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
AWS Console Home
Identity and Access Management (IAM)
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
IAM > Users
Users (0) Info
An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.
Delete
Create user
Search
User name
Path
Groups
Last activity
MFA
Password age
Console last sign-in
No resources to display


Services
Search
[Alt+S]
Global
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
IAM > Users > Create user
Step 1
Specify user details
Step 2
Set permissions
Step 3
Review and create
Step 4
Retrieve password
Specify user details
User details
User name
Soham
The user name can have up to 64 characters. Valid characters: A-Z, a-z, 0-9, and + = , . @ _ - (hyphen)
Provide user access to the AWS Management Console - optional
If you're providing console access to a person, it's a best practice to manage their access in IAM Identity Center.
Console password
Autogenerated password
You can view the password after you create the user.
Custom password
Enter a custom password for the user.
Must be at least 8 characters long
Must include at least three of the following mix of character types: uppercase letters (A-Z), lowercase letters (a-z), numbers (0-9), and symbols ! @ # $ % ^ & * ( ) _ + - (hyphen) = [ ] { } | '
Show password
Users must create a new password at next sign-in - Recommended
Users automatically get the IAMUserChangePassword policy to allow them to change their own password.
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

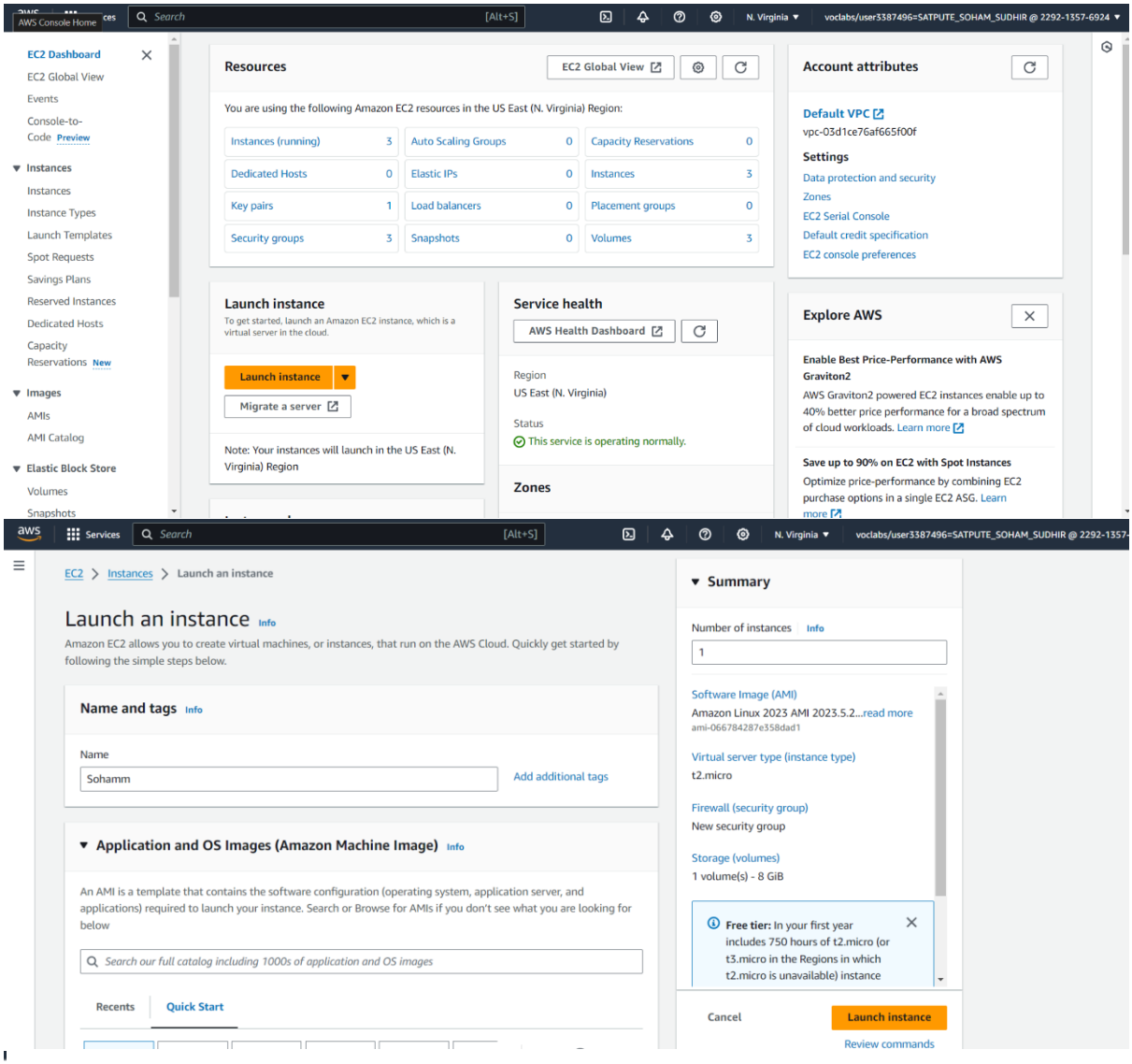

Services
Search
[Alt+S]
Global
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
AWS Console Home
IAM > Users > Create user
Step 1
Specify user details
Step 2
Set permissions
Step 3
Review and create
Step 4
Retrieve password
Review and create
Review your choices. After you create the user, you can view and download the autogenerated password, if enabled.
User details
User name
Soham
Console password type
Custom password
Require password reset
Yes
Permissions summary
Name
Type
Used as
IAMUserChangePassword
AWS managed
Permissions policy
Tags - optional
Tags are key-value pairs you can add to AWS resources to help identify, organize, or search for resources. Choose any tags you want to associate with this user.
No tags associated with the resource.
Add new tag
https://us-east-1.console.aws.amazon.com/console/home?region=us-east-1
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

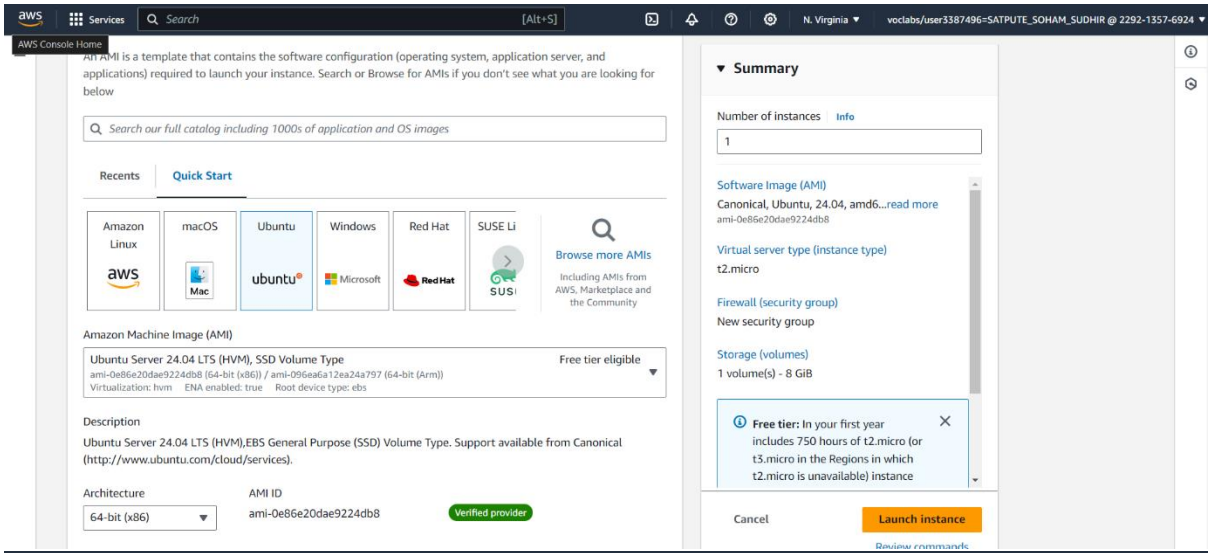

File Edit Find View Go Run Tools Window Support Preview Run Share
Go to Anything (Ctrl-P)
DEMO 1 - /home/
.c9
README.md
Welcome
Developer Tools
AWS Cloud9
Welcome to your development environment
AWS Cloud9 allows you to write, run, and debug your code with just a browser. You can tour the IDE, write code for AWS Lambda and Amazon API Gateway, share your IDE with others in real time, and much more.
Getting started
Create File
Upload Files...
Clone from GitHub
Toolkit for AWS Cloud9
The AWS Toolkit for Cloud9 is an IDE extension that simplifies accessing and interacting with resources from services such as AWS Lambda, AWS CloudFormation, and AWS API Gateway. With the toolkit, developers can also develop, debug, and deploy applications
bash - "ip-172-31-79-16.e
Immediate
voclabs:~/environment $

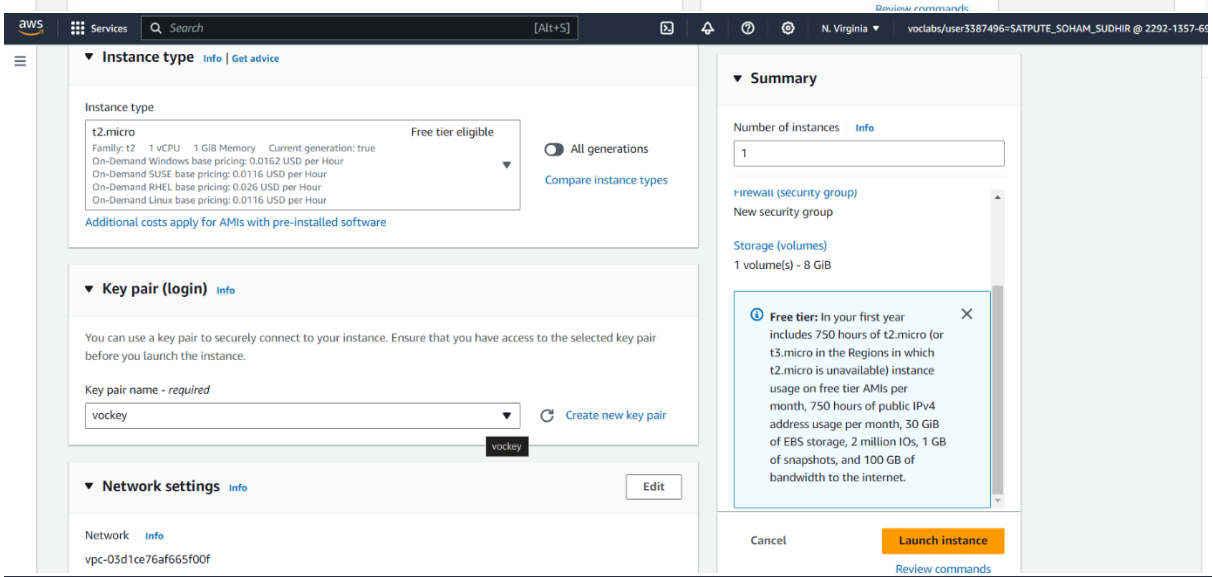

File Edit Find View Go Run Tools Window Support Preview Run Share
Welcome
Untitled1
README.md
Untitled2
prac2.html
DEMO 1 - /home/
IP
Audio 2024-08-18 at
london.png.png
paris.png.png
prac1.html
prac2.html
Screenshot 2024-08
tokyo.png.png
README.md
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Travel Around - Your Gateway to Adventure</title>
<style>
.logo {
width: 150px;
}
.body {
background-color: #f0f0f0;
color: #333;
}
.header {
background-color: #ff6347;
color: #fff;
padding: 10px 0;
text-align: center;
}
.header img {
display: block;
margin: 0 auto 10px auto;
}
.nav ul {
list-style: none;
padding: 0;
}
.nav ul li {
display: inline;
margin: 0 10px;
}
1:1 HTML Spaces: 4

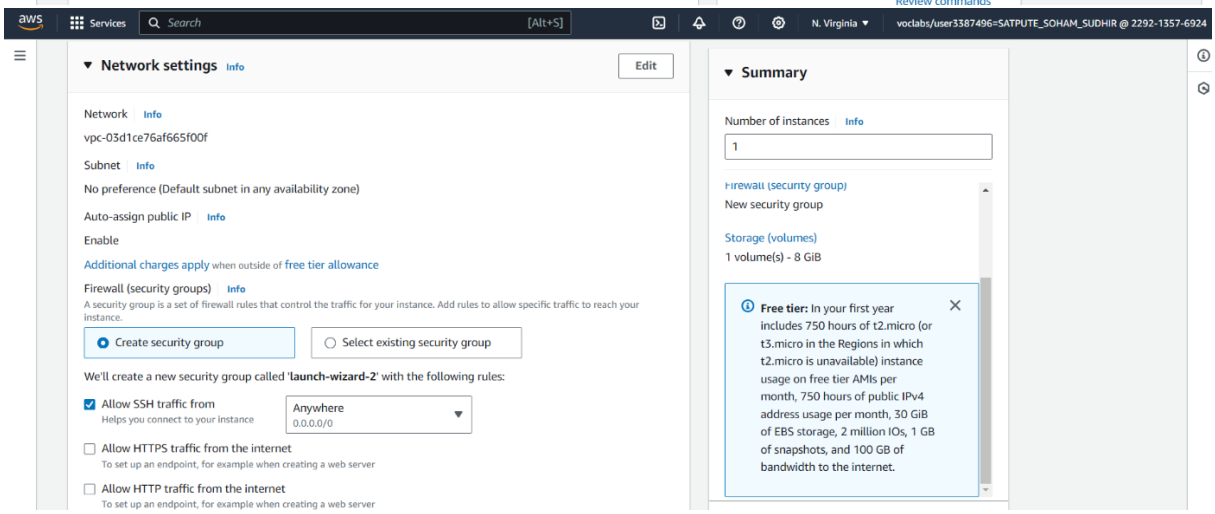

File Edit Find View Go Run Tools Window Support Preview Run Share
Welcome
Untitled1
README.md
Untitled2
prac2.html
[B] /IP/prac2.html
/IP/prac2.html
Browser
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Travel Around - Your Gateway to Adventure</title>
<style>
.logo {
width: 150px;
}
.body {
background-color: #f0f0f0;
color: #333;
}
.header {
background-color: #ff6347;
color: #fff;
padding: 10px 0;
text-align: center;
}
.header img {
display: block;
margin: 0 auto 10px auto;
}
.nav ul {
list-style: none;
padding: 0;
}
.nav ul li {
display: inline;
margin: 0 10px;
}
20:25 HTML Spaces: 4
TRAVEL
Travel Around
Home
About Us
Destinations
Contact
Search to travel...
Welcome to Travel Around!
Your gateway to unforgettable adventures and breathtaking destinations.
bash - "ip-172-31-79-16.e
Immediate
voclabs:~/environment $

2. Hosting using EC2 INSTANCE:




aws
Services
Search
[Alt+S]
N. Virginia
voclabs/user3387496=SATPUTE_SOHAM_SUDHIR @ 2292-1357-6924
AWS Console Home
An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Li
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Ubuntu Server 24.04 LTS (HVM), SSD Volume Type
Free tier eligible
ami-0e86e20dae9224db8 (64-bit (x86)) / ami-096ea6a12ea24a797 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs
Description
Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Architecture
64-bit (x86)
AMI ID
ami-0e86e20dae9224db8
Verified provider
Summary
Number of instances
Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-0e86e20dae9224db8
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance
Cancel
Launch instance


Instance type
Info | Get advice
Instance type
t2.micro
Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Windows base pricing: 0.0162 USD per Hour
On-Demand SUSE base pricing: 0.0116 USD per Hour
On-Demand RHEL base pricing: 0.026 USD per Hour
On-Demand Linux base pricing: 0.0116 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
vockey
Create new key pair
vockey
Network settings
Info
Edit
Network
Info
vpc-03d1ce76af665f00f
Summary
Number of instances
Info
1
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
Cancel
Launch instance
Review commands


Network settings
Info
Edit
Network
Info
vpc-03d1ce76af665f00f
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
We'll create a new security group called 'launch-wizard-2' with the following rules:
Allow SSH traffic from
Helps you connect to your instance
Anywhere
0.0.0.0/0
Allow HTTPS traffic from the internet
To set up an endpoint, for example when creating a web server
Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server
Summary
Number of instances
Info
1
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Configure storage Info

Advanced

1x 8 GiB gp3 Root volume (Not encrypted)

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

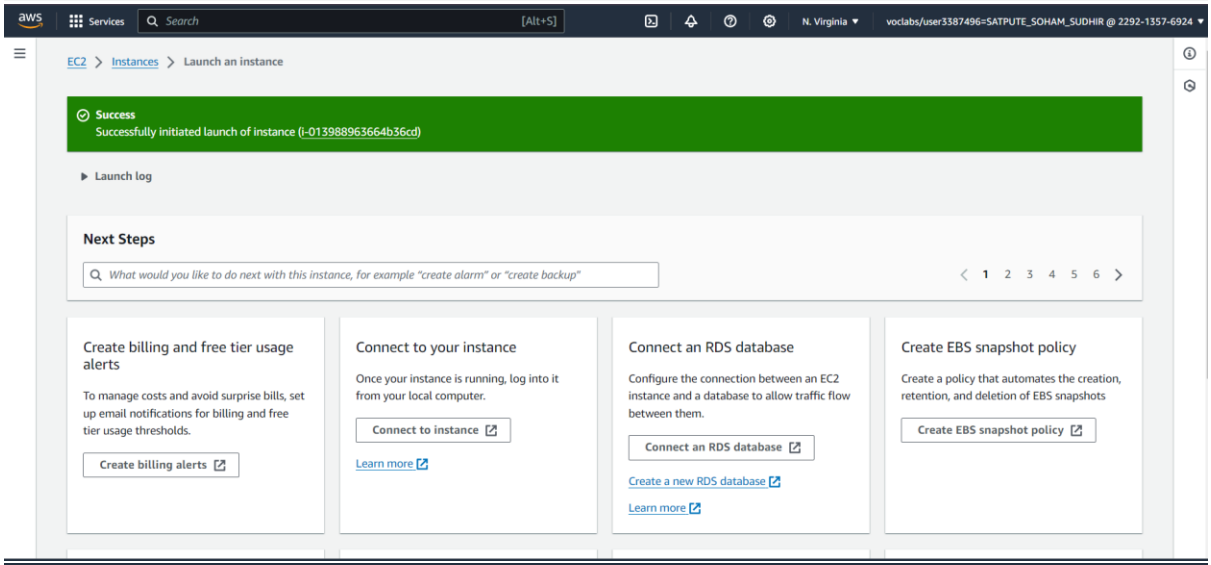
Add new volume

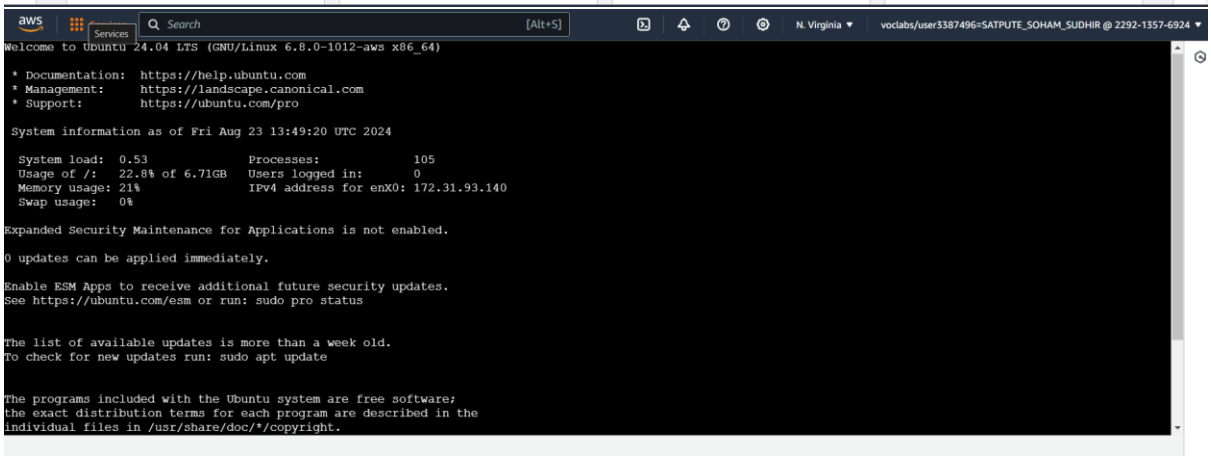
The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

Click refresh to view backup information

The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.

0 x File systems Edit

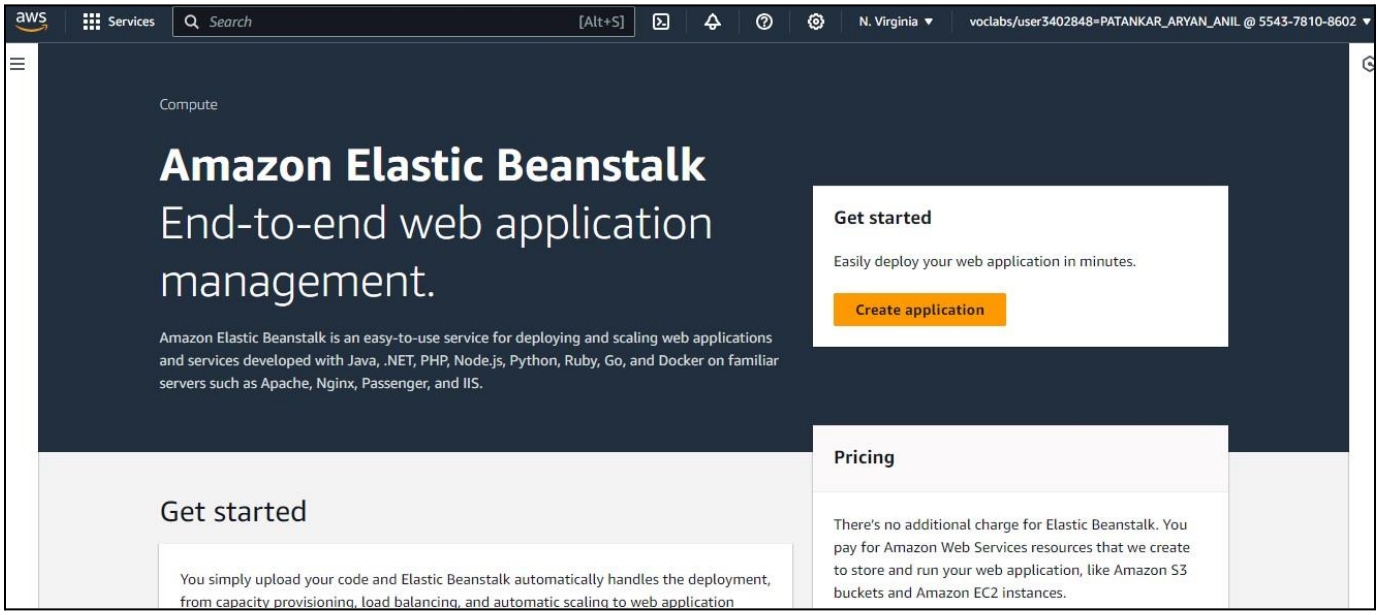




ADVANCE DEVOPS EXPERIMENT NO.2

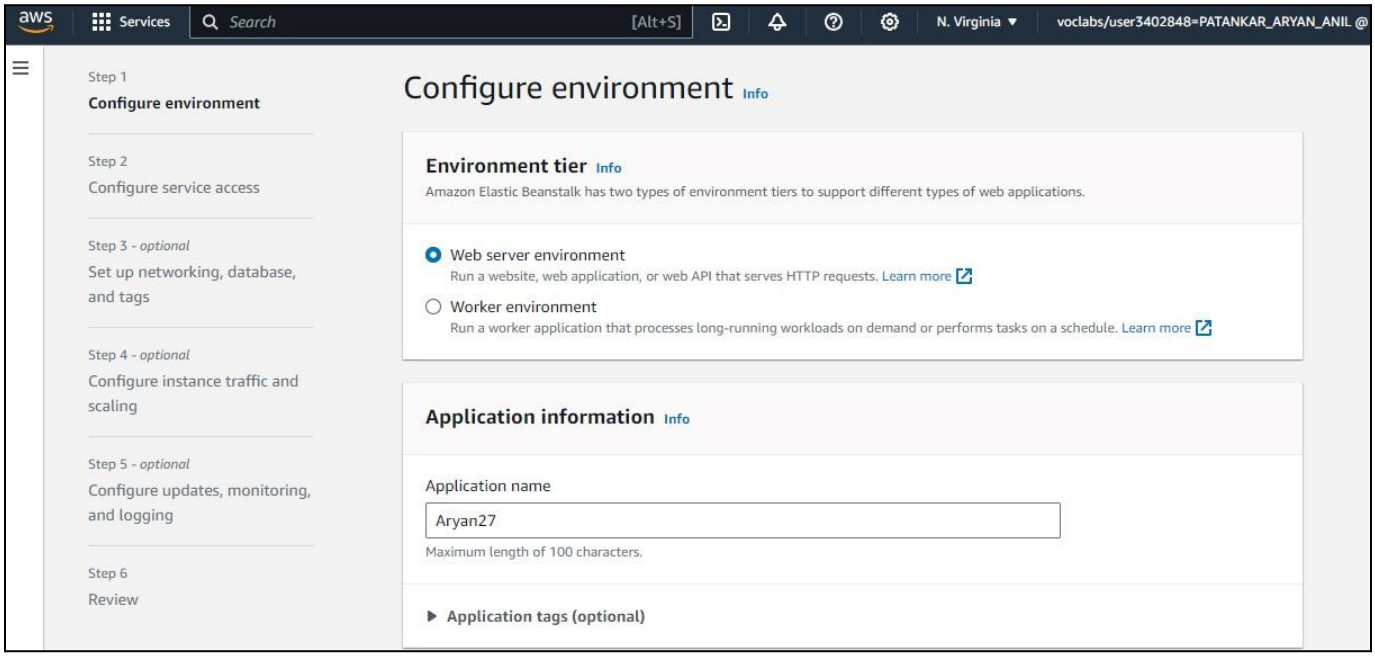
Name: Soham Satpute
Class:D15A
Roll No:52

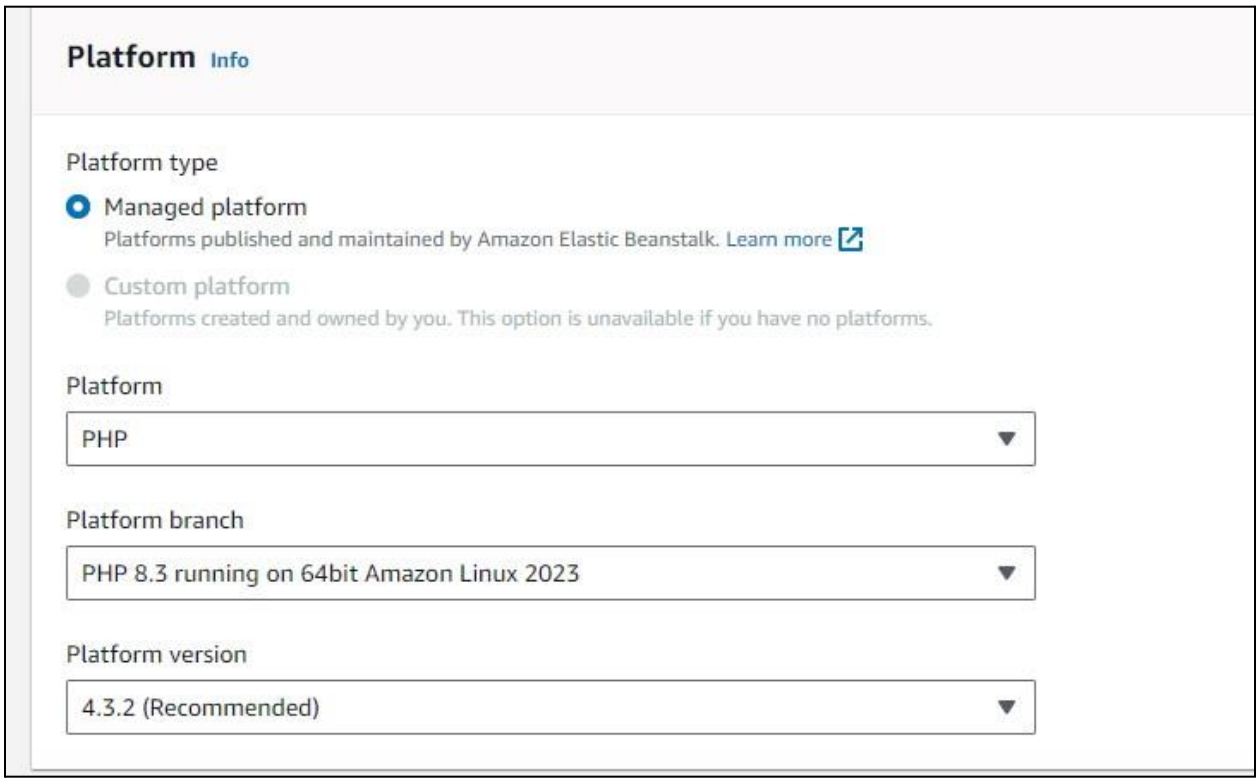
Aim: To Build Your Application using AWS CodeBuild and Deploy on S3 / SEBS using AWS CodePipeline, deploy Sample Application on EC2 instance using AWS CodeDeploy.

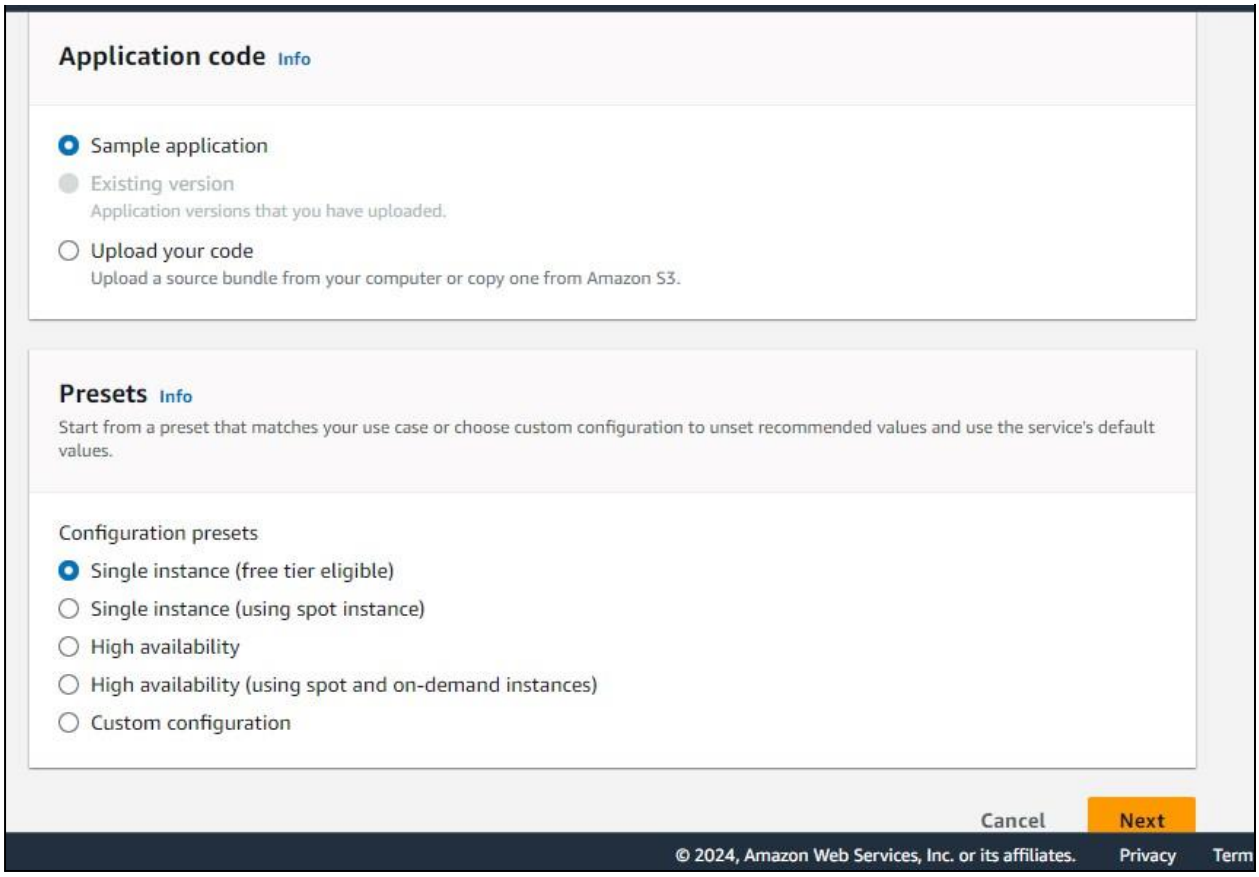


Step 1: Search for **Elastic Beanstalk** in the search bar next to services section and you would see the following page.

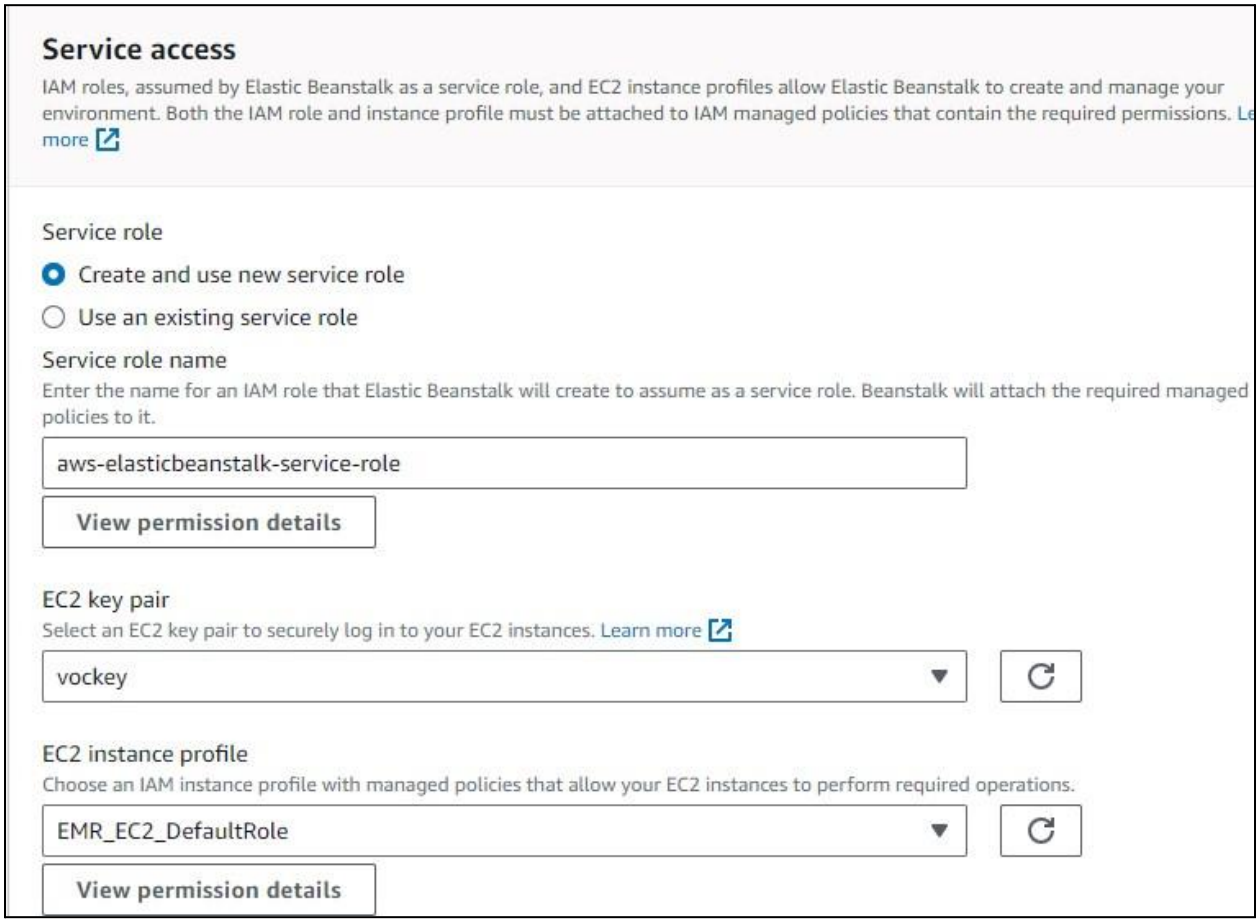
Step 2: Create a new application and proceed with the following settings






Application code Info
Sample application
Existing version
Application versions that you have uploaded.
Upload your code
Upload a source bundle from your computer or copy one from Amazon S3.
Presets Info
Start from a preset that matches your use case or choose custom configuration to unset recommended values and use the service's default values.
Configuration presets
Single instance (free tier eligible)
Single instance (using spot instance)
High availability
High availability (using spot and on-demand instances)
Custom configuration
Cancel
Next
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Term

Step 3: Create a new service role as given below,if an existing service role with the same name does not exist.Proceed with the steps given below.



Instances Info

Configure the Amazon EC2 instances that run your application.

Root volume (boot device)

Root volume type

(Container default)

Size

The number of gigabytes of the root volume attached to each instance.

8 GB

IOPS

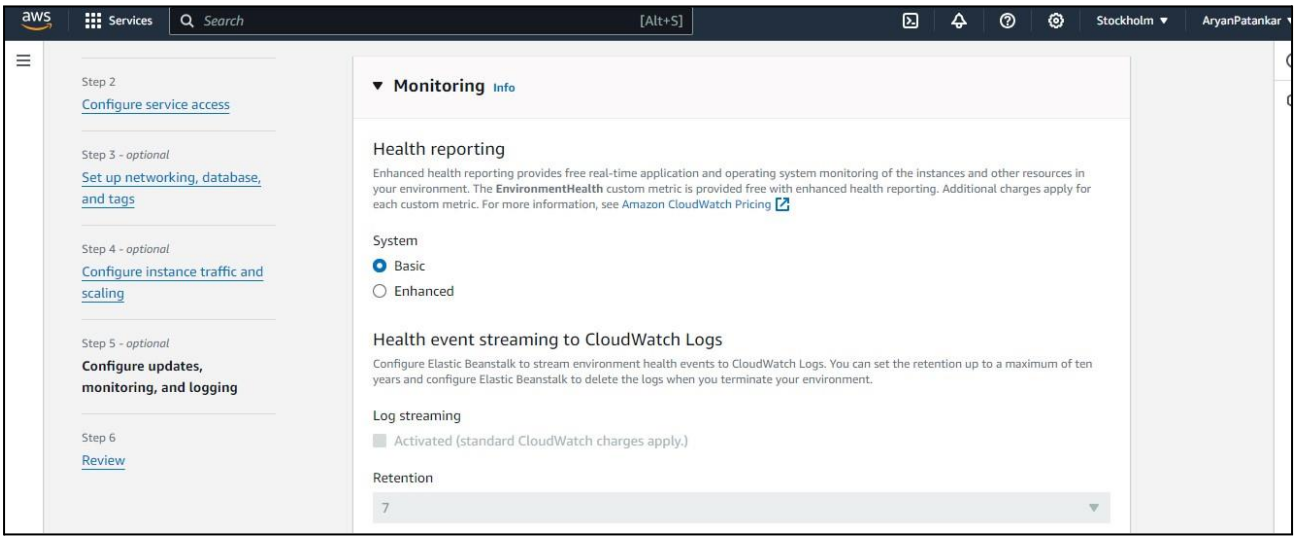
Input/output operations per second for a provisioned IOPS (SSD) volume.

100 IOPS

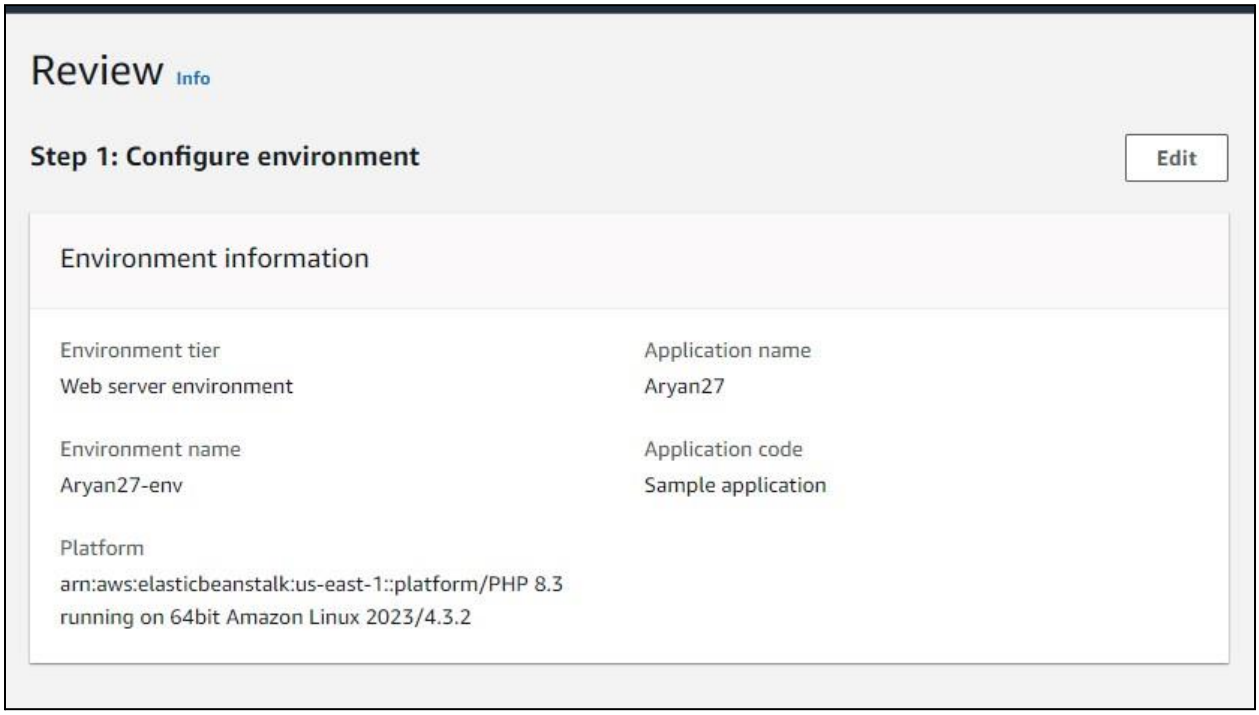
Throughput

The desired throughput to provision for the Amazon EBS root volume attached to your environment's EC2 instance

125 MiB/s



Step 4: Review each step along with the selected options and verify that the correct options have been chosen.



Step 2: Configure service access

Edit

Service access Info

Configure the service role and EC2 instance profile that Elastic Beanstalk uses to manage your environment. Choose an EC2 key pair to securely log in to your EC2 instances.

Service role	EC2 instance profile
arn:aws:iam::405894863107:role/service-role/aws-elasticbeanstalk-service-role	aws-elasticbeanstalk-ec2-role

Step 3: Set up networking, database, and tags

Edit

Networking, database, and tags Info

Configure VPC settings, and subnets for your environment's EC2 instances and load balancer. Set up an Amazon RDS database that's integrated with your environment.

Network

VPC	Public IP address	Instance subnets
vpc-0bf7d7d872a737f13	false	subnet-035fe38d8d742329e,subnet-0a7c9c6dedec1325d

Step 5: Configure updates, monitoring, and logging

Edit

Updates, monitoring, and logging Info

Define when and how Elastic Beanstalk deploys changes to your environment. Manage your application's monitoring and logging settings, instances, and other environment resources.

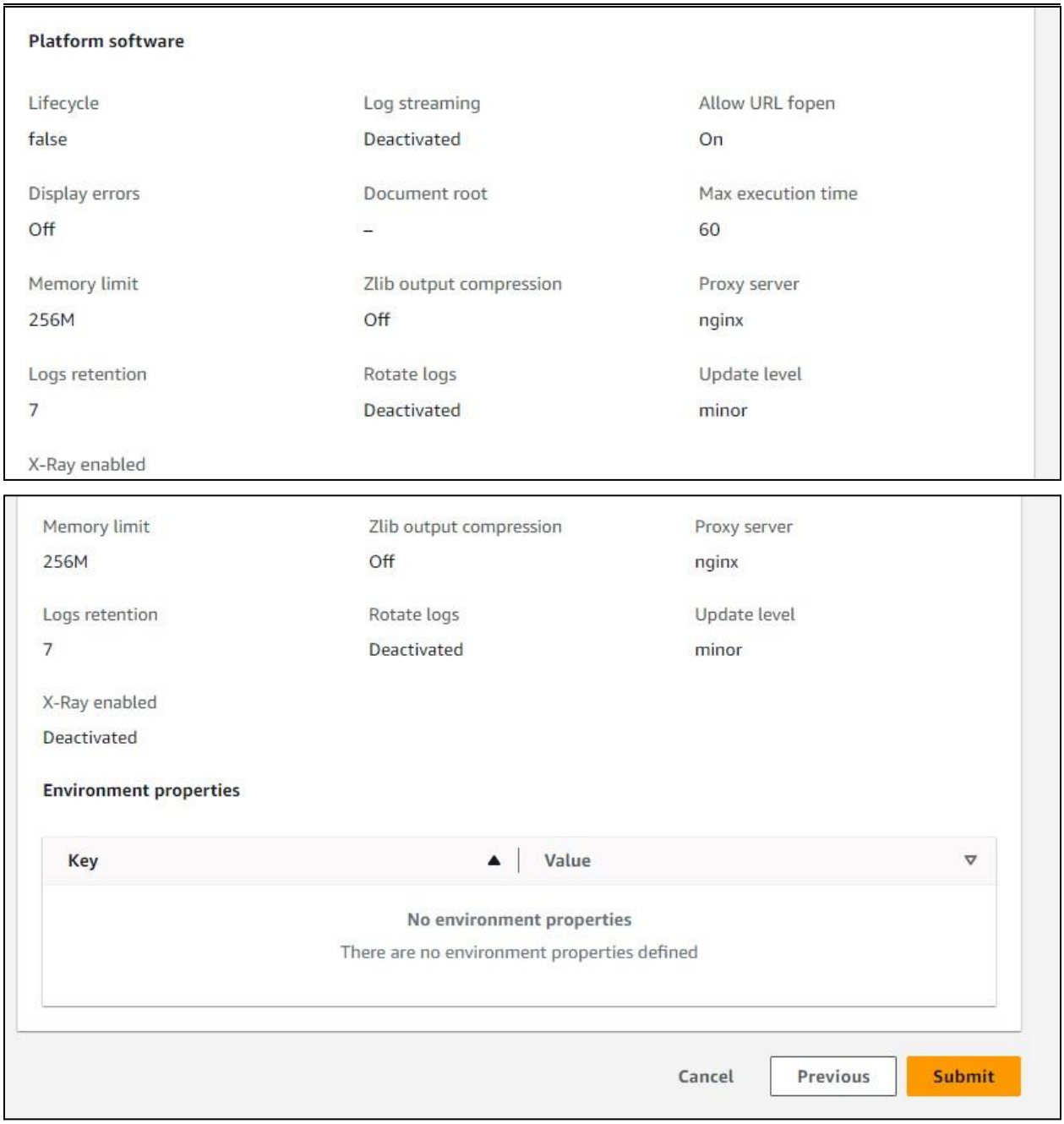
Monitoring

System	Cloudwatch custom metrics - instance	Cloudwatch custom metrics - environment
enhanced	—	—

Log streaming	Retention	Lifecycle
Deactivated	7	false

Updates

Managed updates	Deployment batch size	Deployment batch size type
Activated	100	Percentage



Platform software

Lifecycle	Log streaming	Allow URL fopen
false	Deactivated	On
Display errors	**Document root**	**Max execution time**
Off	–	60
Memory limit	**Zlib output compression**	**Proxy server**
256M	Off	nginx
Logs retention	**Rotate logs**	**Update level**
7	Deactivated	minor

X-Ray enabled

Memory limit	Zlib output compression	Proxy server
256M	Off	nginx
Logs retention	**Rotate logs**	**Update level**
7	Deactivated	minor

X-Ray enabled

Deactivated

Environment properties

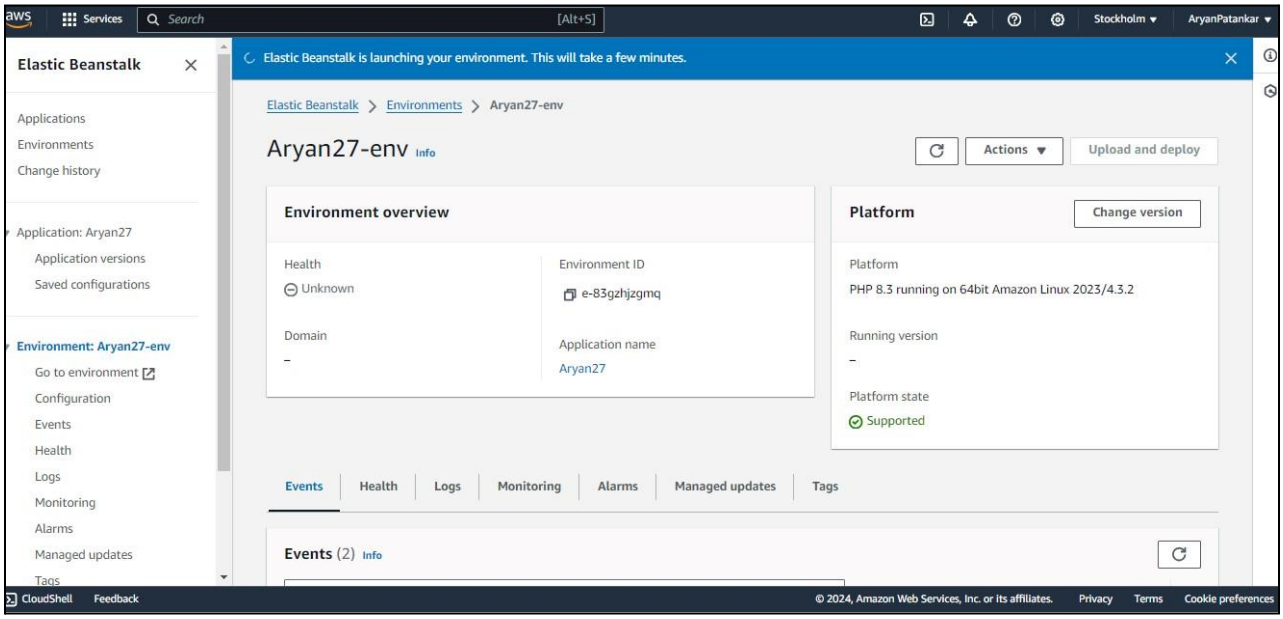
Key ▲	Value ▽

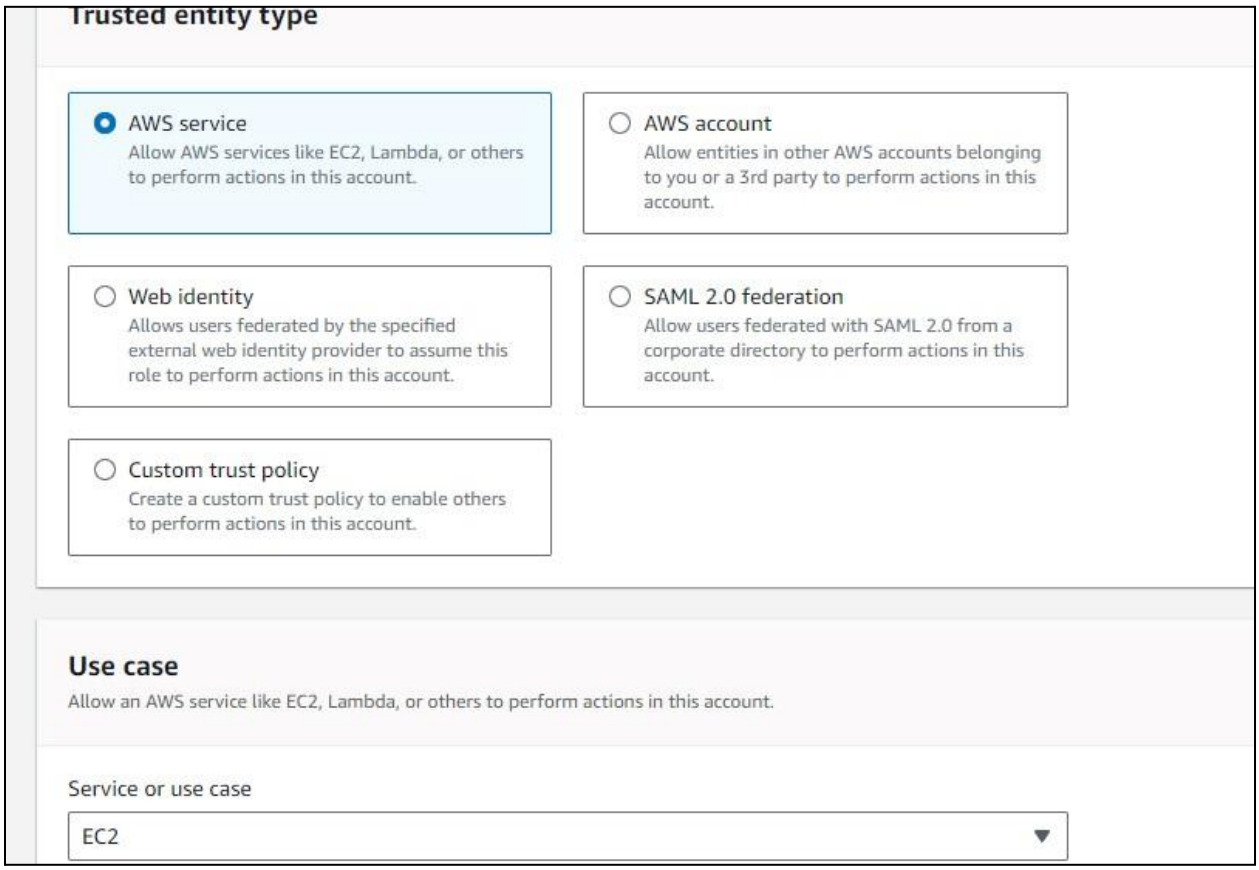
No environment properties

There are no environment properties defined

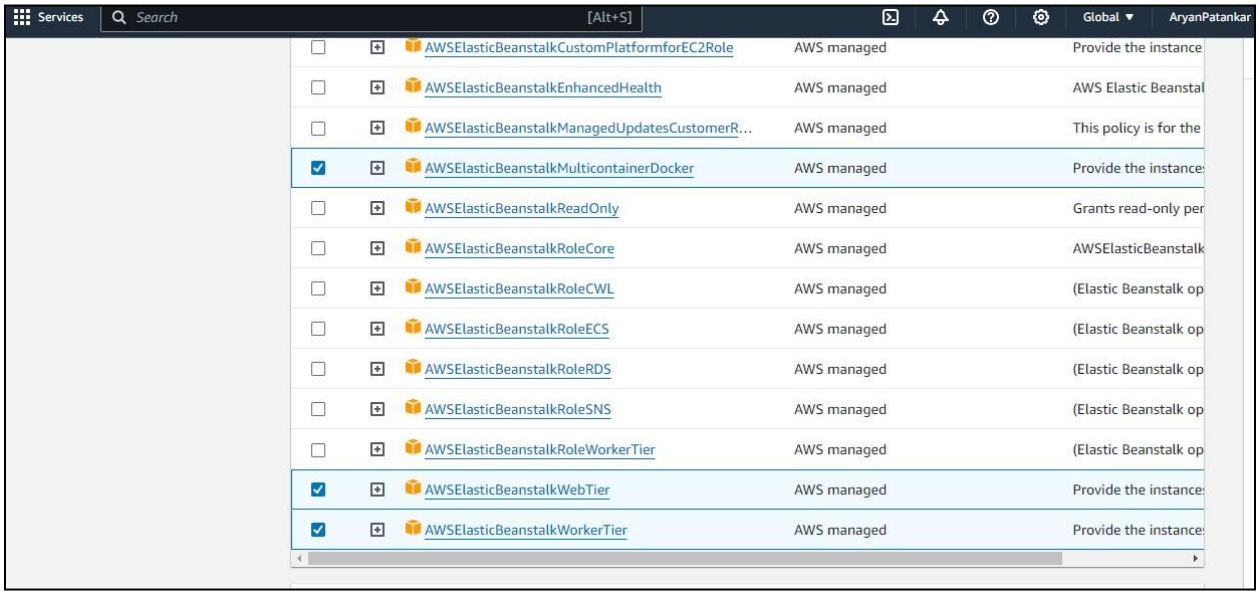
Cancel | Previous | Submit

Step 5: After clicking on the submit button, you would notice that the Elastic Beanstalk environment is being created and it may take some time for the environment to load completely.

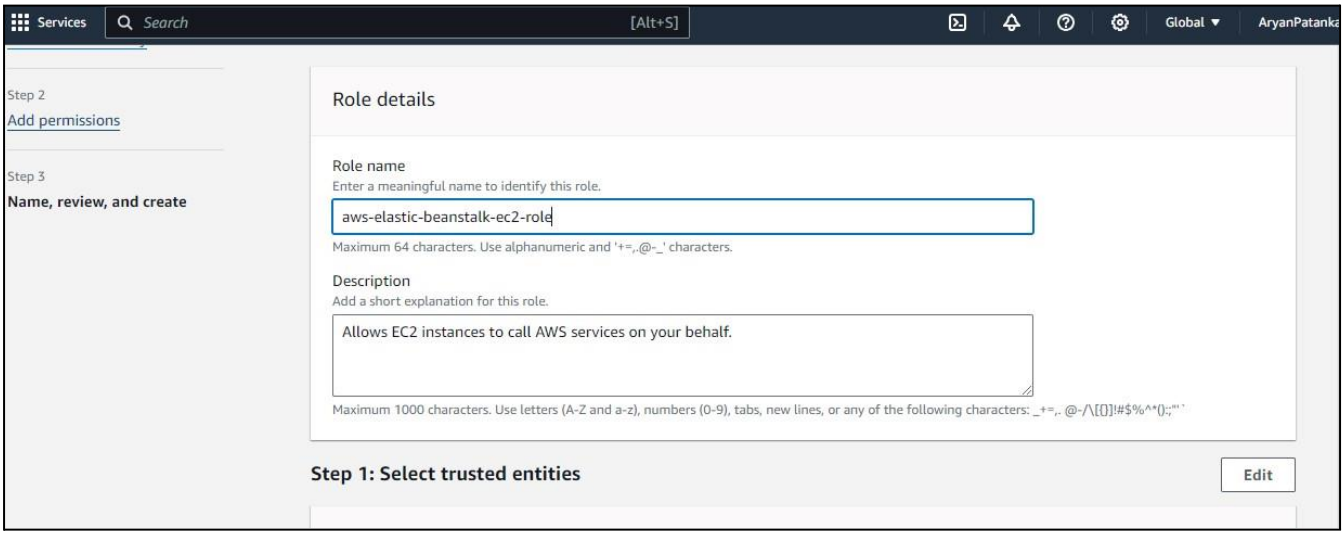


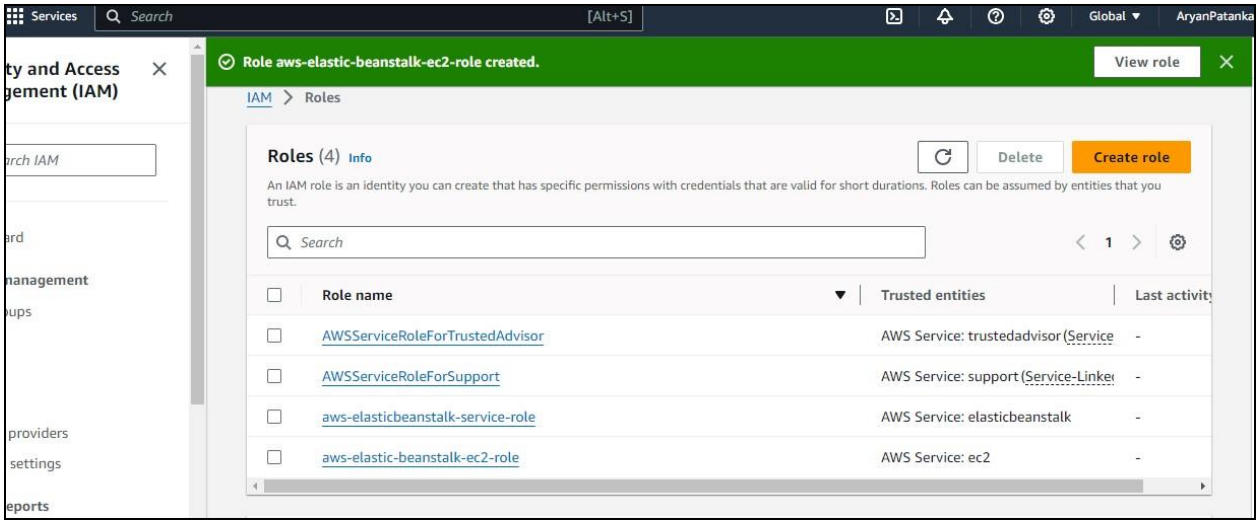


Step 6: Meanwhile,if a role is already not defined, then you need to create a new role for the elastic beanstalk and ensure there is a blue checkmark on the following three permissions given below.

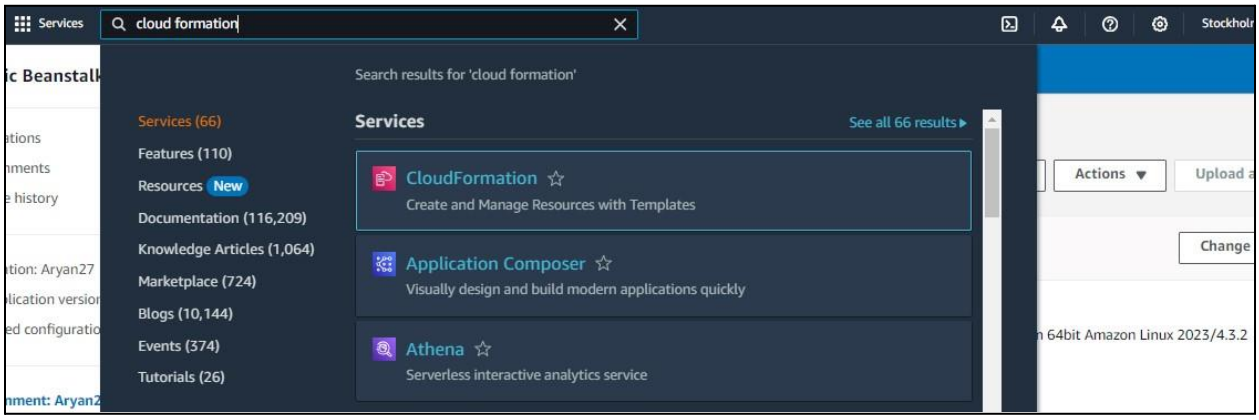


Step 7: Enter a role name and proceed.You would notice the role being successfully created after some time.

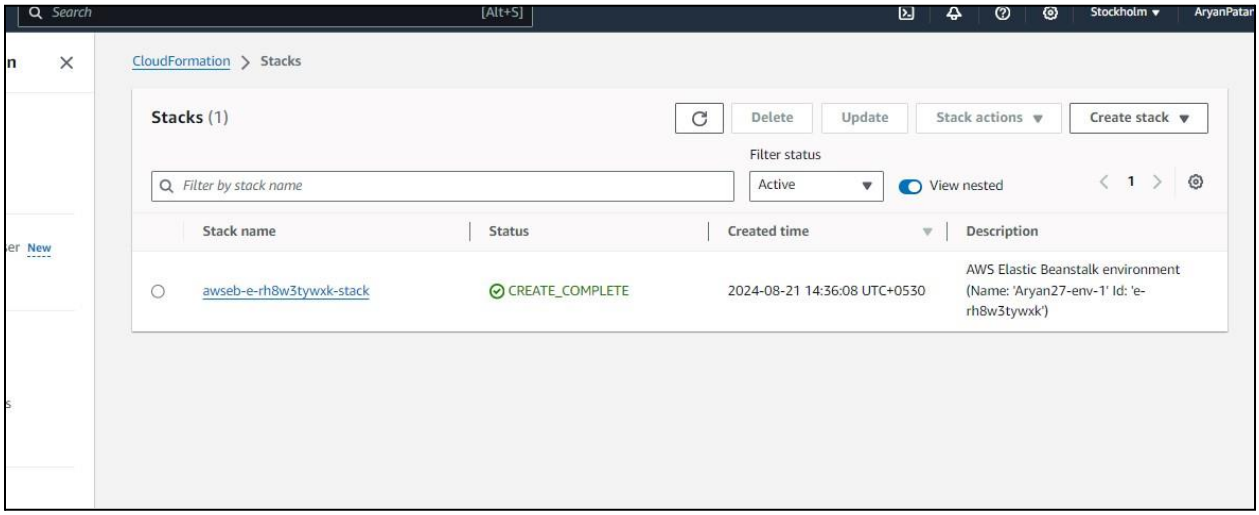


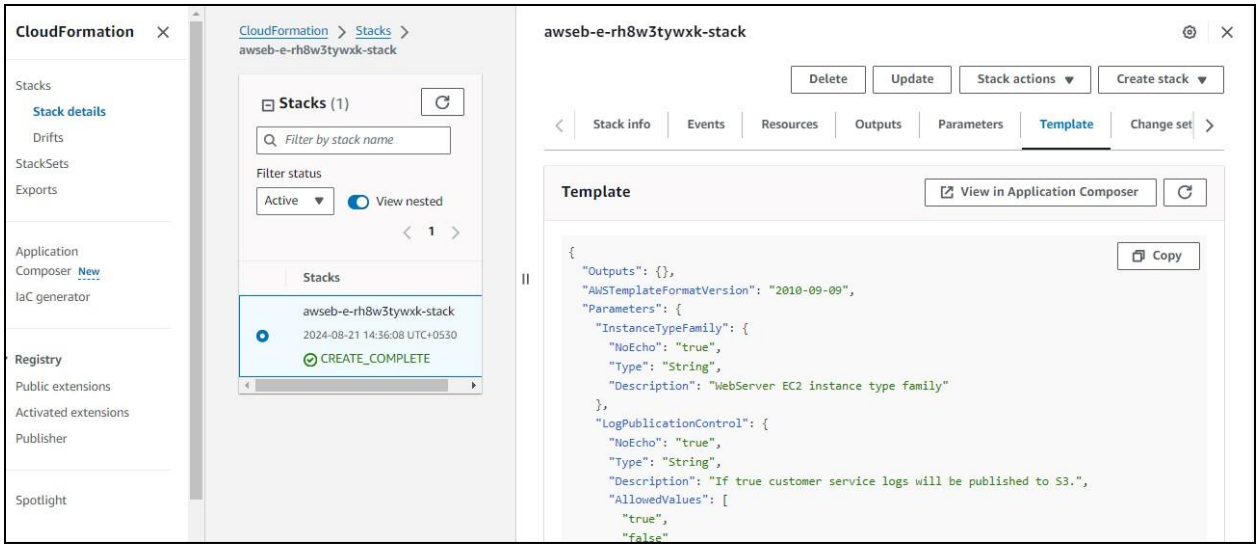


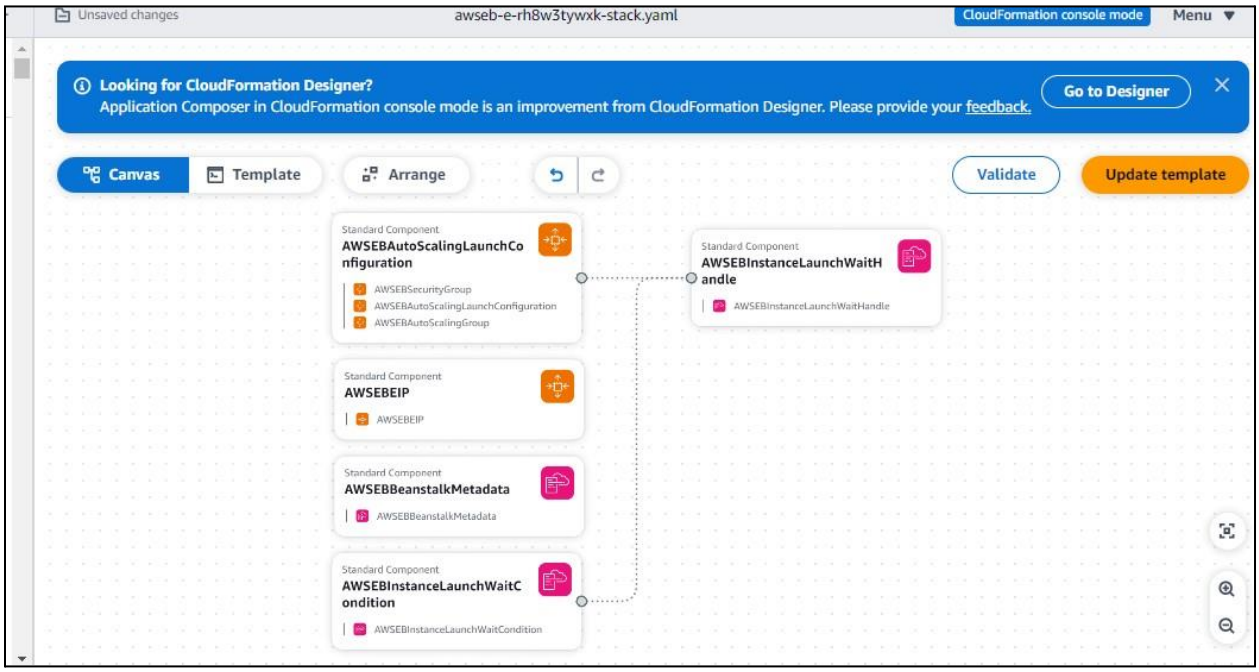
Step 8(optional):Search for CloudFormation as it helps you to manage AWS resources in a text file or a template.



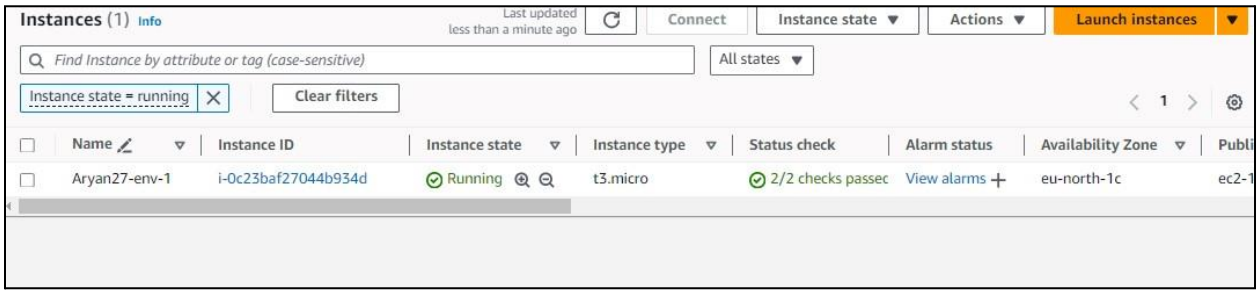
Here, the stacks option given below is a collection of AWS resources.



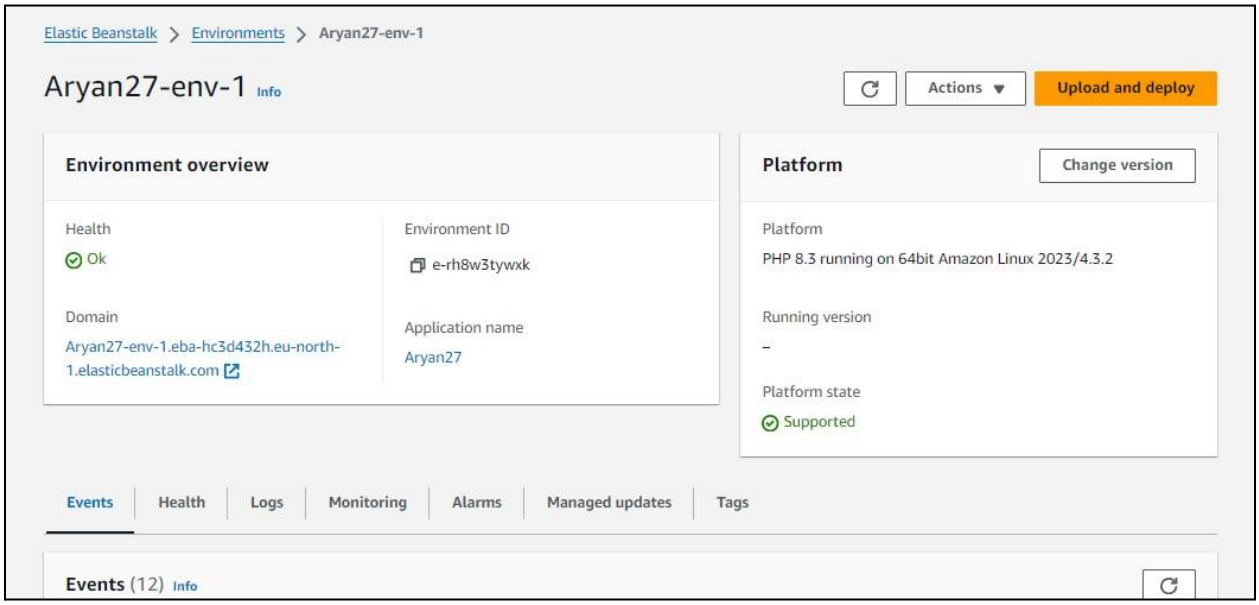


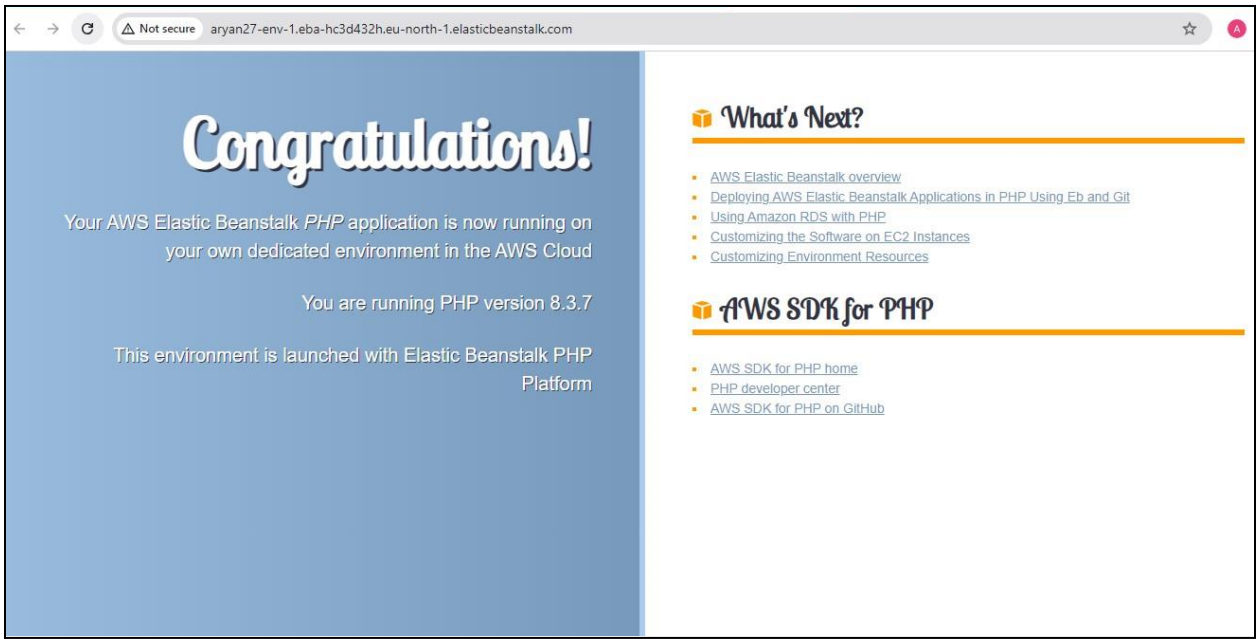


Step 9: Now,we search for EC2 in the services section and we notice that an instance of the Elastic Beanstalk app has already been created and it is running.

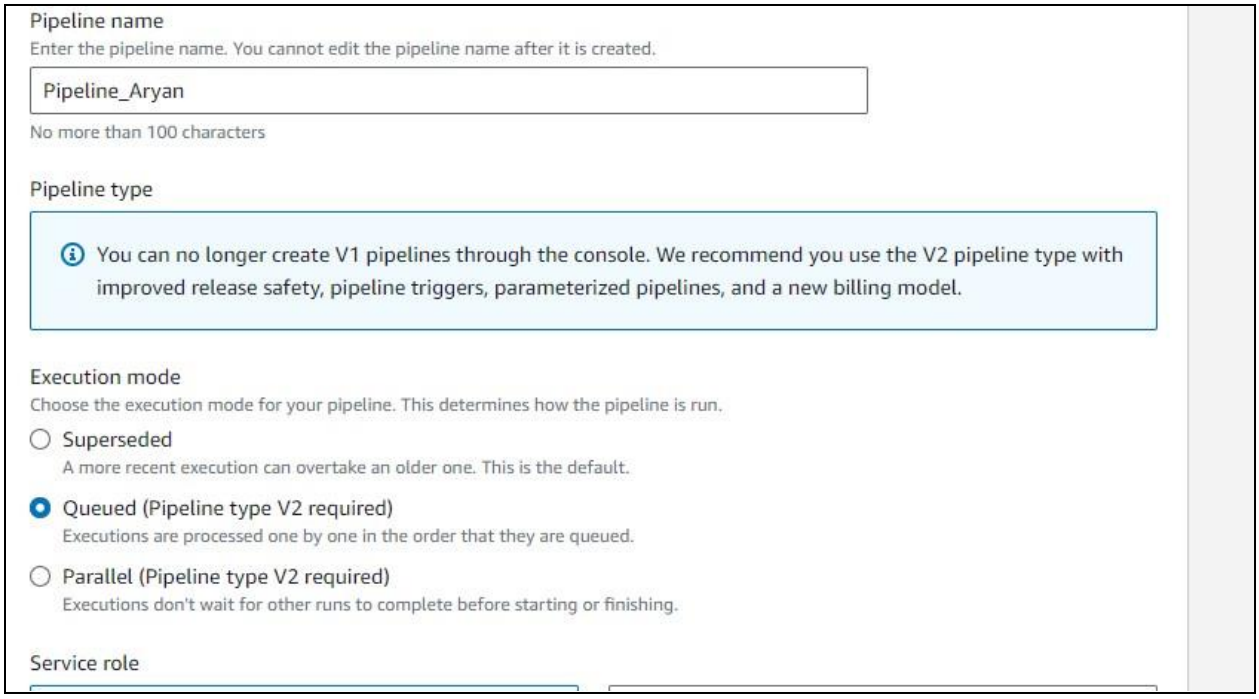


Step 10:Click on the domain link given below,after which we are redirected to a Congratulations page implying that our sample PHP application has been successfully hosted.

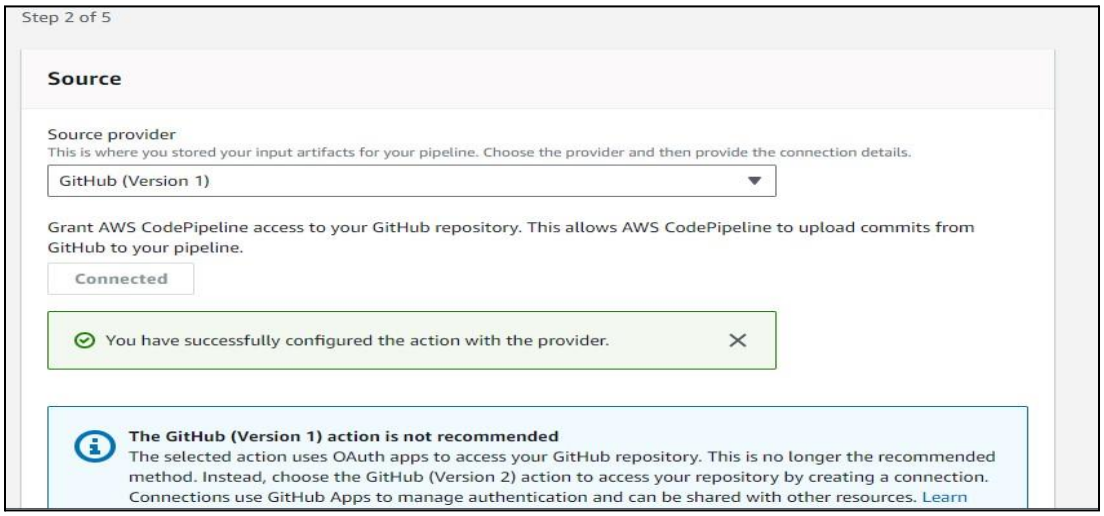


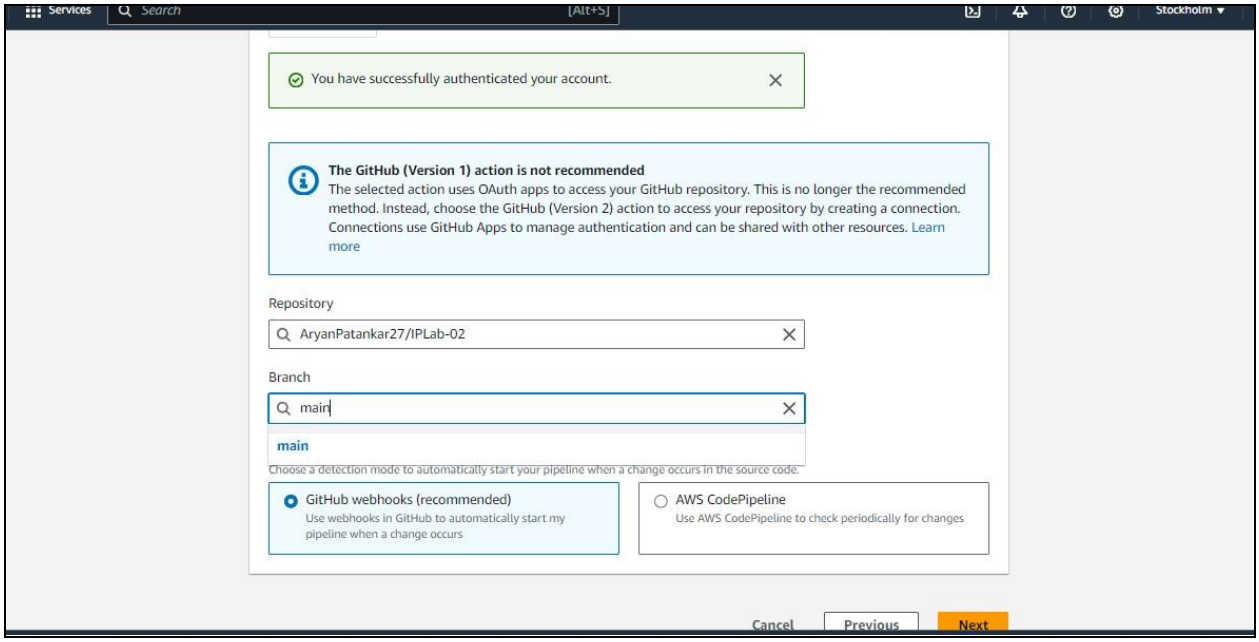


Step 11:Now,we will be deploying our website using CodePipeline,so follow all the steps given below and proceed.



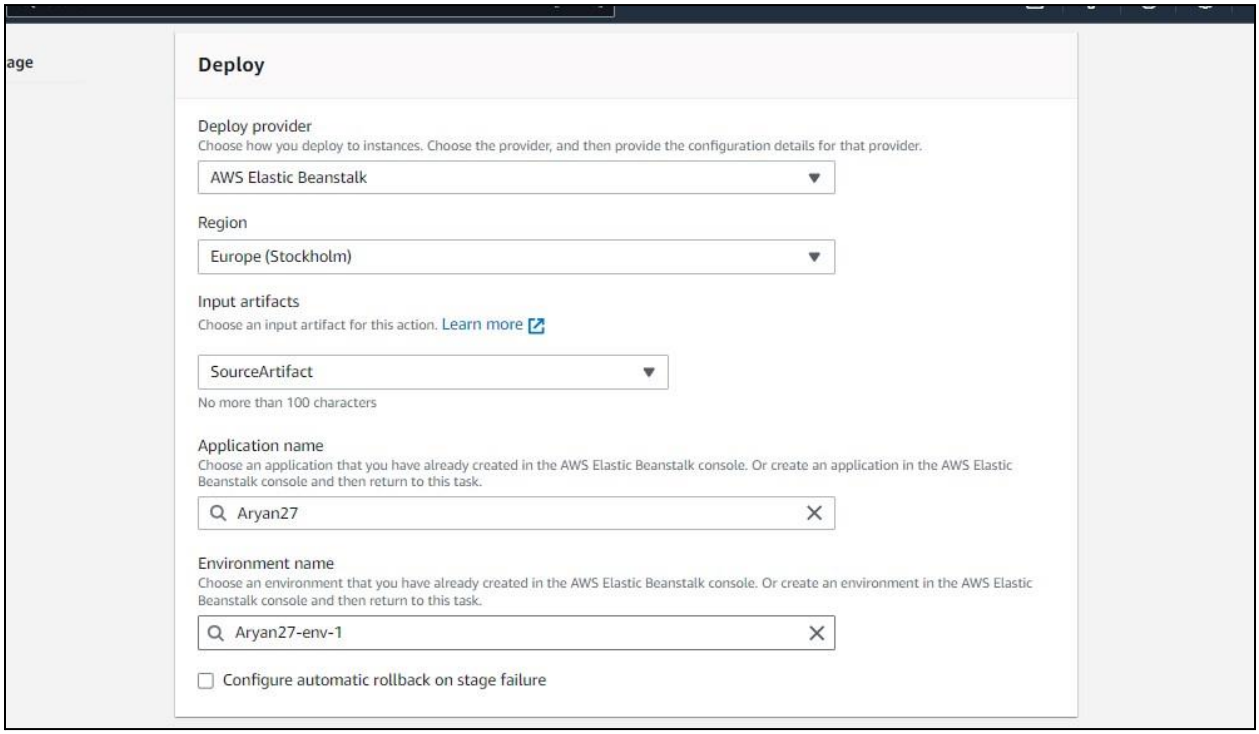
Step 12: In the source stage, choose GitHub v2 as the provider, then connect your GitHub account to
AWS by creating a connection. You'd need your GitHub credentials and then you'd need to authorize and install AWS on the forked GitHub Repository.

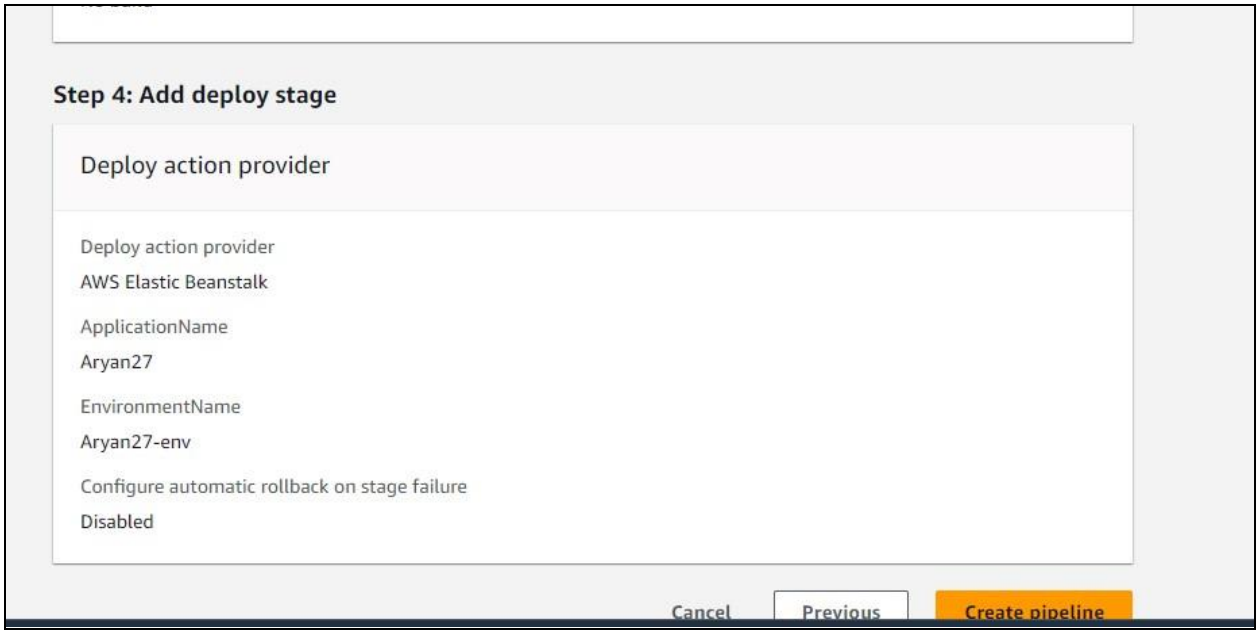




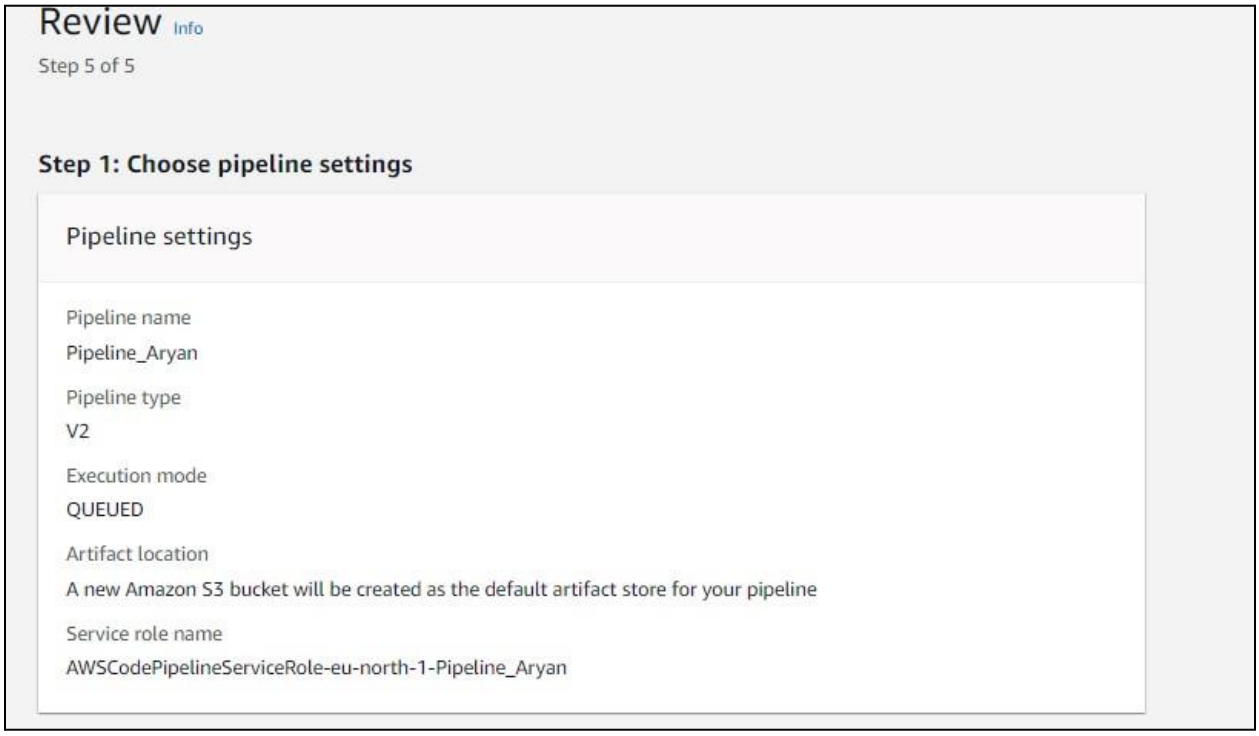
Then, simply choose this forked repository and the branch which you will be able to find in the search box. After that, click Continue and skip the build stage. Proceed to the Deployment stage.

Step 13: Choose Beanstalk as the Deploy Provider, same region as the Bucket and Beanstalk, name and environment name. Click Next, Review and create the pipeline.





Step 14: Review all the selected steps once.



Step 2: Add source stage

Source action provider

Source action provider
GitHub (Version 1)

PollForSourceChanges
false

Repo
IPLab-02

Owner
AryanPatankar27

Branch
main

Step 3: Add build stage

Build action provider

Build stage
No build

Step 4: Add deploy stage

Deploy action provider

Deploy action provider
AWS Elastic Beanstalk

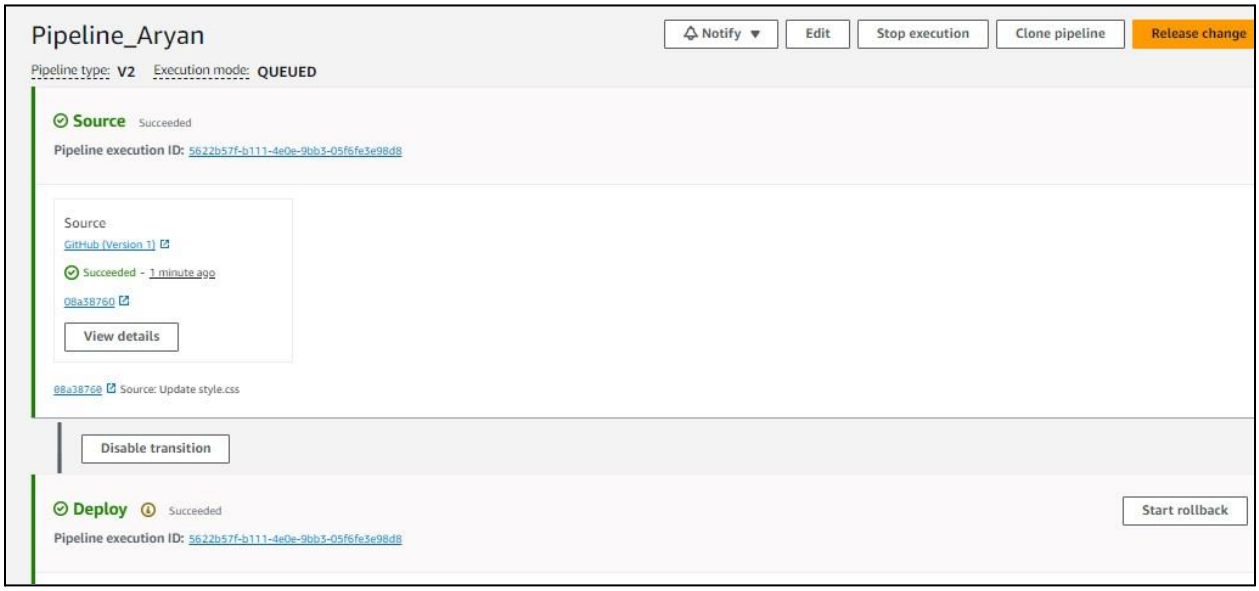
ApplicationName
Aryan27

EnvironmentName
Aryan27-env-1

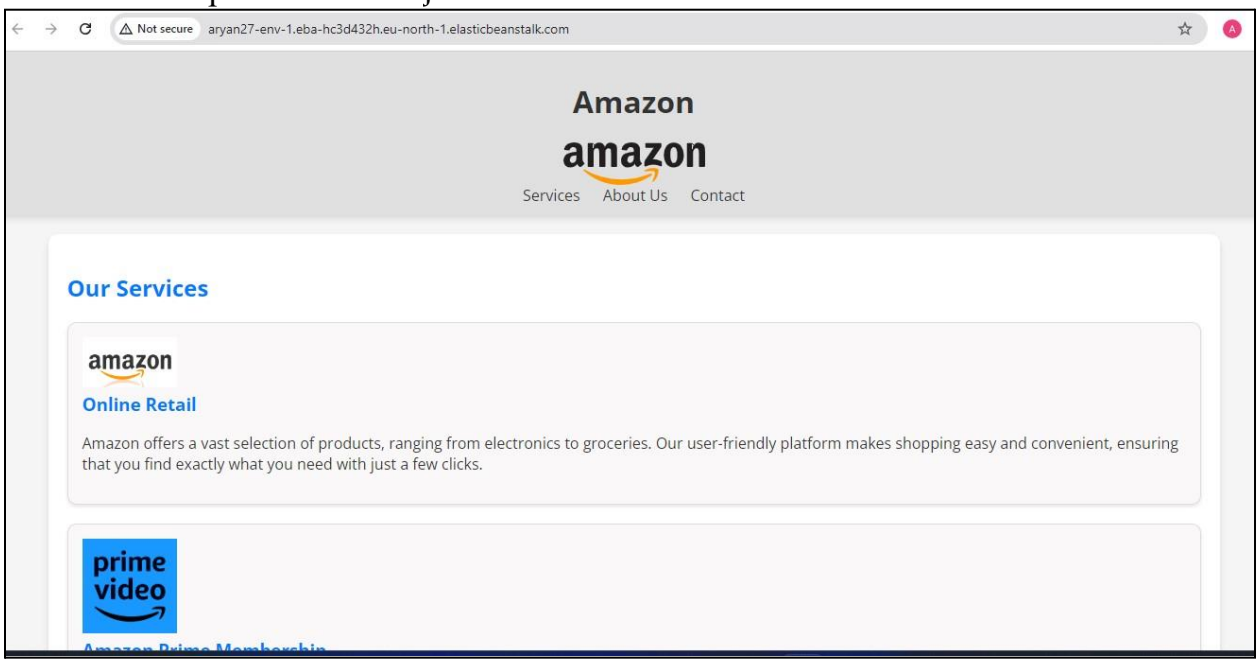
Configure automatic rollback on stage failure
Disabled

Cancel | Previous | Create pipeline

Step 15: In a few minutes, we will have our pipeline created. Once we have the success message on the
Deploy part, we can go ahead and check our URL provided in the EBS environment.



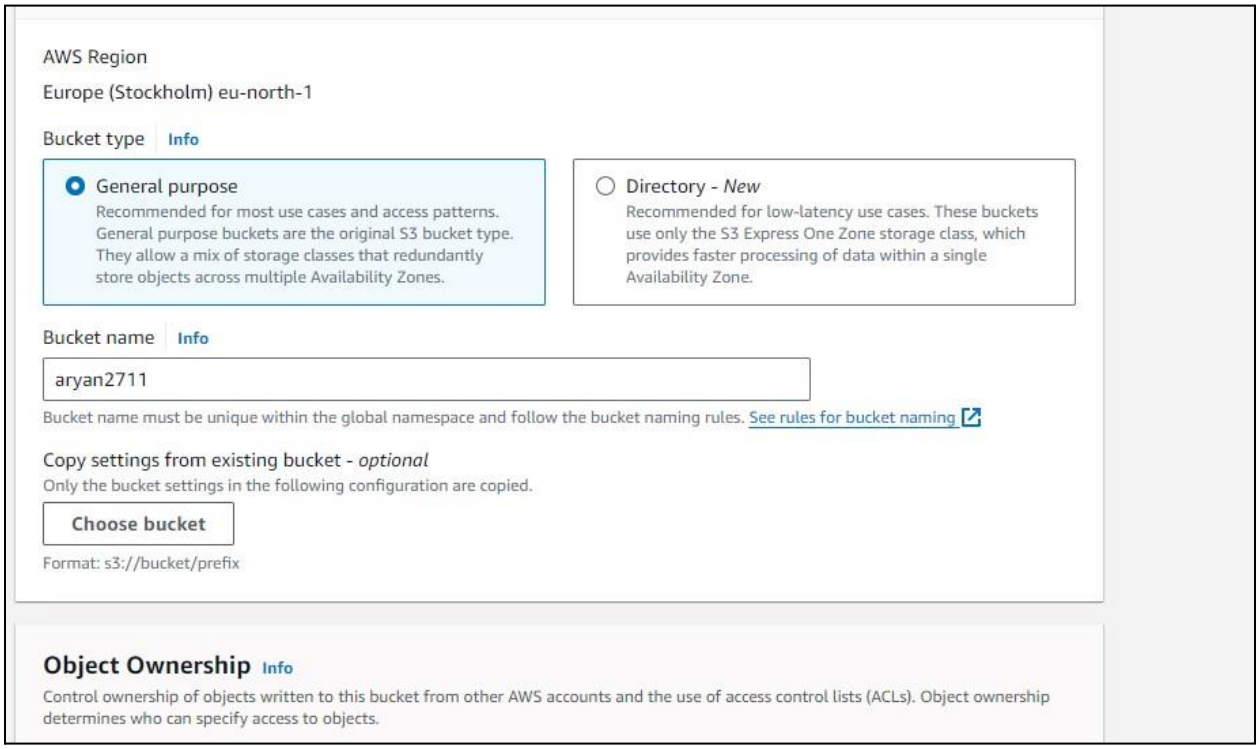
This is the sample website we just created.

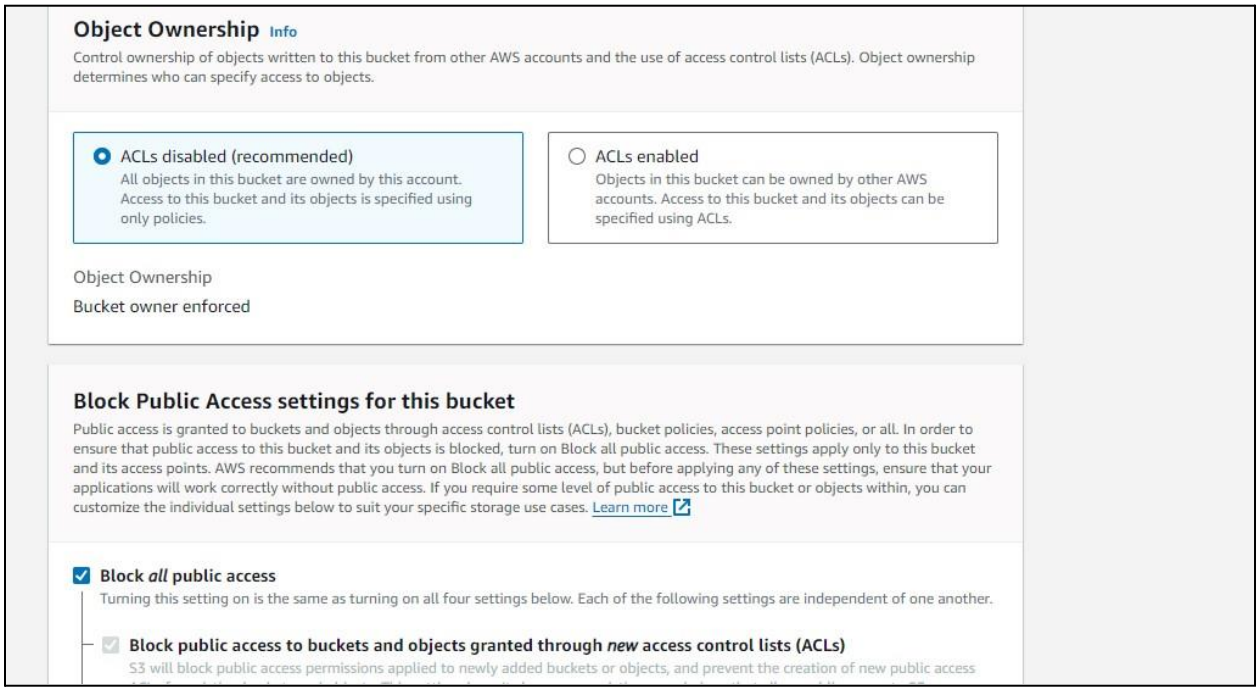


If you can see this, that means that you successfully created an automated software using CodePipeline.

Using S3 Bucket

Step 16: Now, we will be deploying our website using the S3 bucket.So proceed with the options as given below.





Encryption type Info

- Server-side encryption with Amazon S3 managed keys (SSE-S3)
- Server-side encryption with AWS Key Management Service keys (SSE-KMS)
- Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)

Secure your objects with two separate layers of encryption. For details on pricing, see **DSSE-KMS pricing** on the **Storage** tab of the Amazon S3 pricing page.

Bucket Key

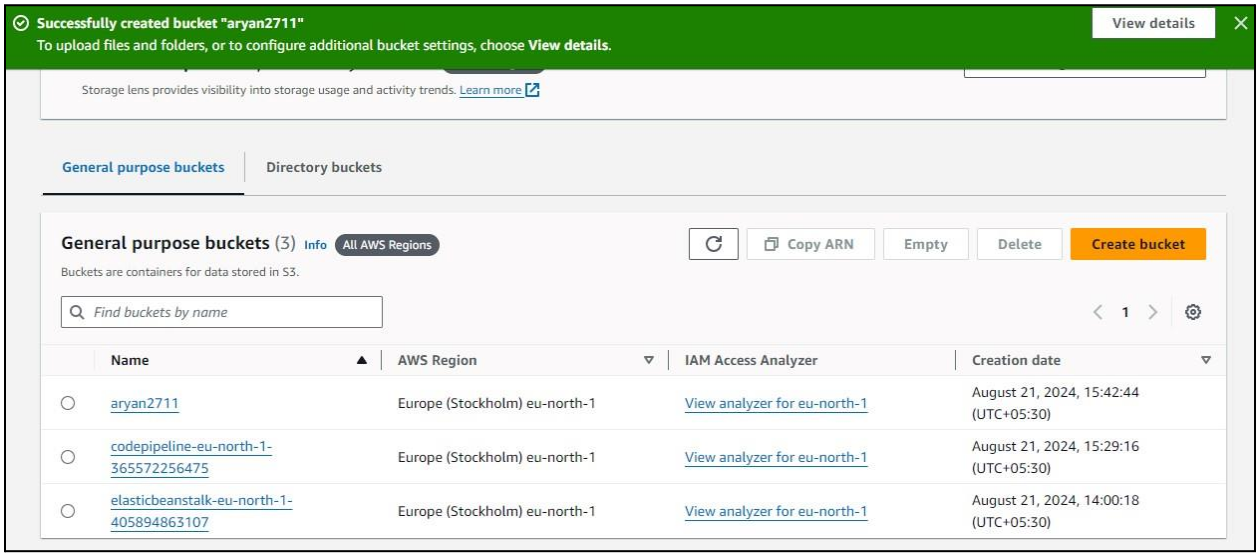
Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-KMS. Learn more

- Disable
- Enable

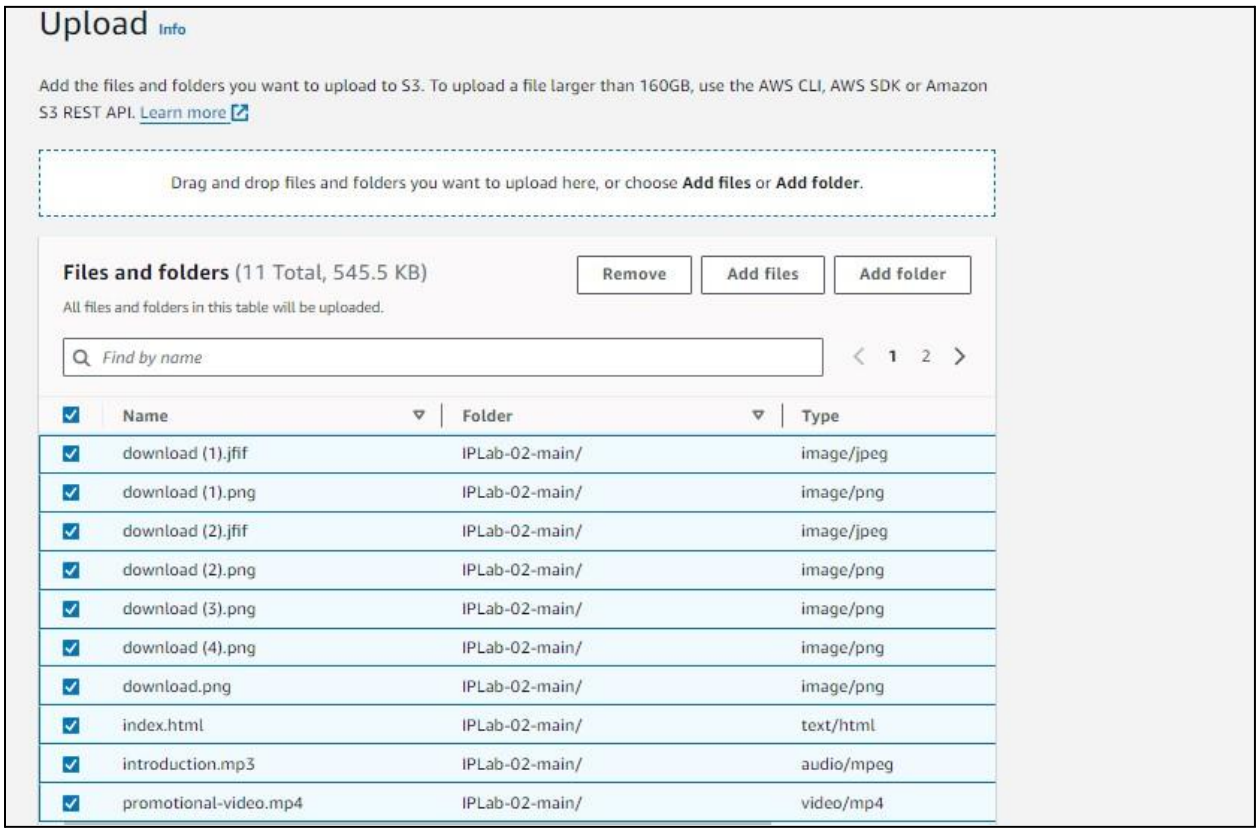
▶ **Advanced settings**

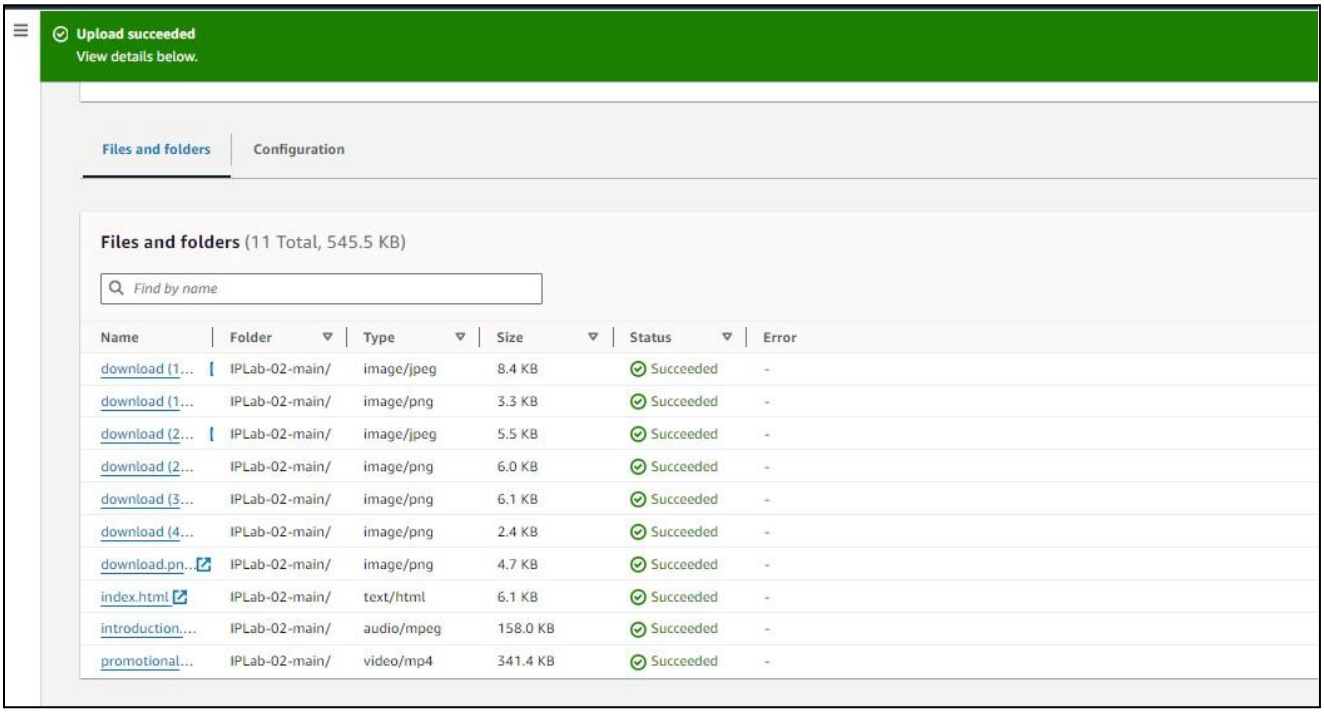
After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

Cancel | Create bucket

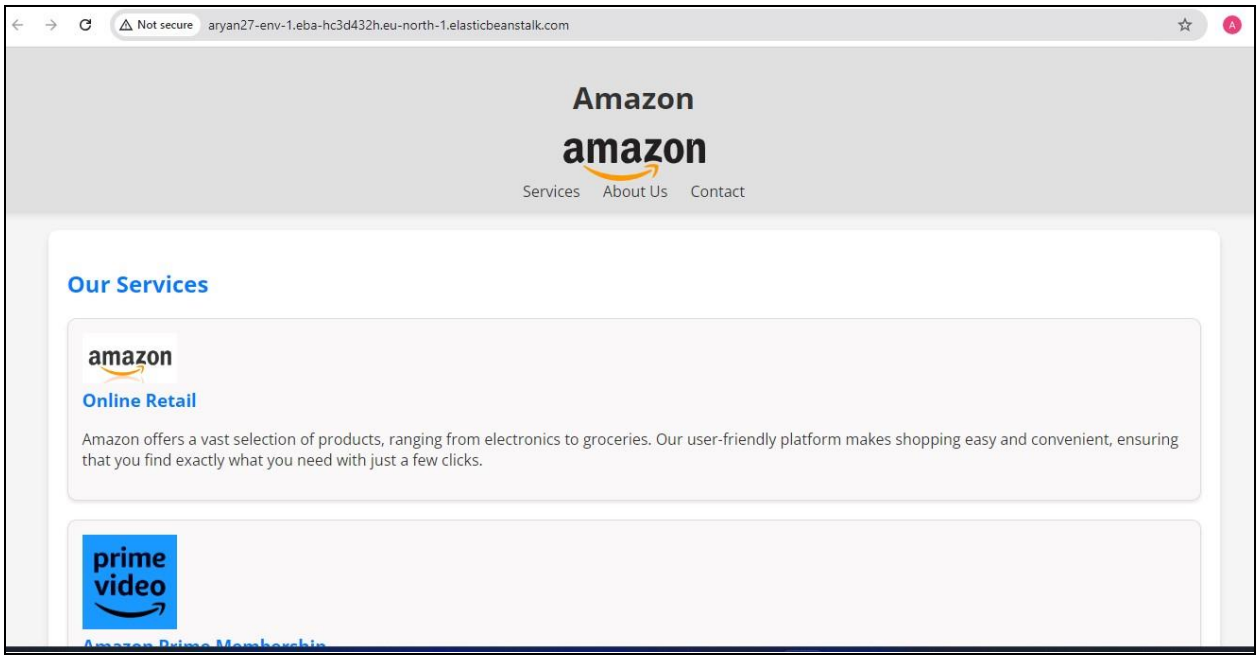


Step 17: Upload all the files that you want on your website that is to be hosted.





Step 18: Here,if the upload of files is successful you would get the following page,meaning your website has been successfully hosted using the S3 bucket.


Not secure
aryan27-env-1.eba-hc3d432h.eu-north-1.elasticbeanstalk.com
Amazon
amazon
Services
About Us
Contact
Our Services
amazon
Online Retail
Amazon offers a vast selection of products, ranging from electronics to groceries. Our user-friendly platform makes shopping easy and convenient, ensuring that you find exactly what you need with just a few clicks.
prime video

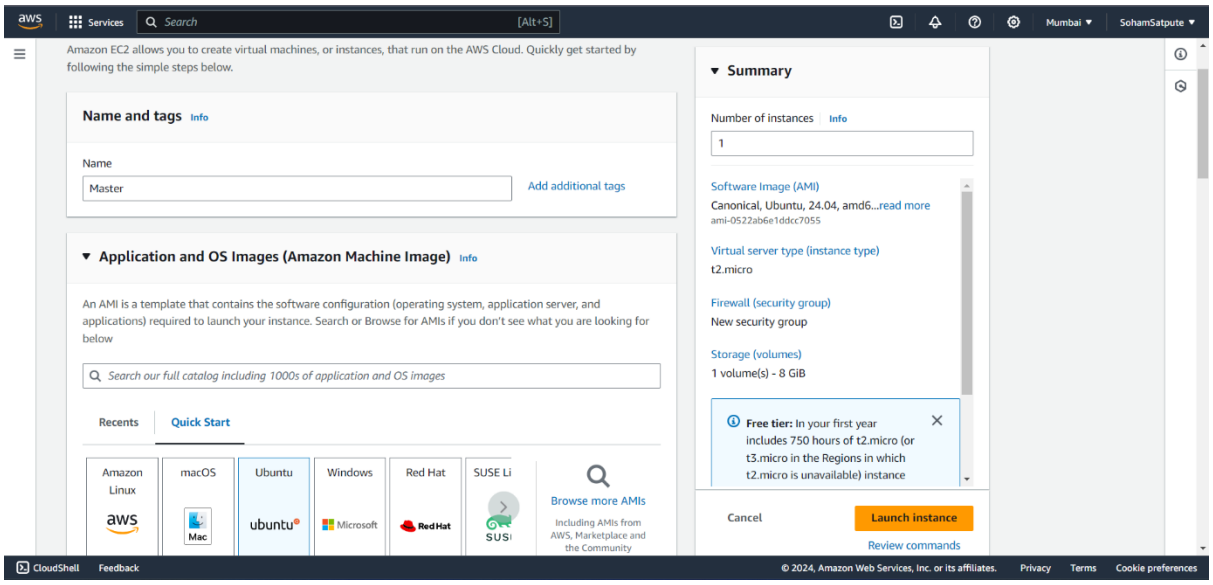
ADVANCE DEVOPS EXP-3

Name: Soham Satpute

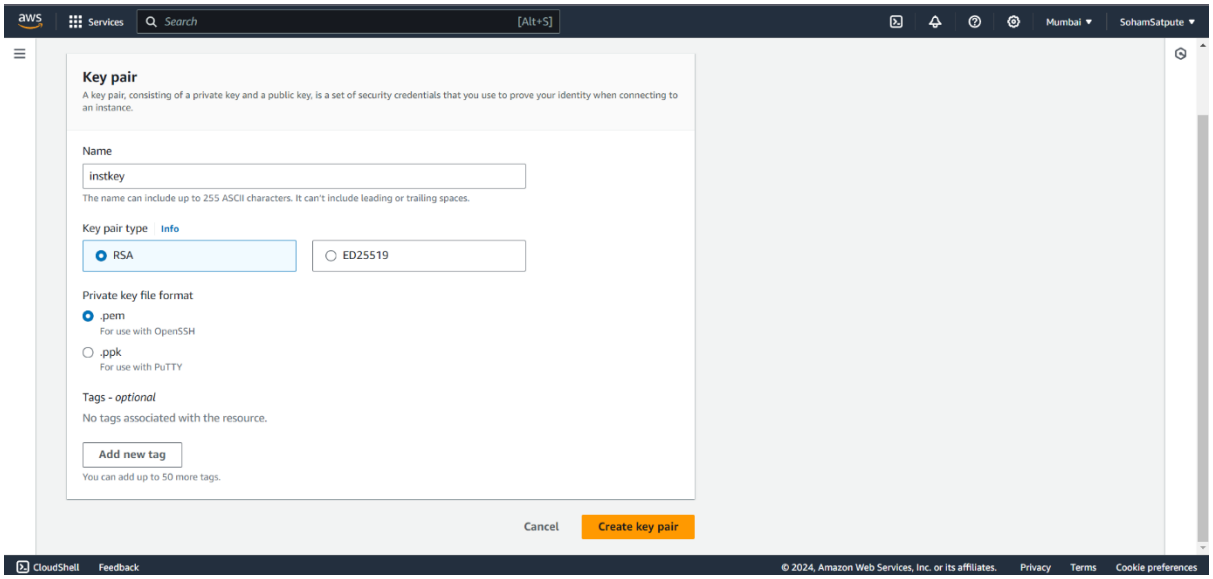
Roll No:52

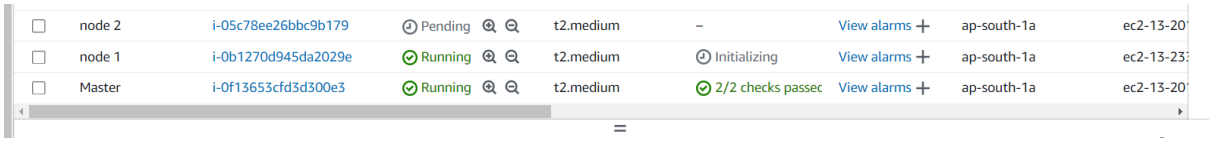
Aim: To understand the Kubernetes Cluster Architecture, install and Spin Up a Kubernetes Cluster on Linux Machines/Cloud Platforms.

Step 1: Create 2 Security Groups for Master and Nodes and add the following inbound rules in those groups:



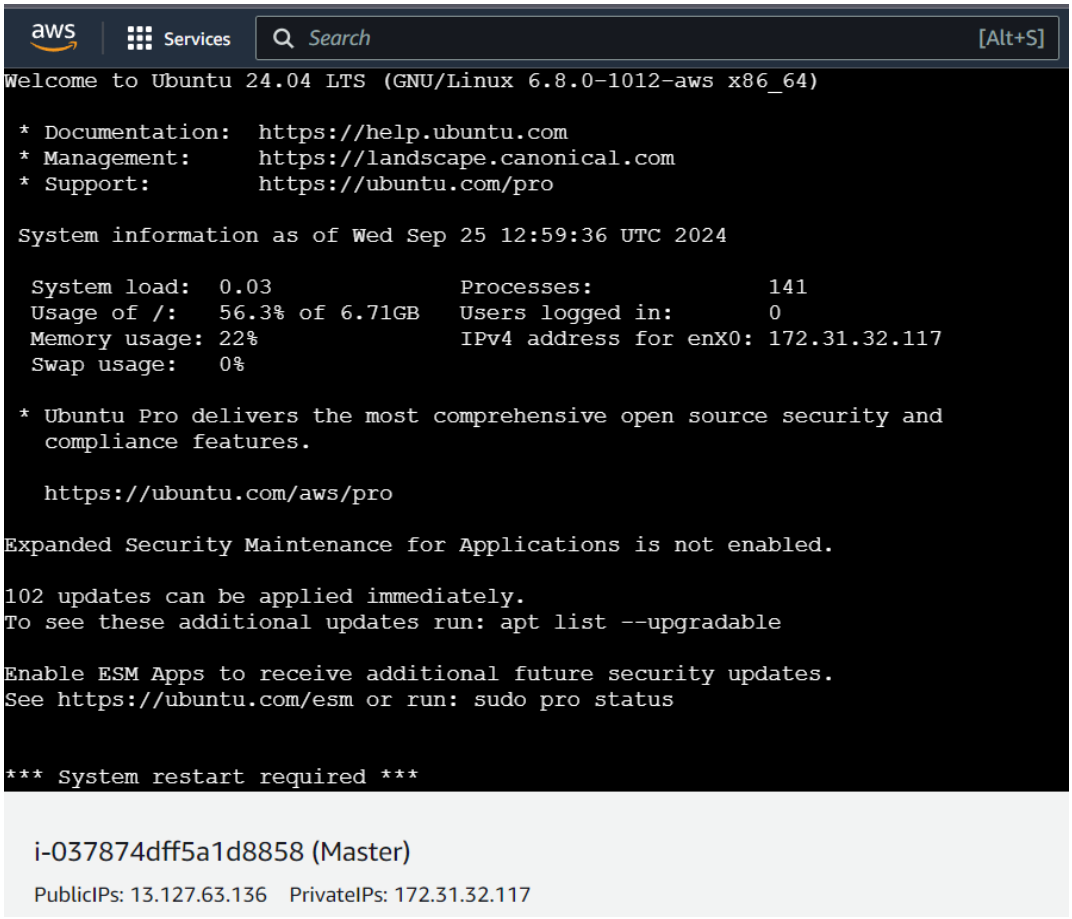
Generate a key pair for the same:

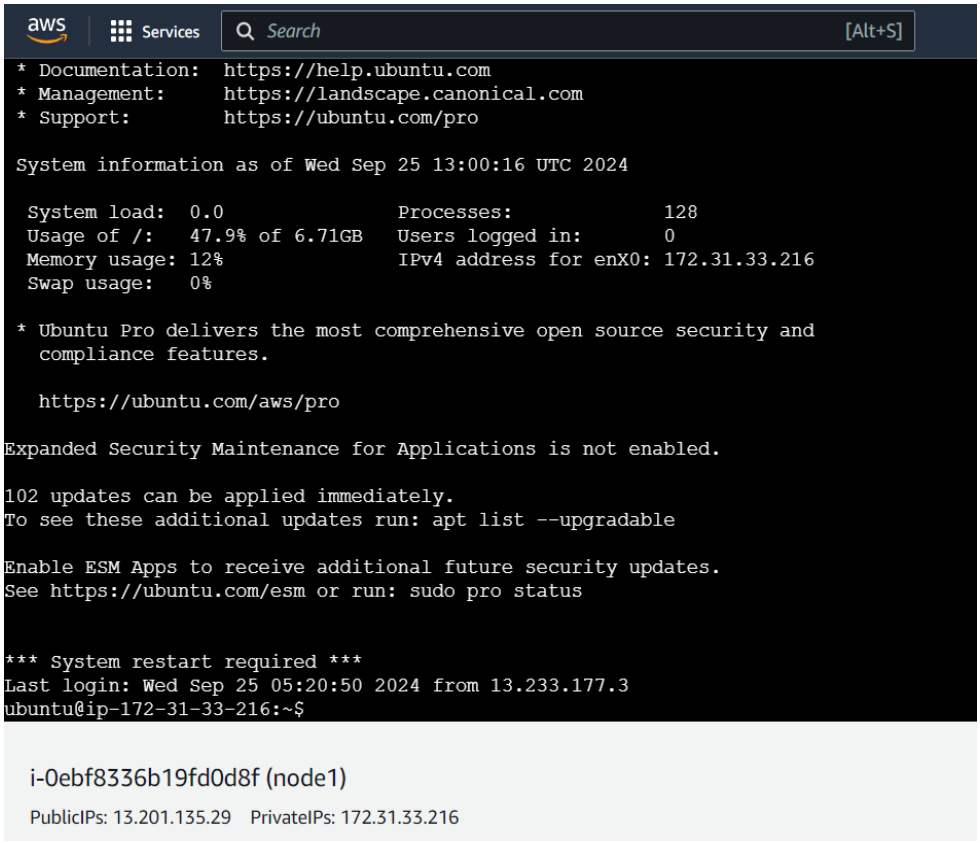




Step2:

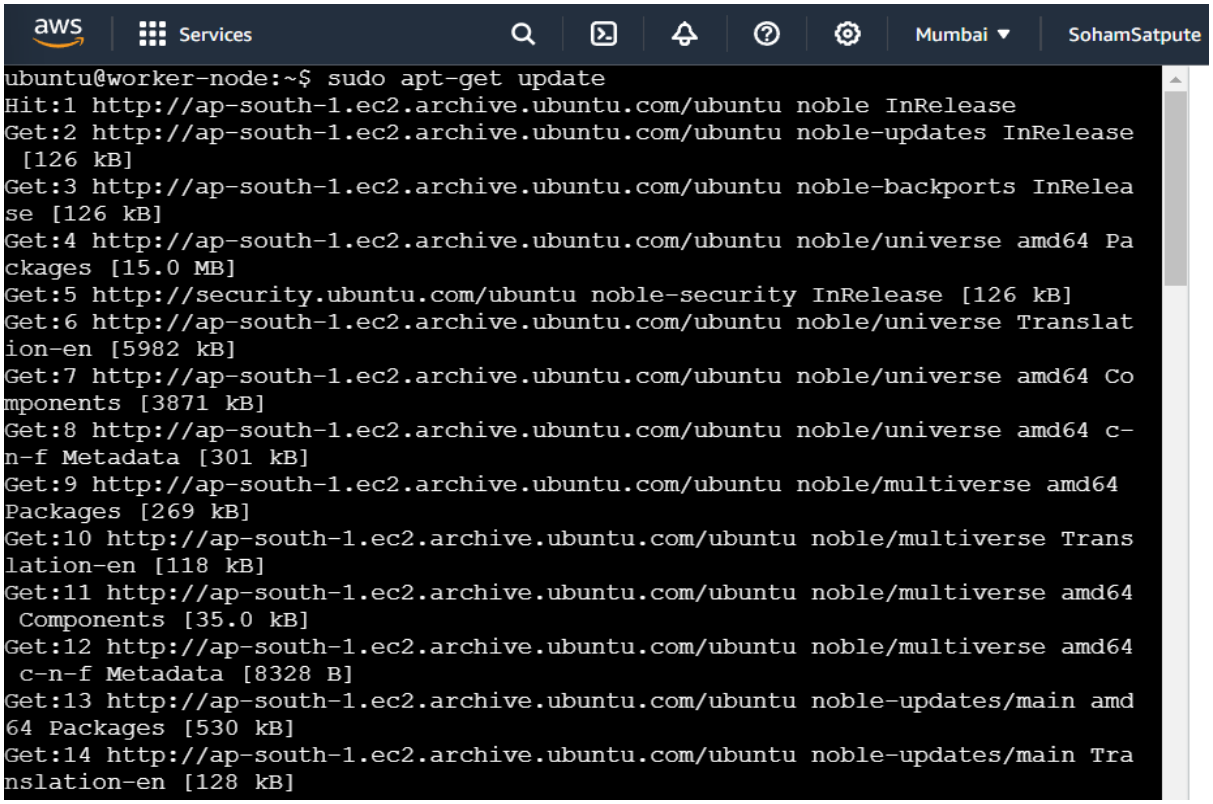
Open Master and node on EC2 terminal:

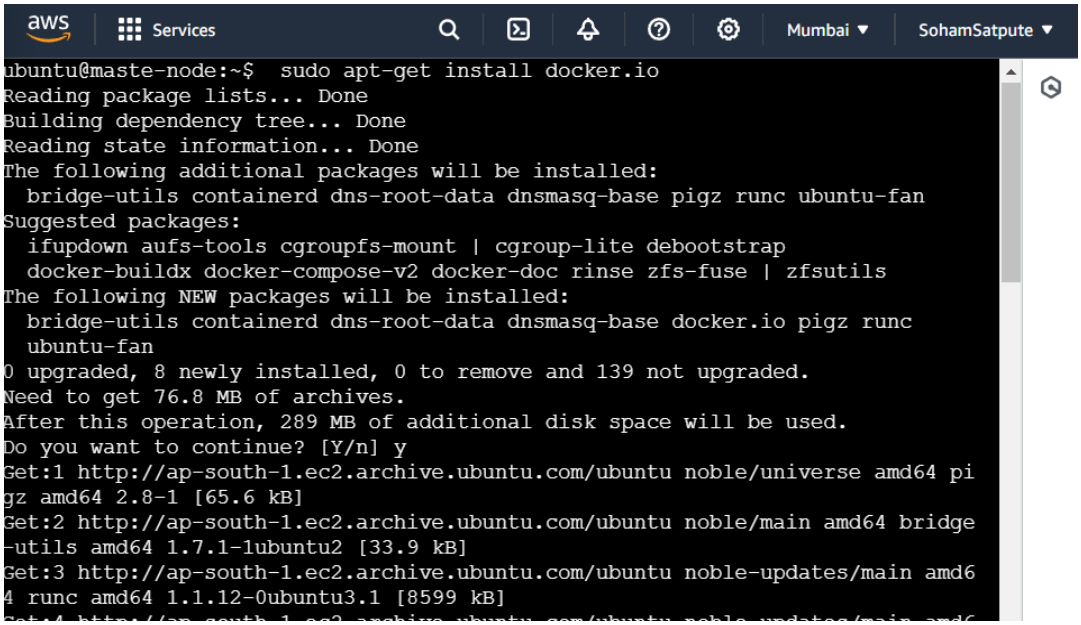


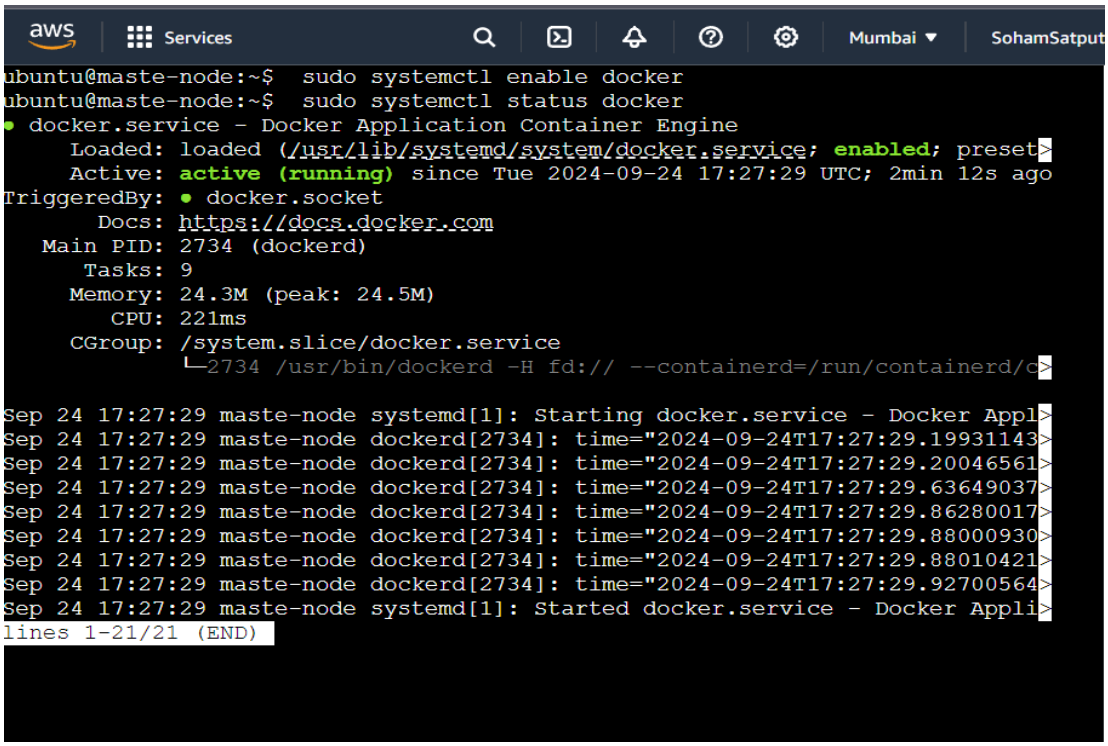


Step 3:

Install Docker

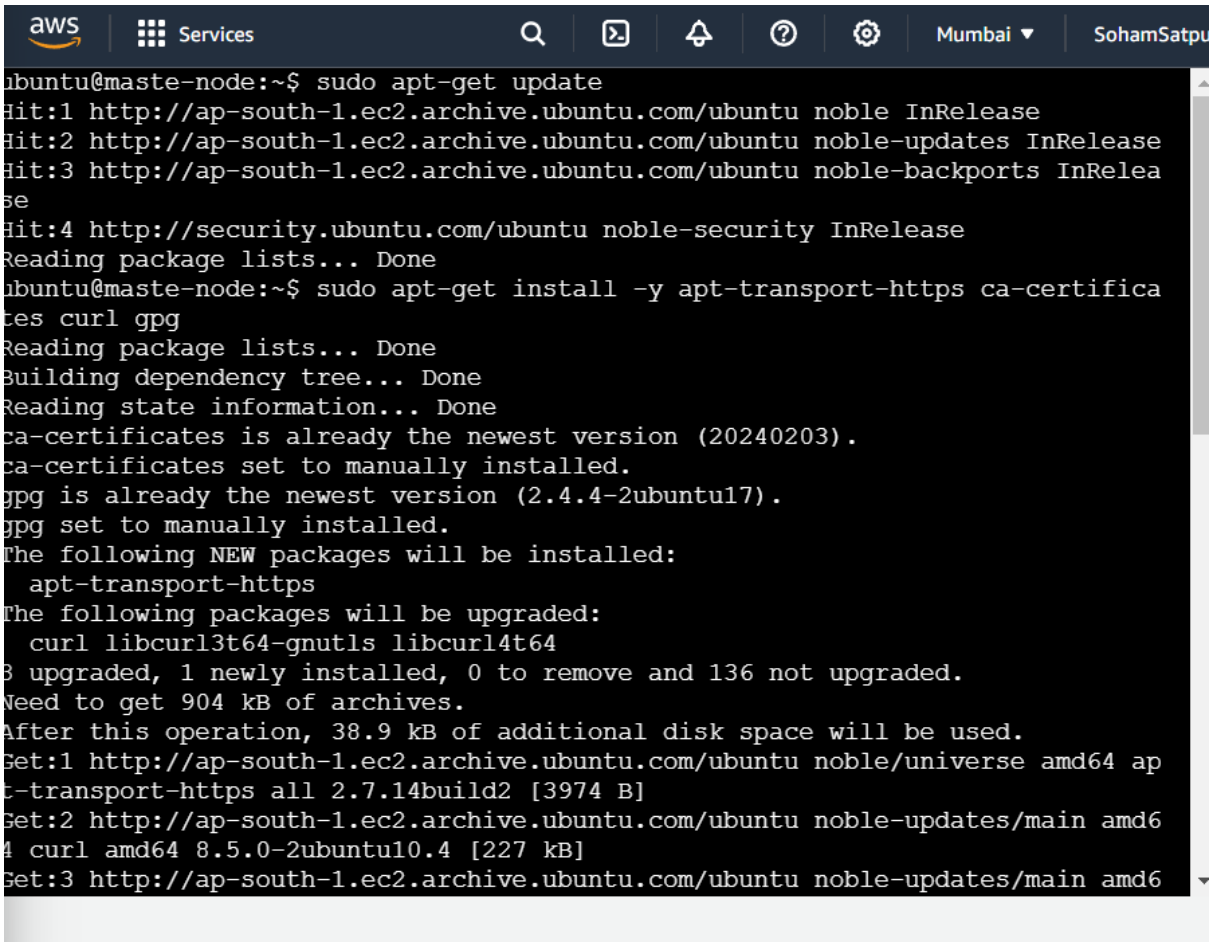


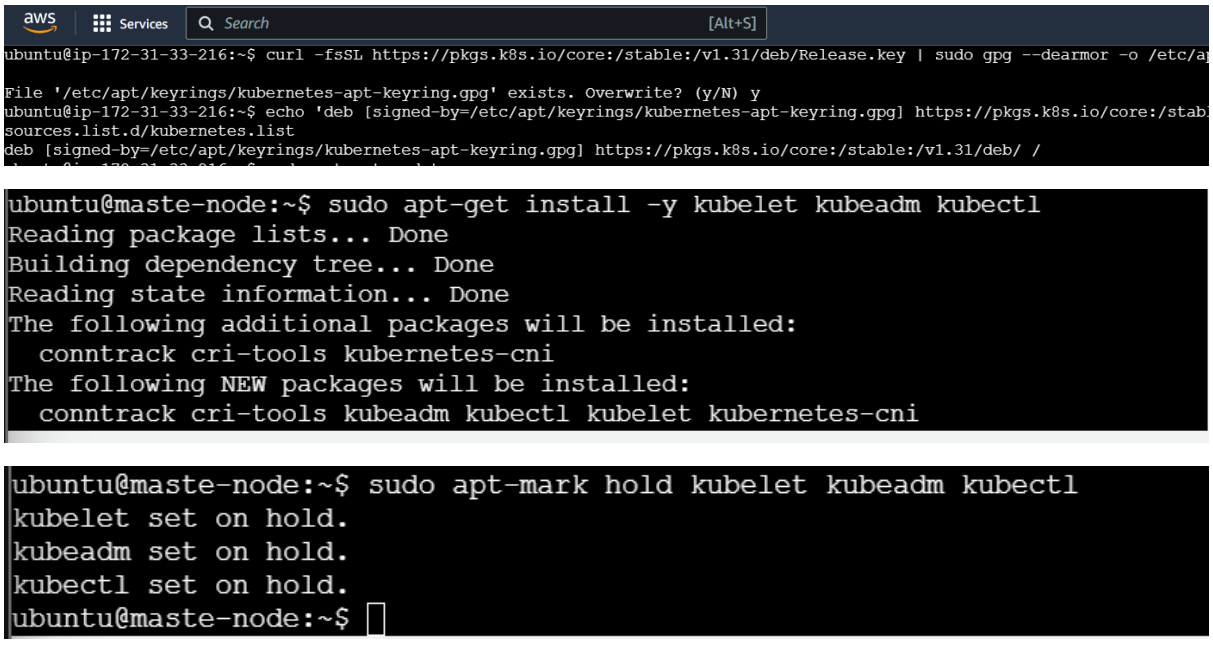

aws
Services
Mumbai
SohamSatpute
ubuntu@maste-node:~$ sudo apt-get install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap
docker-buildx docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc
ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 139 not upgraded.
Need to get 76.8 MB of archives.
After this operation, 289 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 pi
gz amd64 2.8-1 [65.6 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 bridge
-utils amd64 1.7.1-1ubuntu2 [33.9 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd6
4 runc amd64 1.1.12-0ubuntu3.1 [8599 kB]


aws
Services
Mumbai
SohamSatput
ubuntu@maste-node:~$ sudo systemctl enable docker
ubuntu@maste-node:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset
Active: active (running) since Tue 2024-09-24 17:27:29 UTC; 2min 12s ago
TriggeredBy: ● docker.socket
Docs: https://docs.docker.com
Main PID: 2734 (dockerd)
Tasks: 9
Memory: 24.3M (peak: 24.5M)
CPU: 221ms
CGroup: /system.slice/docker.service
└─2734 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/c
Sep 24 17:27:29 maste-node systemd[1]: Starting docker.service - Docker Appl
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.19931143
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.20046561
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.63649037
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.86280017
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.88000930
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.88010421
Sep 24 17:27:29 maste-node dockerd[2734]: time="2024-09-24T17:27:29.92700564
Sep 24 17:27:29 maste-node systemd[1]: Started docker.service - Docker Appli
lines 1-21/21 (END)

Step 4:

Install kubeadm, kubelet, kubectl:





Step5:

Disable Swap (Kubernetes requires swap to be off):

```
ubuntu@maste-node:~$ sudo swapoff -a
ubuntu@maste-node:~$
```

Step 6:

Initialize the Kubernetes Cluster on Master Node On the master node:

sudo kubeadm init --pod-network-cidr=10.244.0.0/16

```
aws | Services | Mumbai | SohamSatput
ubuntu@maste-node:~$  sudo kubeadm init --pod-network-cidr=10.244.0.0/16 --ig
nore-preflight-errors=all

[init] Using Kubernetes version: v1.31.0
[preflight] Running pre-flight checks
        [WARNING FileExisting-socat]: socat not found in system path
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your i
nternet connection
[preflight] You can also perform this action beforehand using 'kubeadm config
 images pull'
W0924 17:41:13.236064    4176 checks.go:846] detected that the sandbox image
"registry.k8s.io/pause:3.8" of the container runtime is inconsistent with tha
t used by kubeadm.It is recommended to use "registry.k8s.io/pause:3.10" as th
e CRI sandbox image.
[certs] Using certificateDir folder "/etc/kubernetes/pki"
[certs] Generating "ca" certificate and key
[certs] Generating "apiserver" certificate and key
[certs] apiserver serving cert is signed for DNS names [kubernetes kubernetes
.default kubernetes.default.svc kubernetes.default.svc.cluster.local maste-no
de] and IPs [10.96.0.1 172.31.32.117]
[certs] Generating "apiserver-kubelet-client" certificate and key
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-client" certificate and key
[certs] Generating "etcd/ca" certificate and key
[certs] Generating "etcd/server" certificate and key
[certs] etcd/server serving cert is signed for DNS names [localhost maste-nod
e] and IPs [172.31.32.117 127.0.0.1 ::1]
```

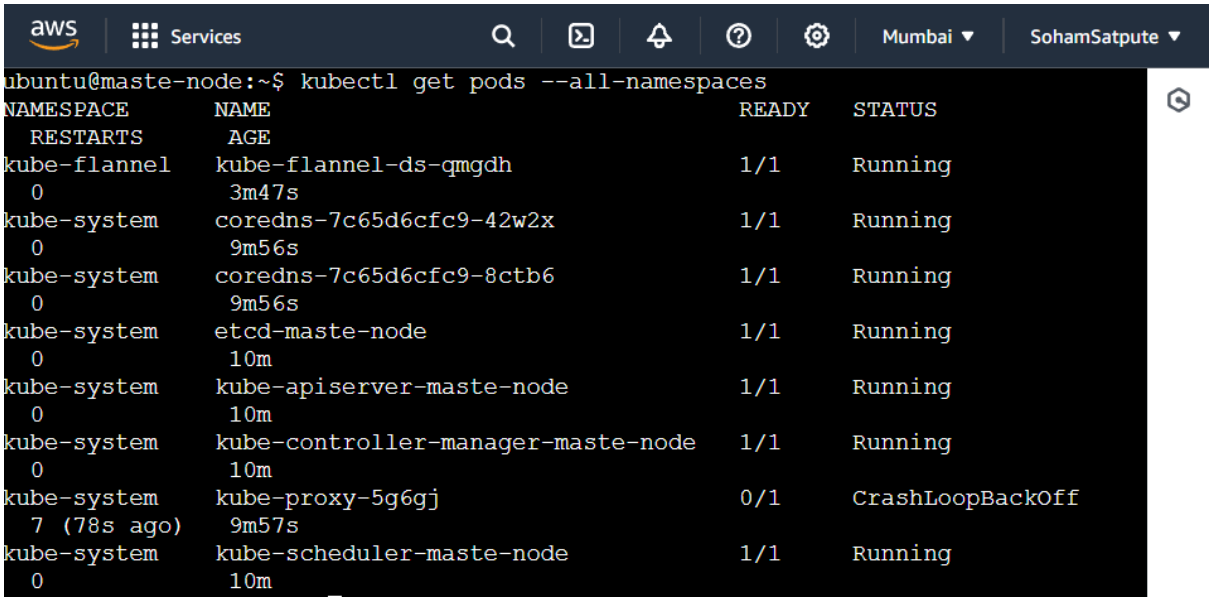
Set up kubectl on the master node:

mkdir -p $HOME/.kube

sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config

sudo chown $(id -u):$(id -g) $HOME/.kube/config

```
kubeadm join 172.31.32.117:6443 --token t2jpj2.rauz0s7fimwpdo4a --discovery-token-ca-cert-hash
sha256:1fa6fa408d342aef675f4bab47ff1c02da288b9cf34dd1cff8161d84586cd50b
```

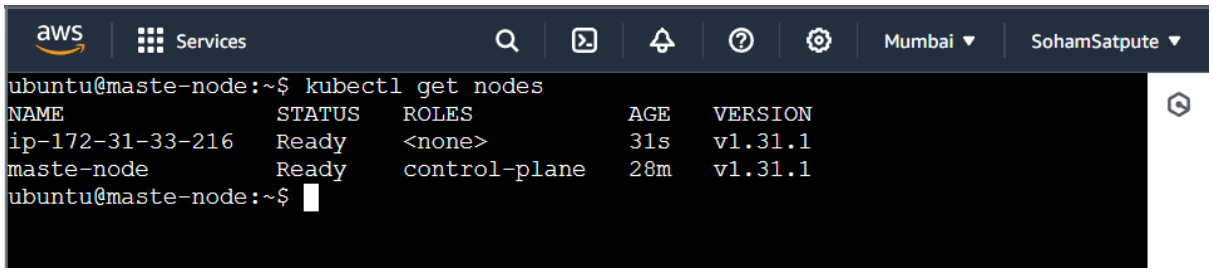


Step 7:

Join Worker Nodes to the Cluster On the worker nodes, run the command provided by the master node during initialization:

Step 8:

Verify the Cluster Once the worker node joins, check the status on the master node



ADVANCE DEVOPS EXP 4

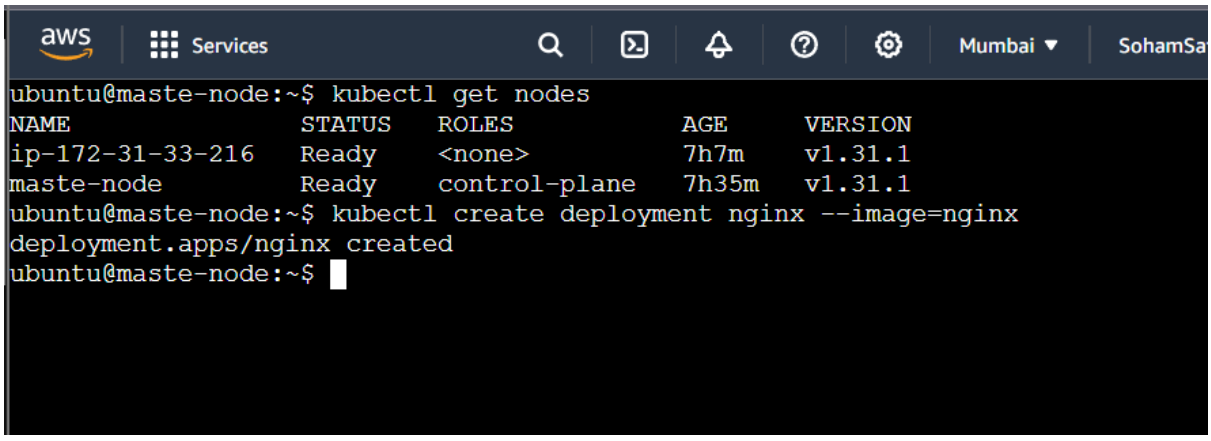
Name :- Soham Satpute

Roll no :- 52

Aim :- To install Kubectl and execute Kubectl commands to manage the Kubernetes cluster and deploy Your First Kubernetes Application

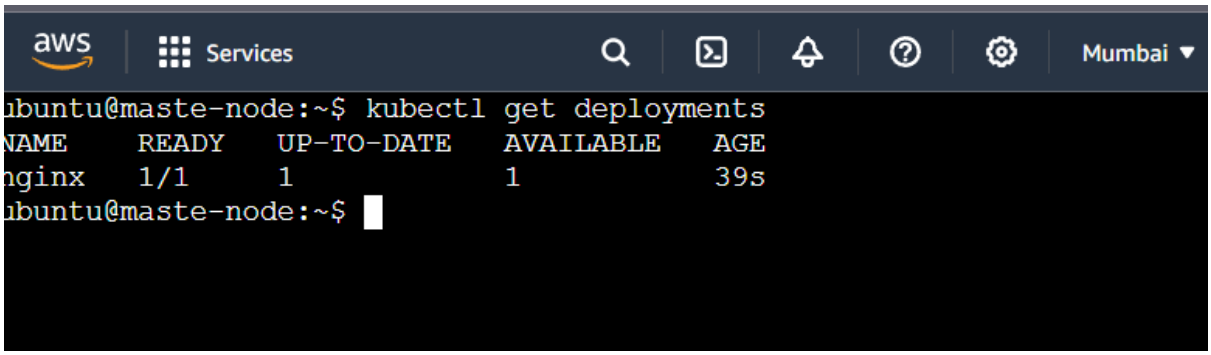
Step 1: As the cluster is up and running, we can deploy our nginx server on this cluster. Apply this deployment file using this command to create a deployment.

$kubectl create deployment nginx --image=nginx



Step 2: Verify the deployment using the command:

$kubectl get deployments

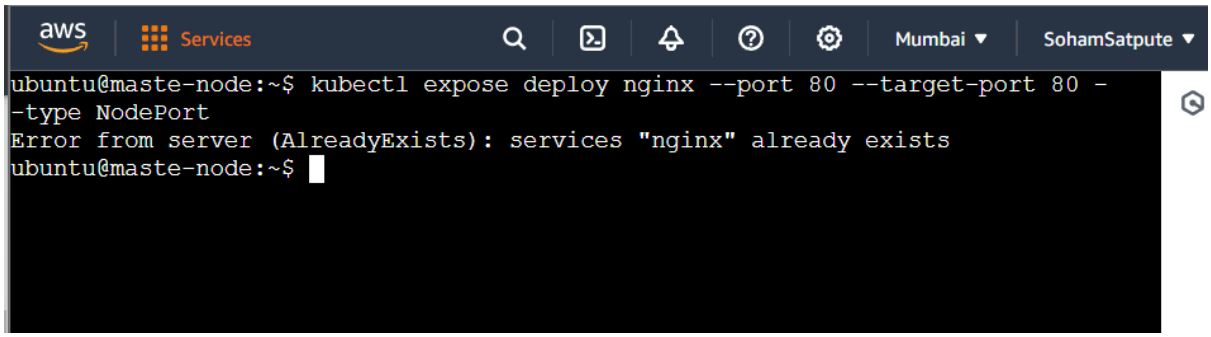


Step 3: Next, run the following command to create a service named nginx that will

expose the app publicly. It will do so through a NodePort, a scheme that will make

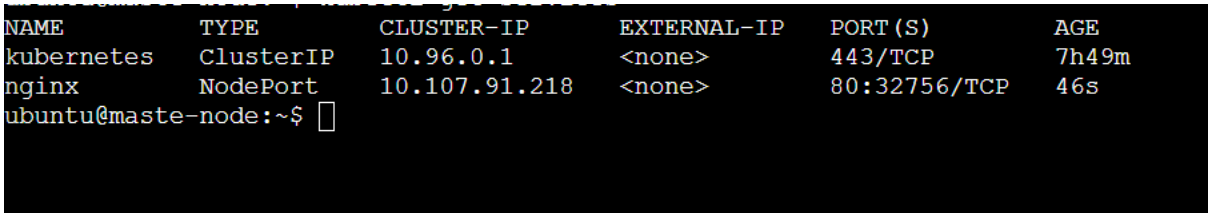
the pod accessible through an arbitrary port opened on each node of the clusterwith this service-type, Kubernetes will assign this service on ports on the **30000+**range.

$kubectl expose deploy nginx --port 80 --target-port 80 --type NodePort



Step 4: Run this command to see a summary of the service and the ports exposed.

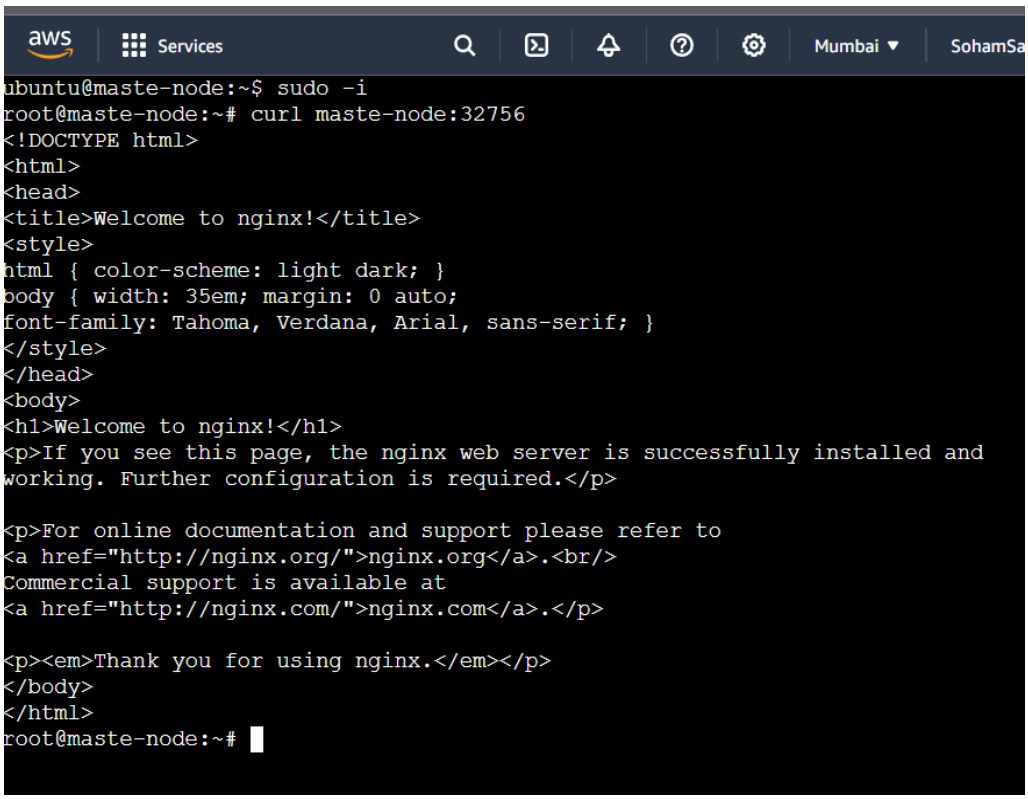
$kubectl get services



Step 5: Add the port which is displayed i.e. 32756(in our case) in the inbound

rules of the security group.

Step 6: Now you can verify that the Nginx page is reachable on all nodes using thecurl command.As you can see, the "**WELCOME TO NGINX!**" page can be reached.

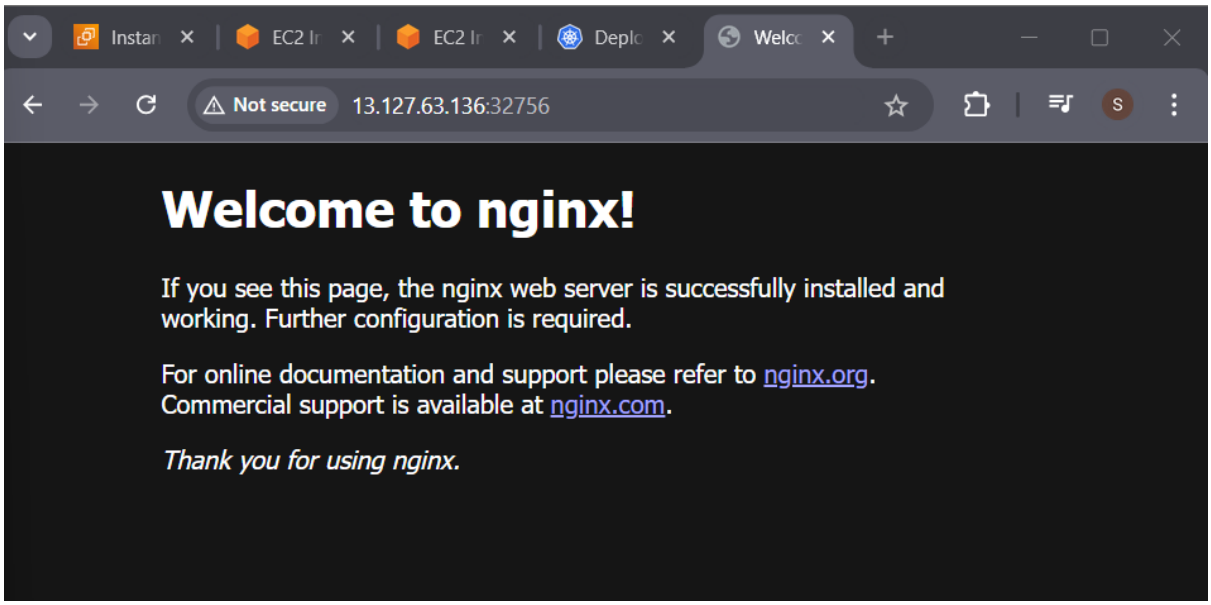


Step 7: To test that everything is working, visithttp://worker_1_ip:nginx_port

or http://worker_2_ip:nginx_port

through a browser on your local machine. You will see Nginx's familiar welcomepage.

http://13.127.63.136:32756/



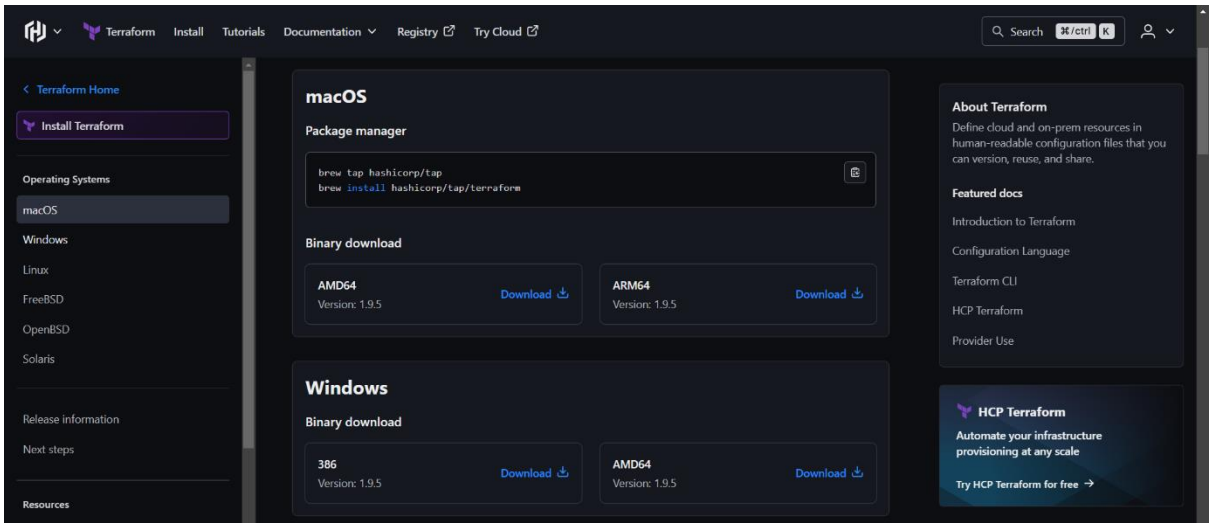
Experiment no 5

Name :Soham Satpute

Roll no :- 52/D15A

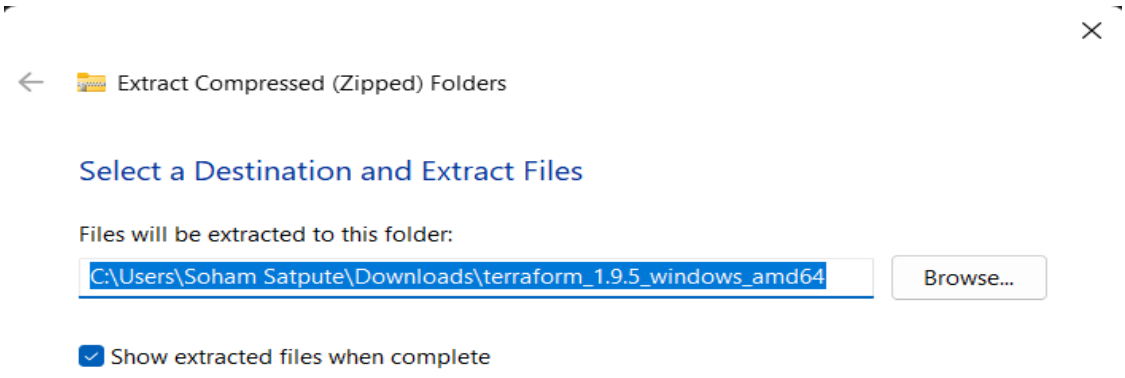
Aim :-Installation and Configuration of Terraform in Windows

Installation for Windows :-



Step1: In your Downloads, right-click on the downloaded Terraform binary file and select "**Extract All**" .

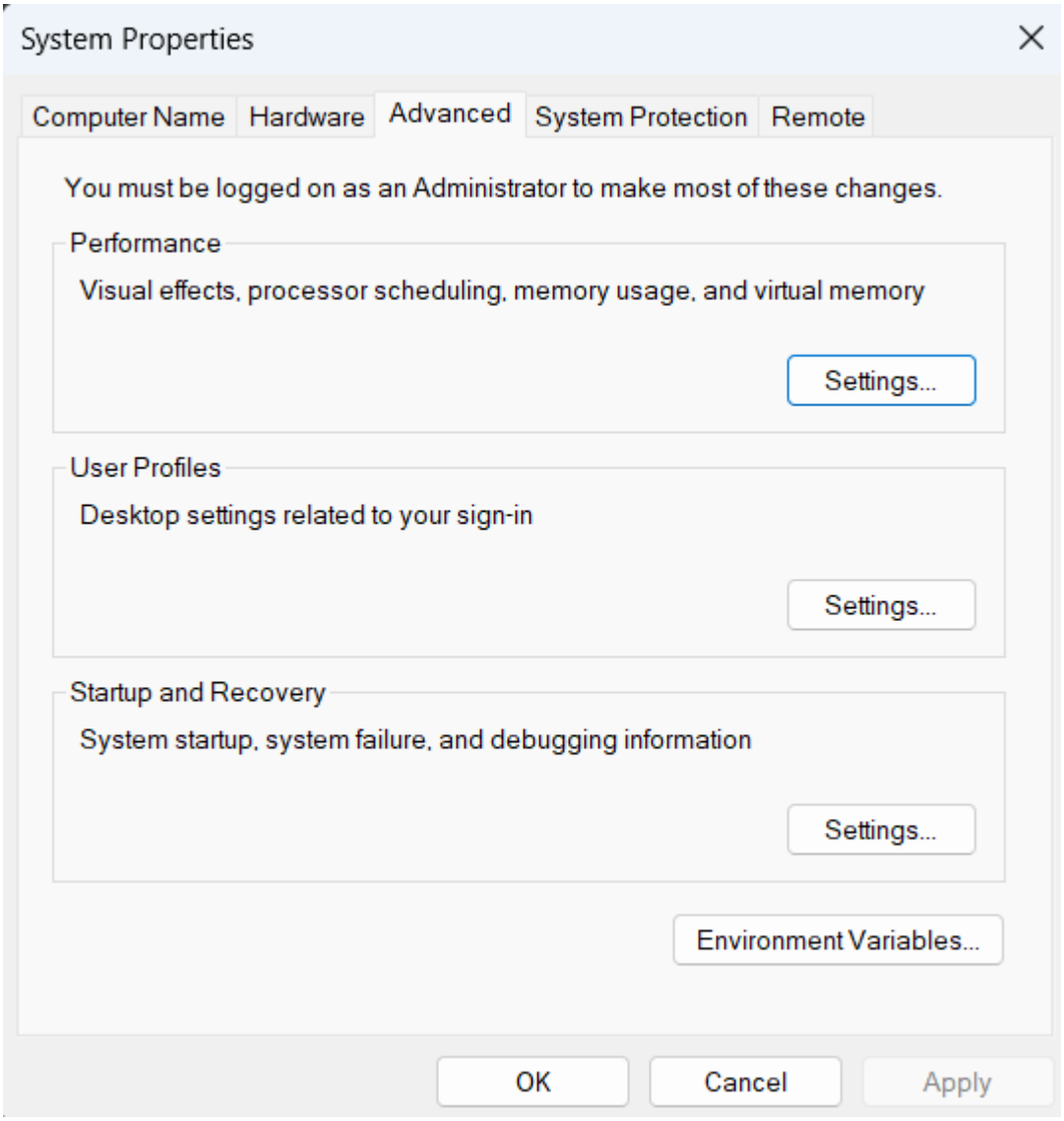
The following window will pop up:



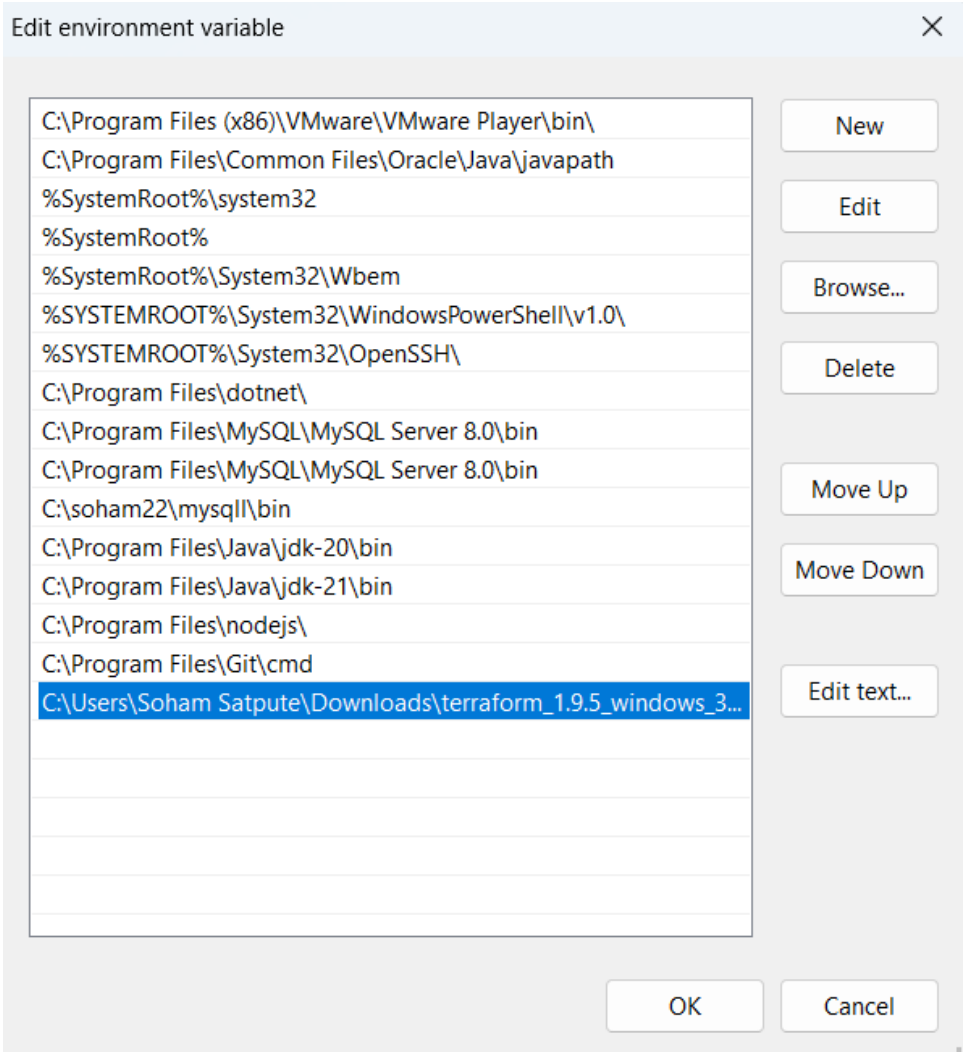
Step 2 :

Set Terraform Path to System Environment Variables

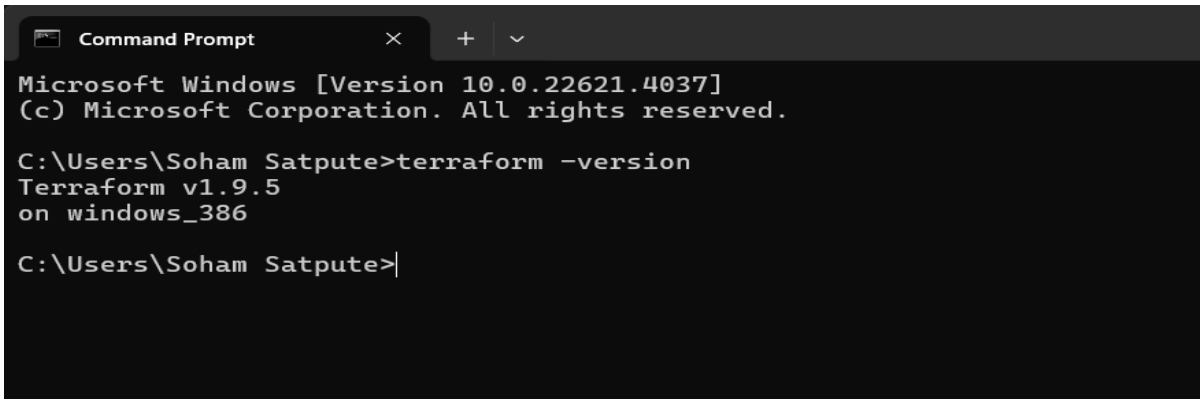
Click on the “**Environment variables**” in the system properties:



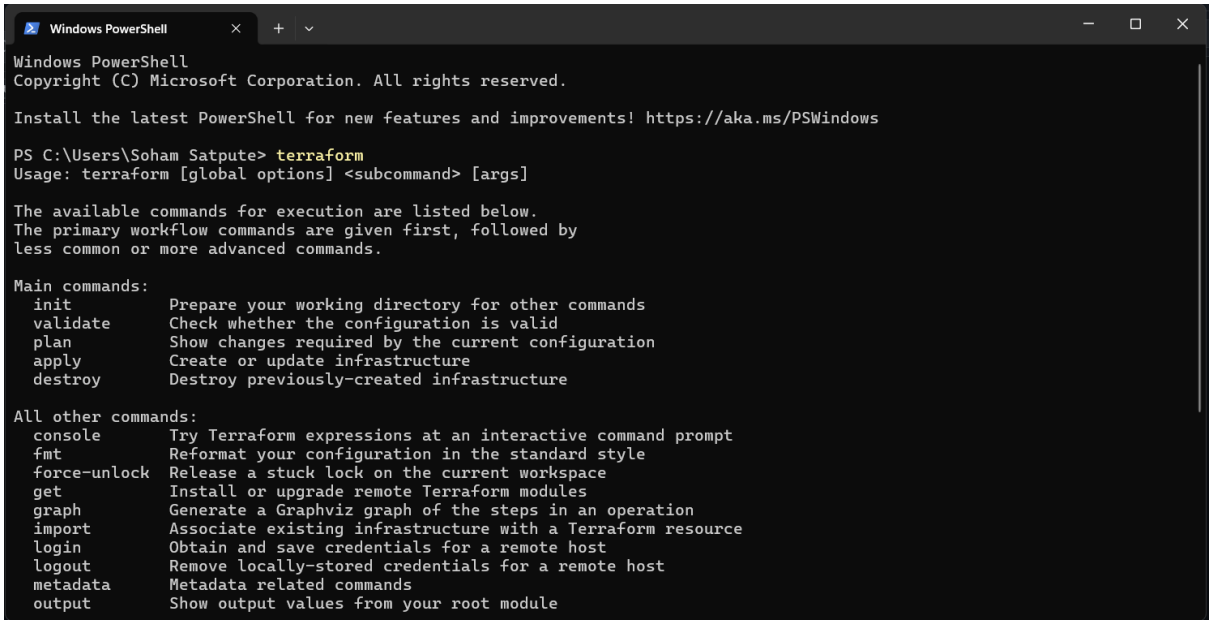
Step 3: Set the path



Step 4: Navigate to the folder path C:\terraform in a new command prompt window and type the terraform -version to verify the installed version.



Step 5: To see more Terraform commands, you can simply type terraform in the terminal.



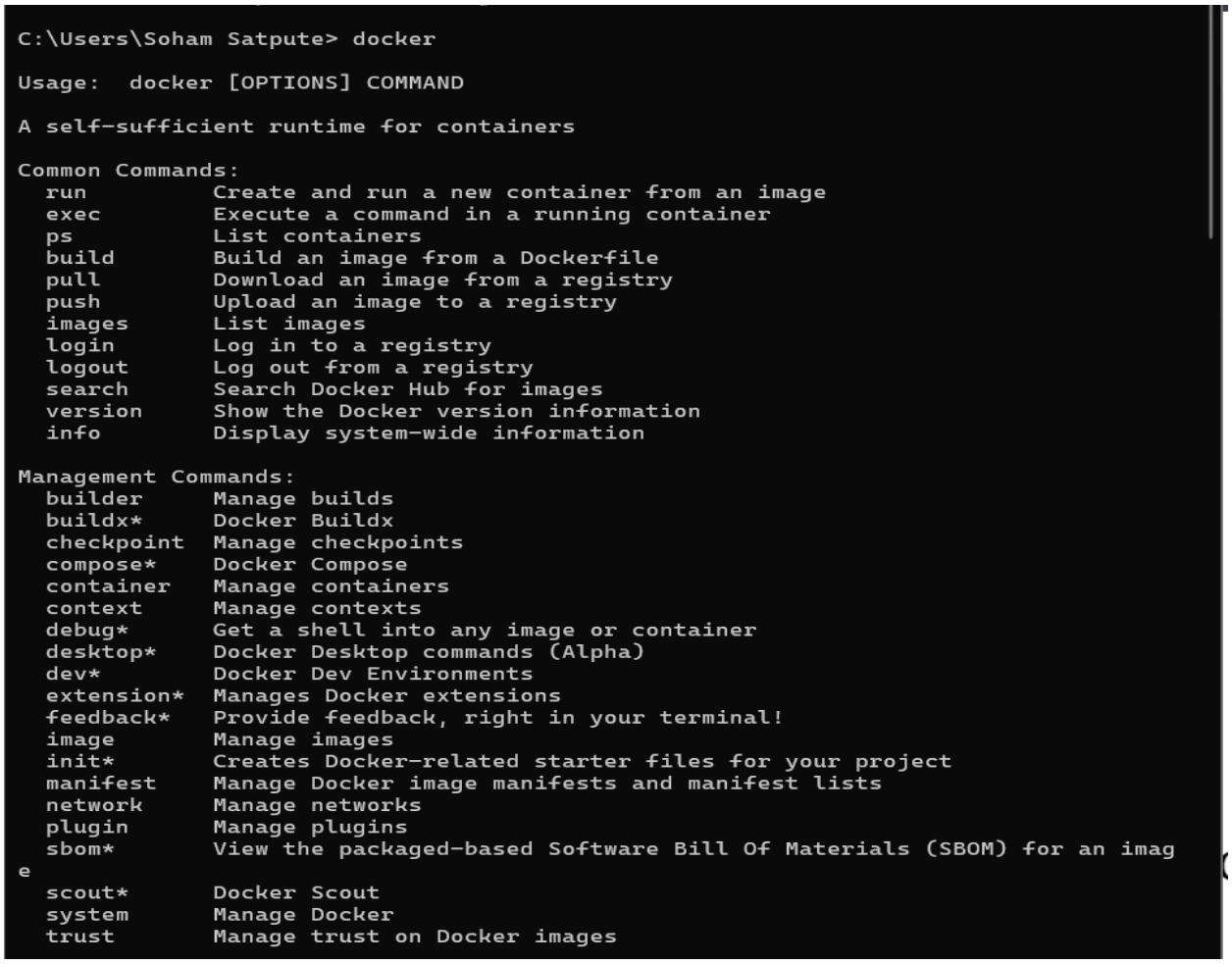
Experiment no 6

Name: Soham Satpute
Roll_No :52

Aim :- To Build, change, and destroy AWS / GCP /Microsoft Azure/ DigitalOcean infrastructure Using Terraform. (S3 bucket or Docker) fdp

Part A:Creating docker image using terraform Prerequisite:
1) Download and Install Docker Desktop from https://www.docker.com/

Step 1:
Check Docker functionality:



```
C:\Users\Soham Satpute> docker

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Common Commands:
  run         Create and run a new container from an image
  exec        Execute a command in a running container
  ps          List containers
  build       Build an image from a Dockerfile
  pull        Download an image from a registry
  push        Upload an image to a registry
  images      List images
  login       Log in to a registry
  logout      Log out from a registry
  search      Search Docker Hub for images
  version     Show the Docker version information
  info        Display system-wide information

Management Commands:
  builder     Manage builds
  buildx*     Docker Buildx
  checkpoint  Manage checkpoints
  compose*    Docker Compose
  container   Manage containers
  context     Manage contexts
  debug*      Get a shell into any image or container
  desktop*    Docker Desktop commands (Alpha)
  dev*        Docker Dev Environments
  extension*  Manages Docker extensions
  feedback*   Provide feedback, right in your terminal!
  image       Manage images
  init*       Creates Docker-related starter files for your project
  manifest    Manage Docker image manifests and manifest lists
  network     Manage networks
  plugin      Manage plugins
  sbom*       View the packaged-based Software Bill Of Materials (SBOM) for an imag
e
  scout*      Docker Scout
  system      Manage Docker
  trust       Manage trust on Docker images
```

Check for the docker version with the following command:

```
C:\Users\Soham Satpute> docker --version
Docker version 27.1.1, build 6312585

C:\Users\Soham Satpute>
```

Now, create a folder named ‘Terraform Scripts’ in which we save our different types of scripts which will be further used in this experiment.
Step 2: Firstly create a new folder named ‘Docker’ in the ‘TerraformScripts’ folder. Then create a new docker.tf file using Atom editor and write the following contents into it to create a Ubuntu Linux container.

Script:

```
terraform {

required_providers {

docker = {

source = "kreuzwerker/docker"
version = "2.25.0"

   }
 }
}

provider "docker" {

host = "npipe:////.//pipe//docker_engine"
}

resource "docker_image" "ubuntu" {
name = "ubuntu:latest"
}

resource "docker_container" "foo" {
```

image = docker_image.ubuntu.image_id
name = "foo"
command = ["sleep", "3600"]
}

docker.tf

```
terraform {
  required_providers {
    docker = {
      source  = "kreuzwerker/docker"
      version = "2.25.0"
    }
  }
}

provider "docker" {
  host = "npipe:////.//pipe//docker_engine"
}

resource "docker_image" "ubuntu" {
  name = "ubuntu:latest"
}

resource "docker_container" "foo" {
  image   = docker_image.ubuntu.image_id
  name    = "foo"
  command = ["sleep", "3600"]
}
```

Step 3:
Execute Terraform Init command to initialize the resources:

Windows PowerShell

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\soham22\Terraform Scripts\Docker> terraform init
Initializing the backend...
Initializing provider plugins...
- Reusing previous version of kreuzwerker/docker from the dependency lock file
- Using previously-installed kreuzwerker/docker v2.25.0

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

Step 4:

Execute Terraform plan to see the available resources:

```
PS C:\soham22\Terraform Scripts\Docker> terraform plan
docker_image.ubuntu: Refreshing state... [id=sha256:b1e9cef3f2977f8bdd19eb9ae04f83b315f80fe4f5c5651fedf41482c12432f7ubun
tu:latest]
docker_container.foo: Refreshing state... [id=0200e3c246ed3069424b55d2bb9803da5442e04190c918629f4ee6a8879218fa]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the
following symbols:
-/+ destroy and then create replacement

Terraform will perform the following actions:

  # docker_container.foo must be replaced
-/+ resource "docker_container" "foo" {
      + bridge                                      = (known after apply)
      + container_logs                              = (known after apply)
      - cpu_shares                                  = 0 -> null
      - dns                                         = [] -> null
      - dns_opts                                    = [] -> null
      - dns_search                                  = [] -> null
      ~ entrypoint                                  = [] -> (known after apply)
      ~ env                                         = [] -> (known after apply)
      + exit_code                                   = (known after apply)
      ~ gateway                                     = "172.17.0.1" -> (known after apply)
      - group_add                                   = [] -> null
      ~ hostname                                    = "0200e3c246ed" -> (known after apply)
      ~ id                                          = "0200e3c246ed3069424b55d2bb9803da5442e04190c918629f4ee6a8879218fa"
 -> (known after apply)
      ~ init                                        = false -> (known after apply)
      ~ ip_address                                  = "172.17.0.2" -> (known after apply)
```

Step 5 :

Type terraform apply to apply changes:

```
PS C:\soham22\Terraform Scripts\Docker> terraform apply

Terraform used the selected providers to generate the following
execution plan. Resource actions are indicated with the following
symbols:
  + create

Terraform will perform the following actions:

  # docker_container.foo will be created
  + resource "docker_container" "foo" {
      + attach                                      = false
      + bridge                                      = (known after apply)
      + command                                     = [
          + "sleep",
          + "3600",
        ]
      + container_logs                              = (known after apply)
      + container_read_refresh_timeout_milliseconds = 15000
      + entrypoint                                  = (known after apply)
      + env                                         = (known after apply)
      + exit_code                                   = (known after apply)
      + gateway                                     = (known after apply)
      + hostname                                    = (known after apply)
      + id                                          = (known after apply)
      + image                                       = (known after apply)
      + init                                        = (known after apply)
      + ip_address                                  = (known after apply)
```

```
  Plan: 2 to add, 0 to change, 0 to destroy.

  Do you want to perform these actions?
    Terraform will perform the actions described above.
    Only 'yes' will be accepted to approve.

    Enter a value: yes

  docker_image.ubuntu: Creating...
  docker_image.ubuntu: Still creating... [10s elapsed]
  docker_image.ubuntu: Still creating... [20s elapsed]
  docker_image.ubuntu: Still creating... [30s elapsed]
```

Docker images , Before Executing Apply

```
PS C:\soham22\Terraform Scripts\Docker> docker images
REPOSITORY    TAG       IMAGE ID       CREATED         SIZE
```

Docker images , After Executing Apply

```
Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
PS C:\soham22\Terraform Scripts\Docker> docker images
REPOSITORY    TAG       IMAGE ID       CREATED          SIZE
ubuntu        latest    b1e9cef3f297   3 weeks ago      78.1MB
nginx         latest    39286ab8a5e1   5 weeks ago      188MB
hello-world   latest    d2c94e258dcb   16 months ago    13.3kB
PS C:\soham22\Terraform Scripts\Docker>
```

Step 6:

Execute Terraform destroy to delete the configuration ,which will automatically delete the Ubuntu Container:

```
PS C:\soham22\Terraform Scripts\Docker> terraform destroy
docker_image.ubuntu: Refreshing state... [id=sha256:b1e9cef3f2977f8bdd19eb9ae04f83b315f80fe4f5c5651fedf41482c12432f7ubuntu:latest]
docker_container.foo: Refreshing state... [id=877e2e0bb5cfd00634ddc5cde0f73121bc963959cb5c8f1ddf827471f515e4d5]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # docker_container.foo will be destroyed
  - resource "docker_container" "foo" {
      - attach                                      = false -> null
      - command                                     = [
          - "sleep",
          - "3600",
        ] -> null
      - container_read_refresh_timeout_milliseconds = 15000 -> null
      - cpu_shares                                  = 0 -> null
      - dns                                         = [] -> null
      - dns_opts                                    = [] -> null
      - dns_search                                  = [] -> null
      - entrypoint                                  = [] -> null
      - env                                         = [] -> null
      - gateway                                     = "172.17.0.1" -> null
      - group_add                                   = [] -> null
      - hostname                                    = "877e2e0bb5cf" -> null
      - id                                          = "877e2e0bb5cfd00634ddc5cde0f73121bc963959cb5c8f1ddf827471f515e4d5" -> null
      - image                                       = "sha256:b1e9cef3f2977f8bdd19eb9ae04f83b315f80fe4f5c5651fedf41482c12432f7" -> null
```

Docker images After Executing Destroy step:

```
Destroy complete! Resources: 2 destroyed.
PS C:\soham22\Terraform Scripts\Docker> docker images
REPOSITORY    TAG       IMAGE ID       CREATED         SIZE
nginx         latest    39286ab8a5e1   5 weeks ago     188MB
hello-world   latest    d2c94e258dcb   16 months ago   13.3kB
```

ADVANCE DEVOPS EXP 7

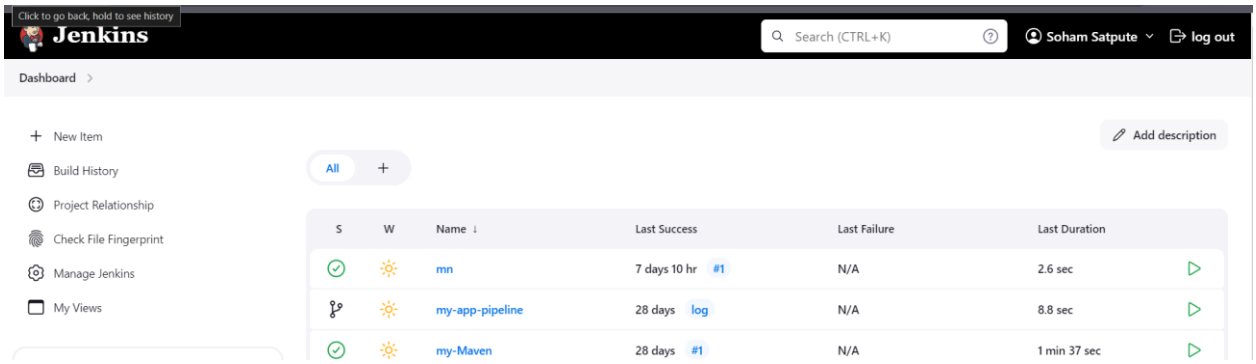
Name: Soham Satpute
Class:D15A
Roll No:52

Aim: To understand Static Analysis SAST process and learn to integrate Jenkins SAST to SonarQube/GitLab.

Jenkins integration with SonarQube:

Steps:

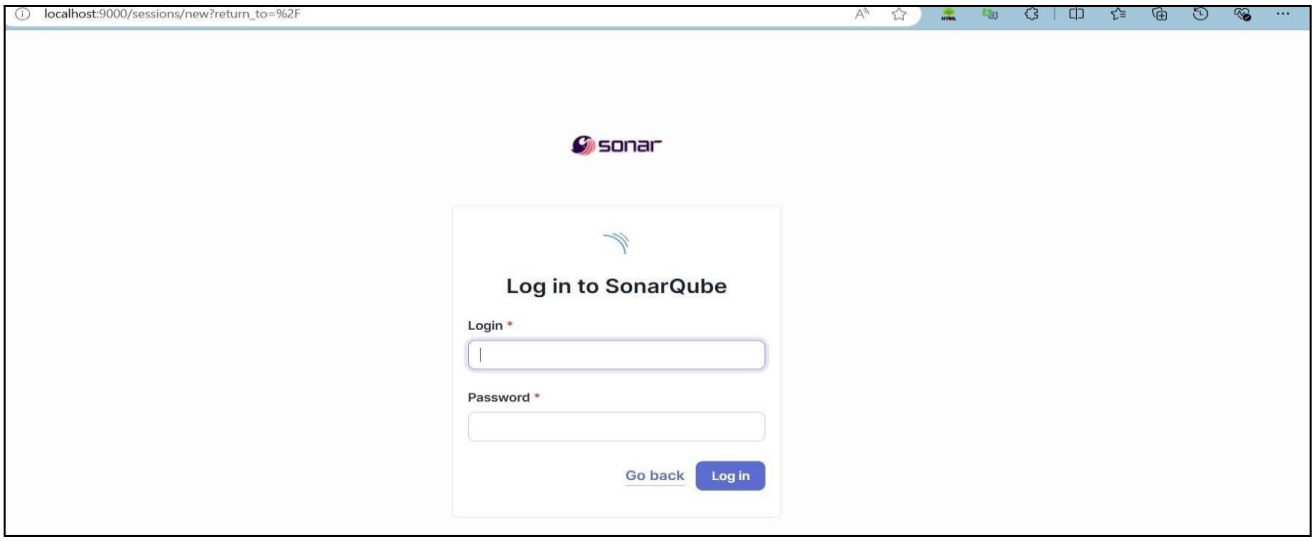
1.Open up Jenkins Dashboard on localhost, port 8080 or whichever port it is at for you.



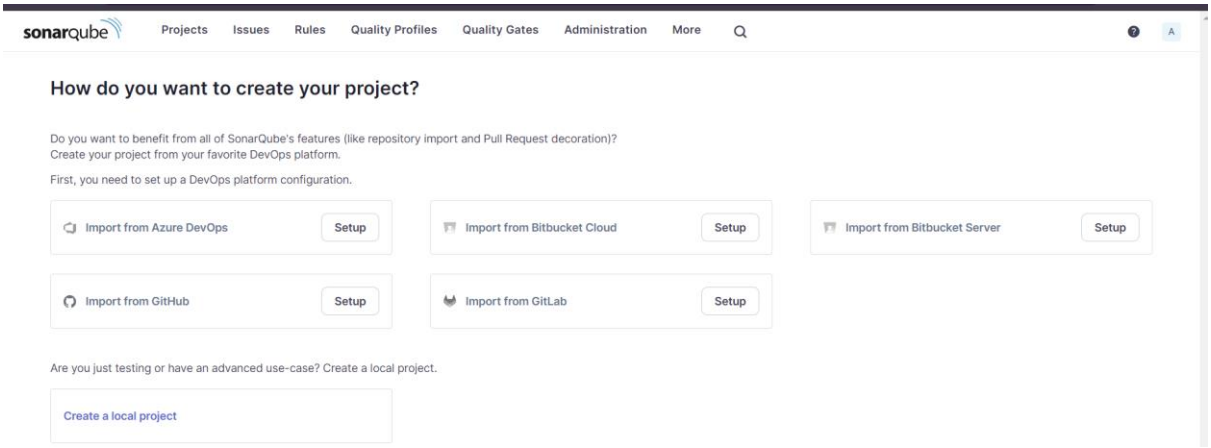
2.Run SonarQube in a Docker container using this command:
docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest

```
PS C:\Windows\system32> docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest
Unable to find image 'sonarqube:latest' locally
latest: Pulling from library/sonarqube
7478e0ac0f23: Pull complete
90a925ab929a: Pull complete
7d9a34308537: Pull complete
80338217a4ab: Pull complete
1a5fd5c7e184: Pull complete
7b87d6fa783d: Pull complete
bd819c9b5ead: Pull complete
4f4fb700ef54: Pull complete
Digest: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31aecde
Status: Downloaded newer image for sonarqube:latest
5ab3928e5e27607e3661d129731e4e600a9019574c7dc2767aa9b3bfdaa941be
```

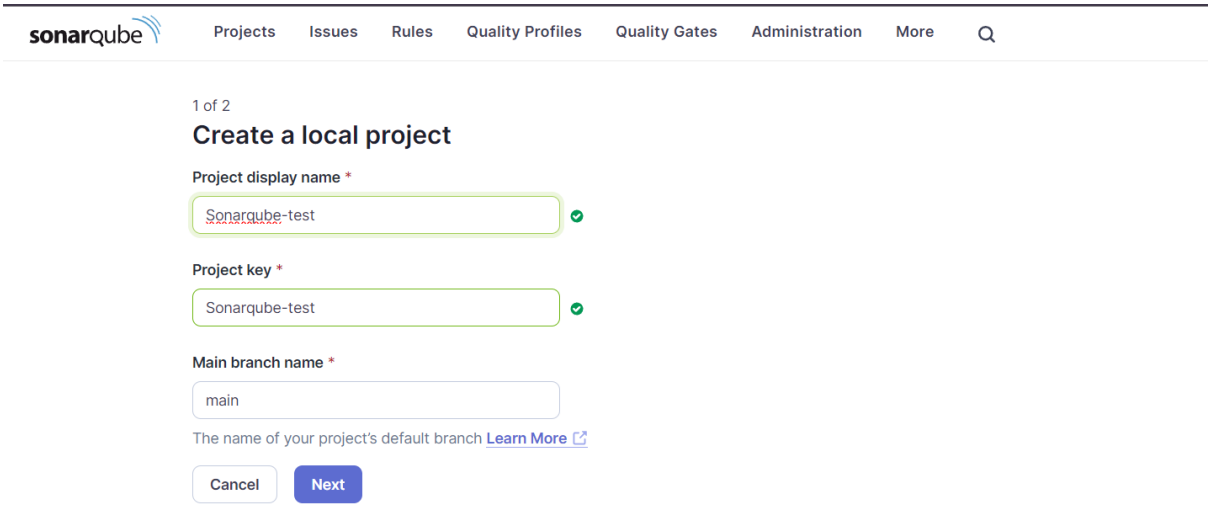
3. Once the container is up and running, you can check the status of SonarQube at localhost port 9000.

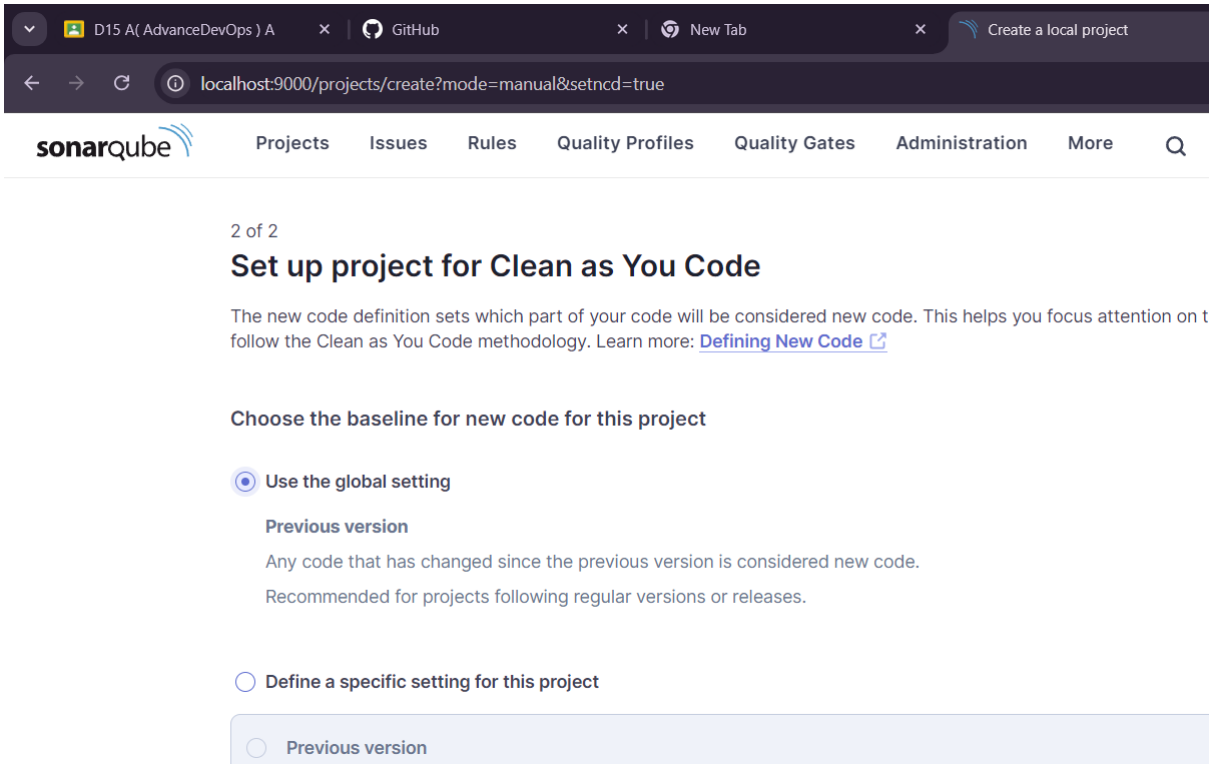


4.Login to SonarQube using username admin and password admin.



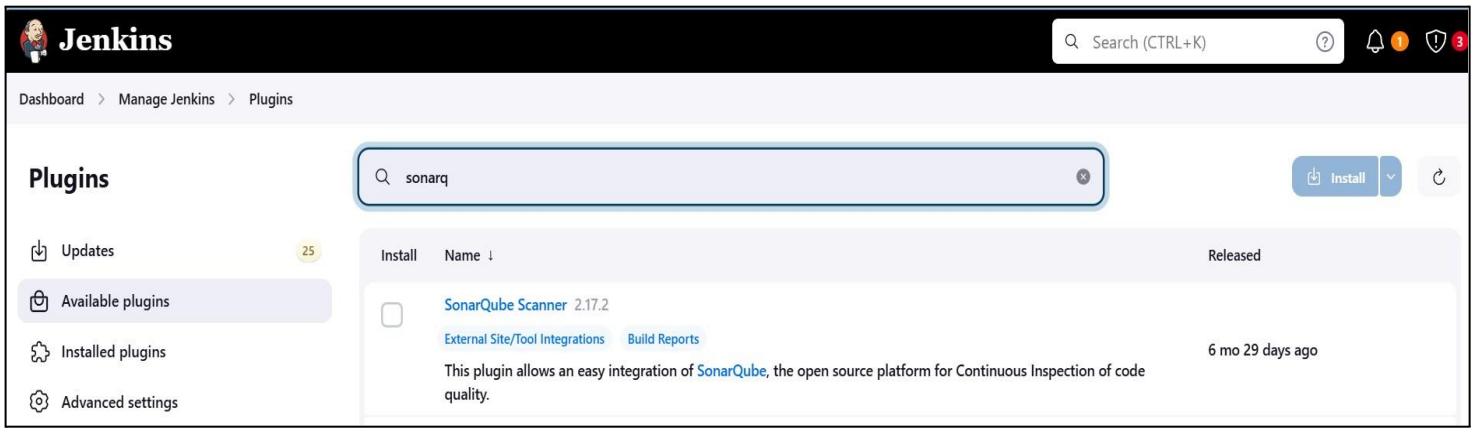
5.Create a manual project in SonarQube with the name sonarqube

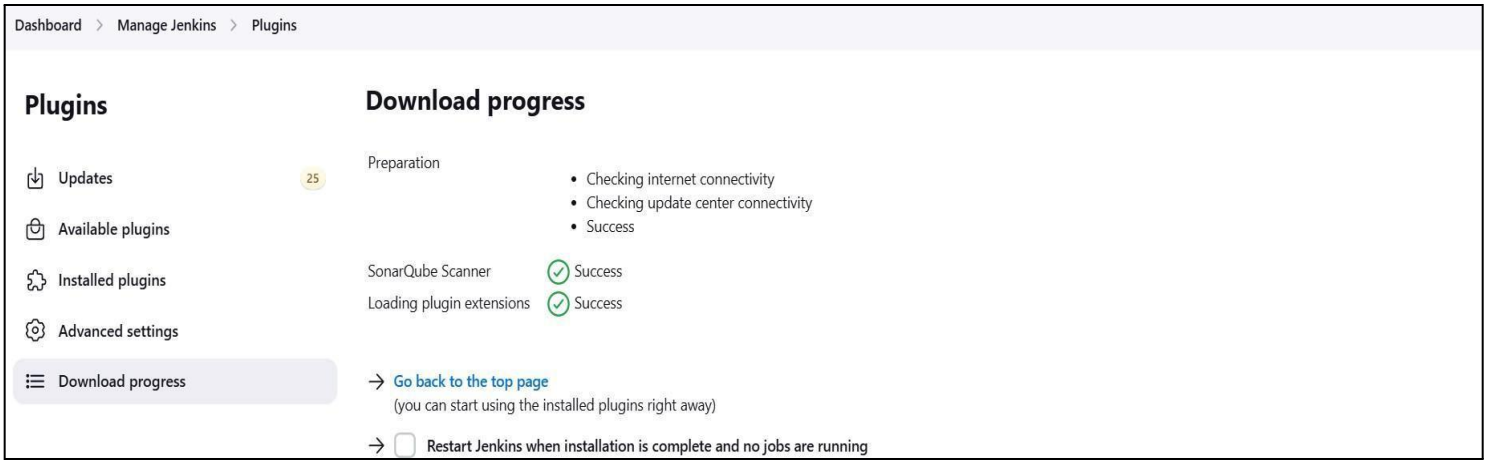




Setup the project and come back to Jenkins Dashboard.

Go to Manage Jenkins and search for SonarQube Scanner for Jenkins and install it.

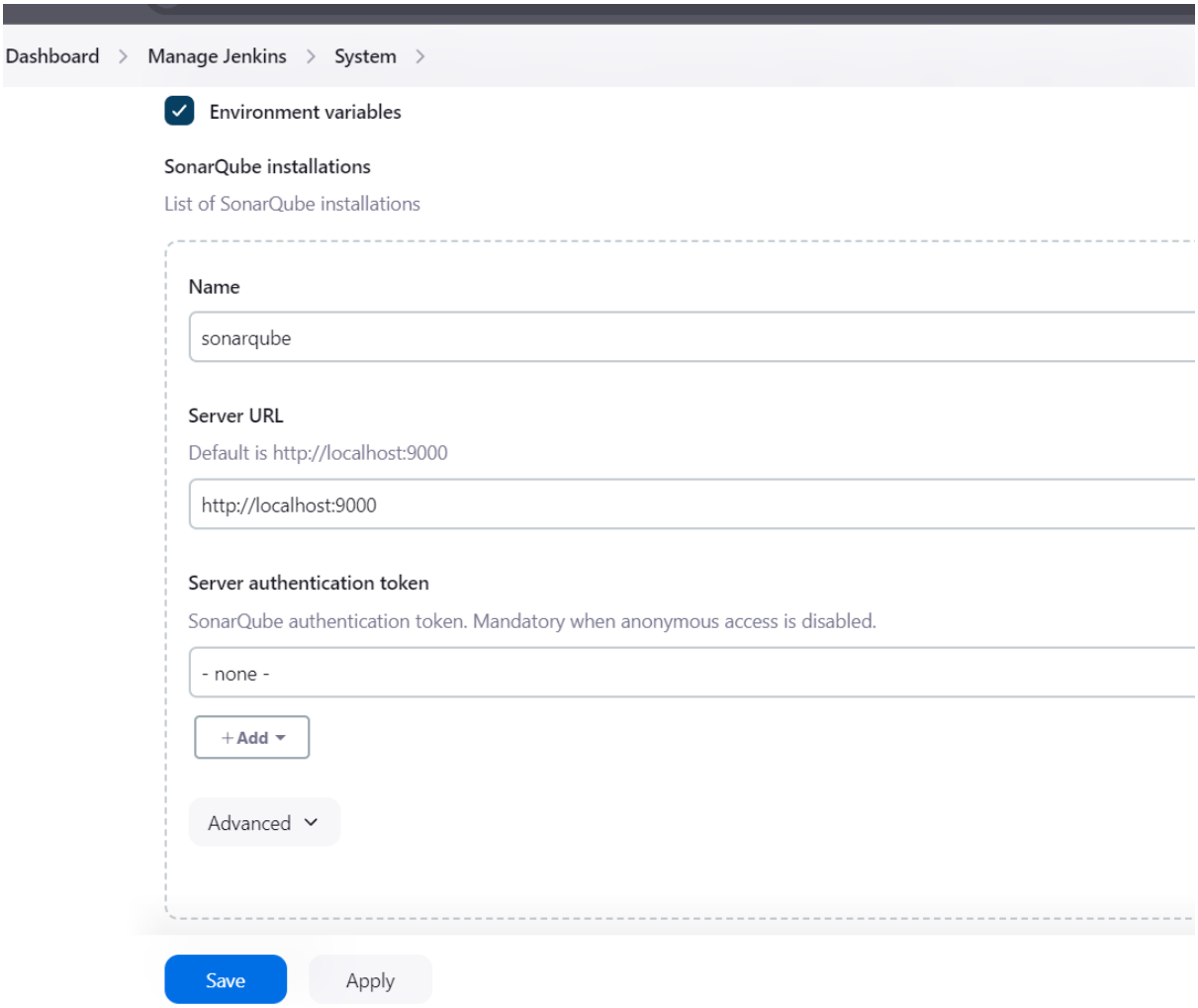




6.Under Jenkins ‘Manage Jenkins’ then go to ‘system’, scroll and look for **SonarQube Servers** and enter
the details.

Enter the Server Authentication token if needed.

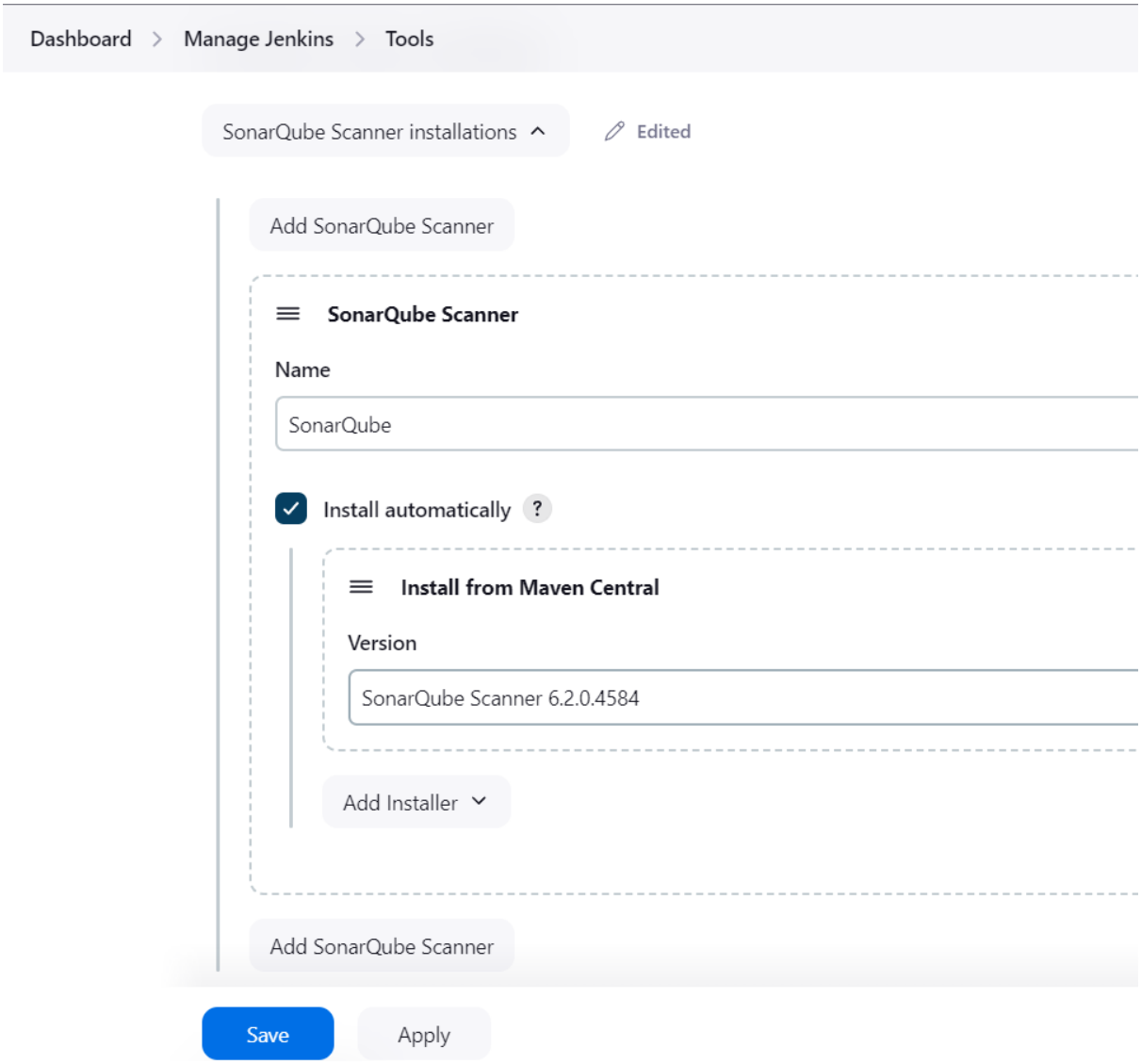
In SonarQube installations: Under **Name** add <project name of sonarqube>,here we have named it as **adv_devops_7_sonarqube** In **Server URL** Default is **http://localhost:9000**



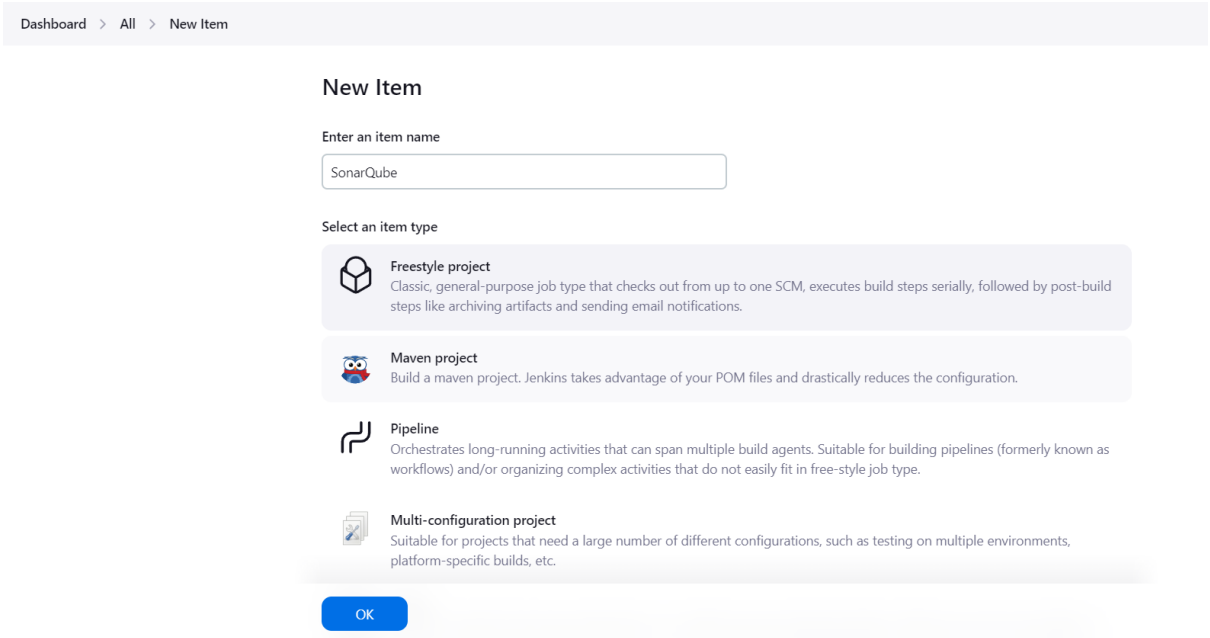
7. Search for SonarQube Scanner under Global Tool Configuration.

Choose the latest configuration and choose Install automatically.

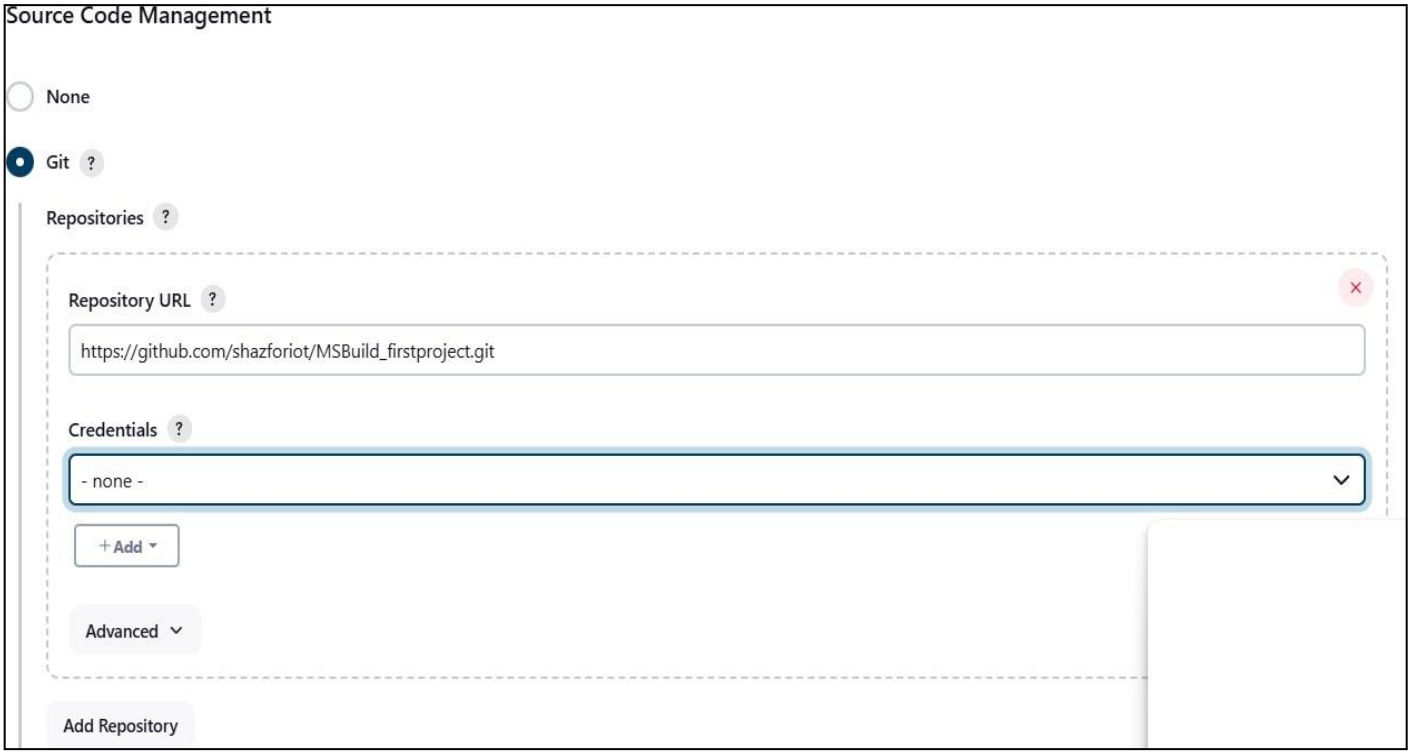
Dashboard > Manage Jenkins > Tools



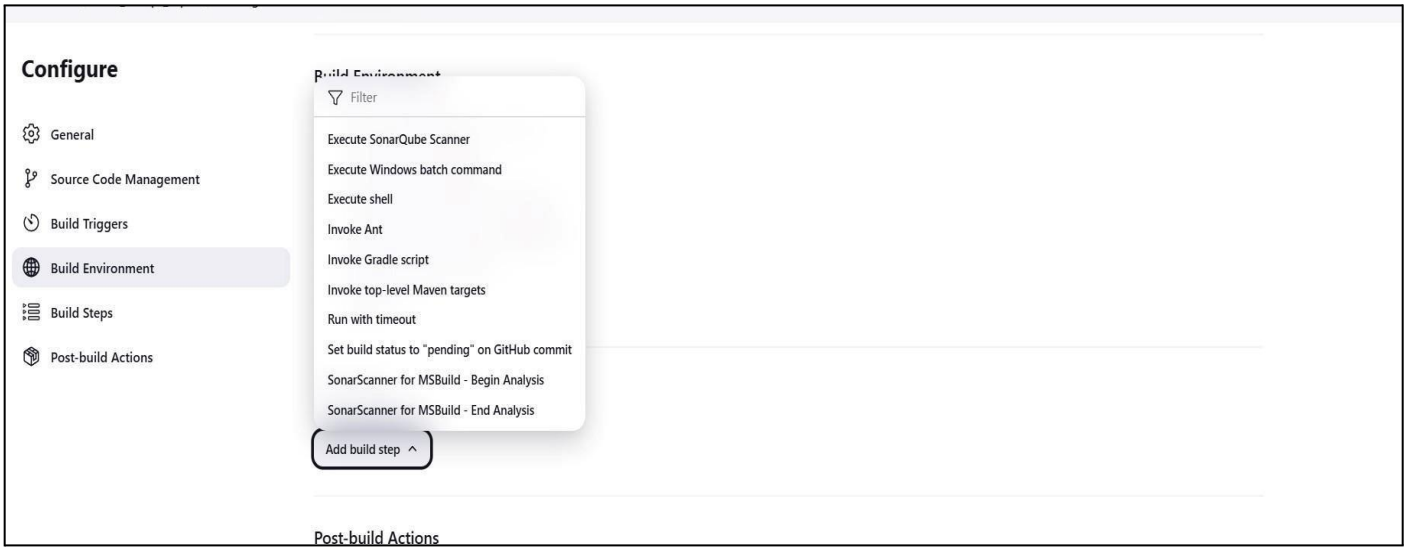
8.After the configuration, create a New Item in Jenkins, choose a freestyle project.



9. Choose this GitHub repository in Source Code Management.
https://github.com/shazforiot/MSBuild_firstproject.git
It is a sample hello-world project with no vulnerabilities and issues, just to test the integration.



10. Under **Select project → Configuration → Build steps → Execute SonarQube Scanner**, enter these Analysis properties. Mention the SonarQube Project Key, Login, Password, Source path and Host URL.



JDK ?

JDK to be used for this SonarQube analysis

(Inherit From Job)

Path to project properties ?

Analysis properties ?

```
sonar.projectKey=Sonarqube-test
sonar.sources=.
sonar.host.url=http://localhost:9000
sonar.login=admin
sonar.password=
```

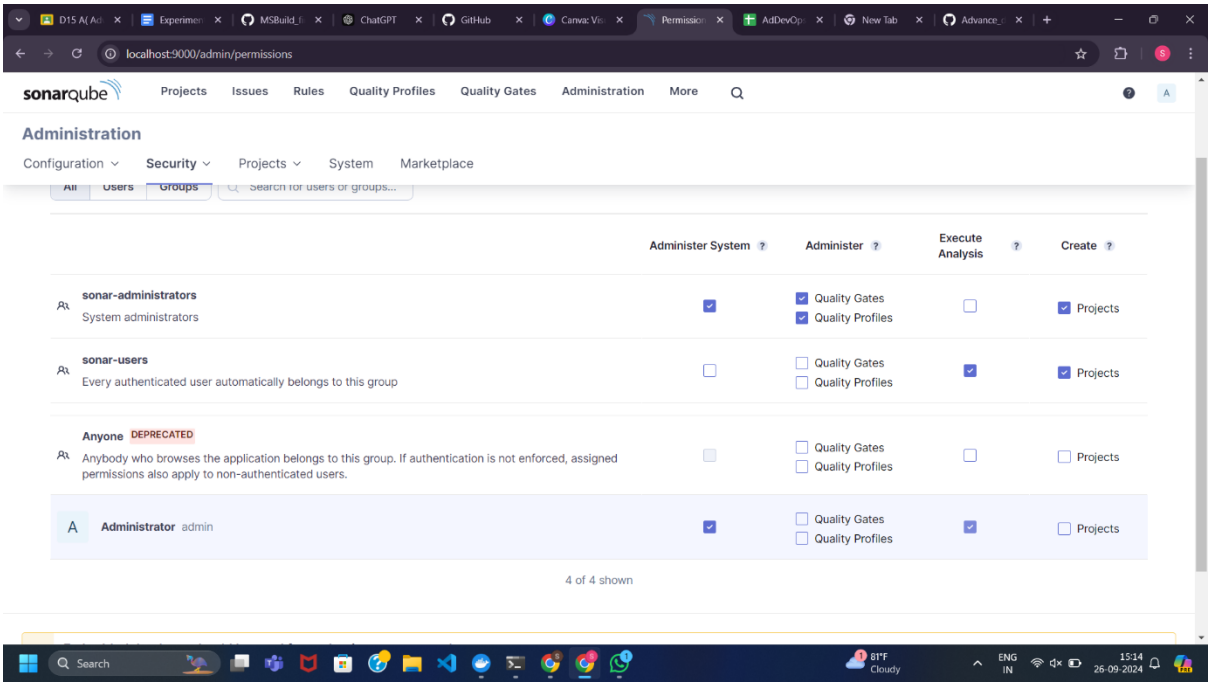
Additional arguments ?

JVM Options ?

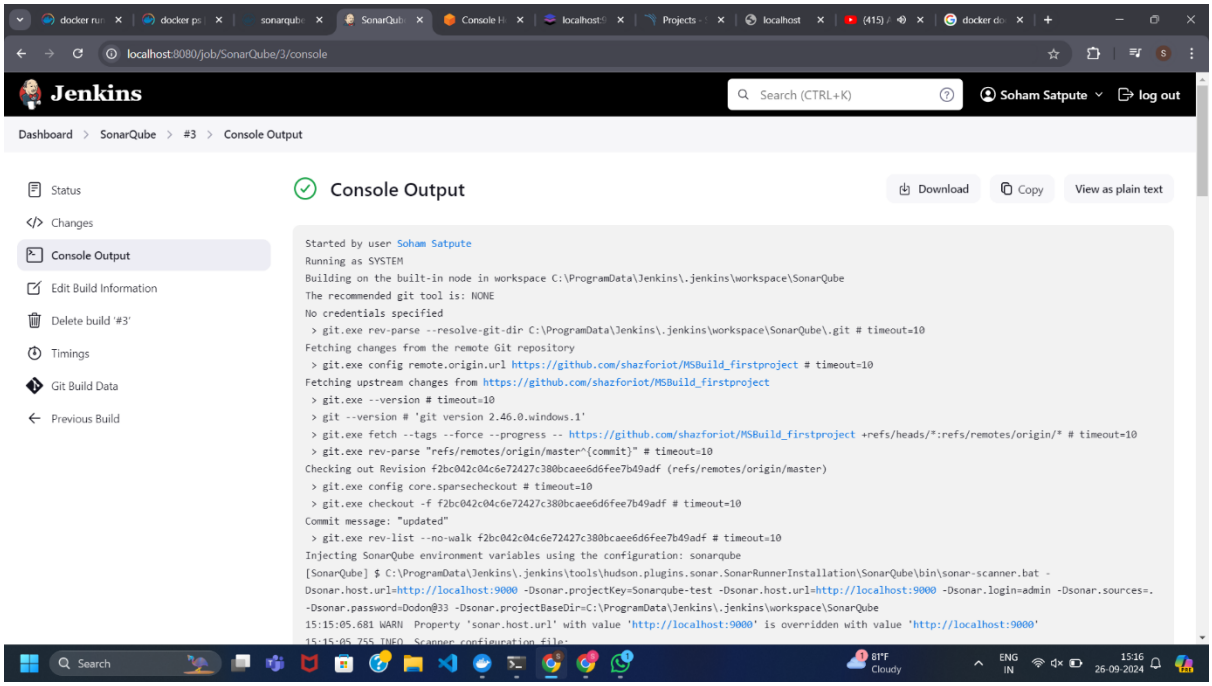
Add build step

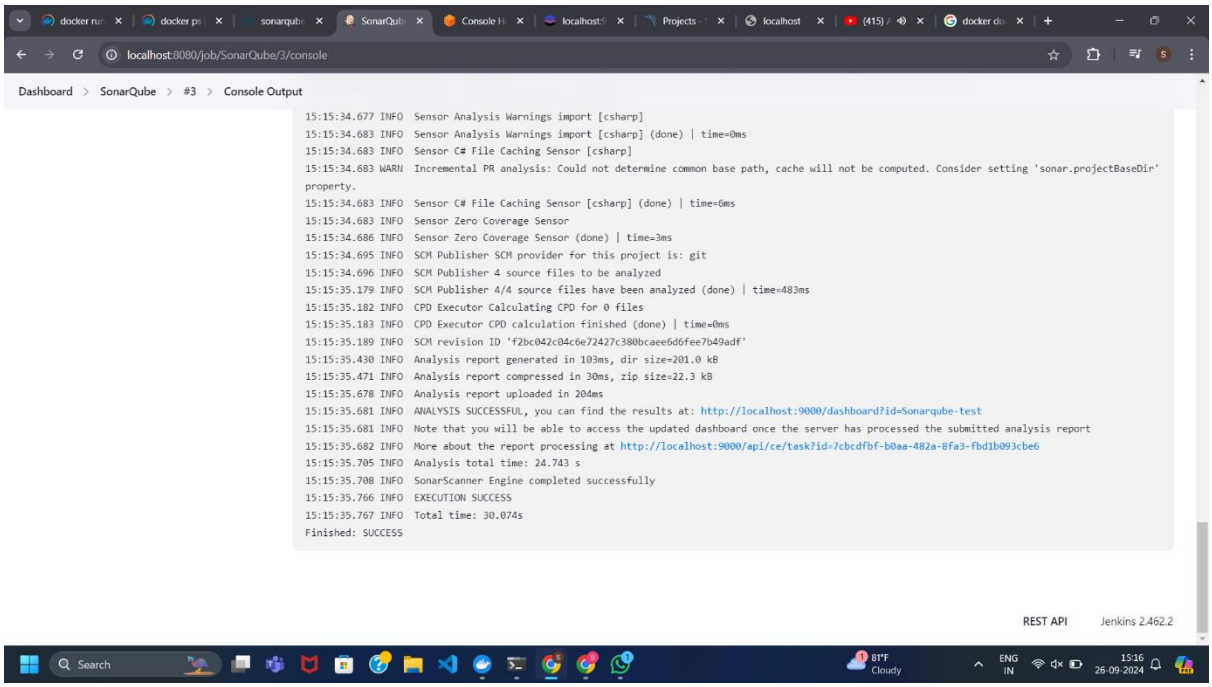
Save Apply

11. Go to http://localhost:9000/<user_name>/permissions and allow Execute Permissions to the Admin user

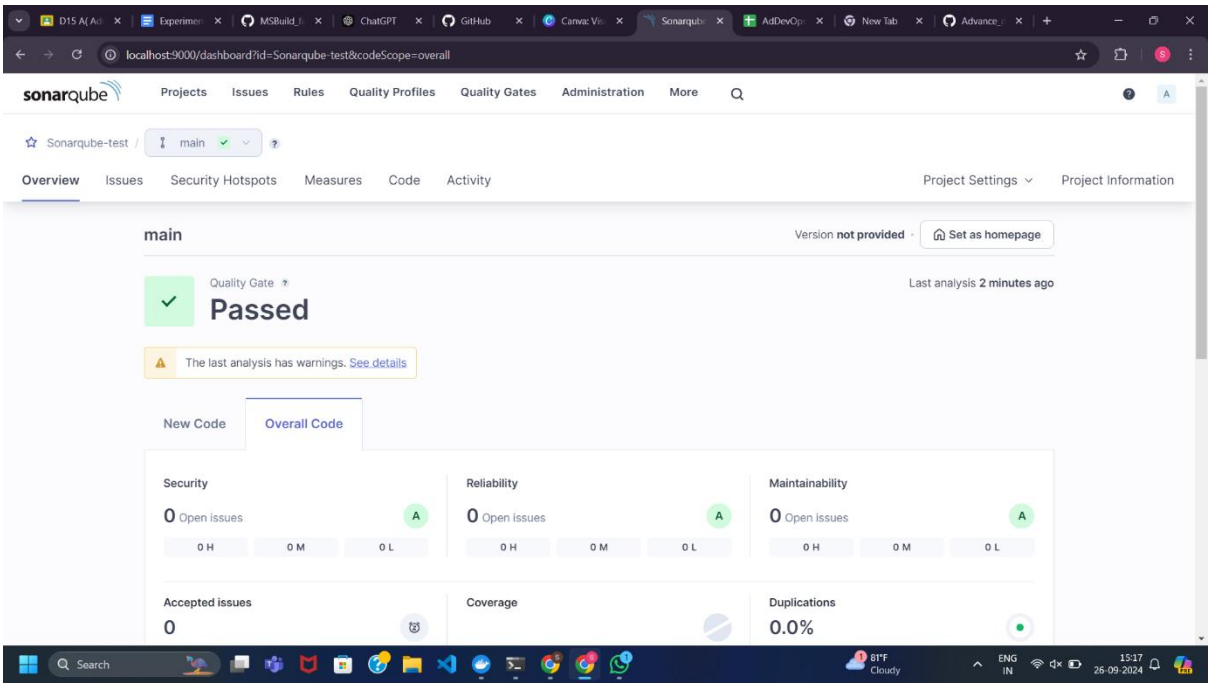


12.Check the console Output





13.Once the build is complete, check project on SonarQube



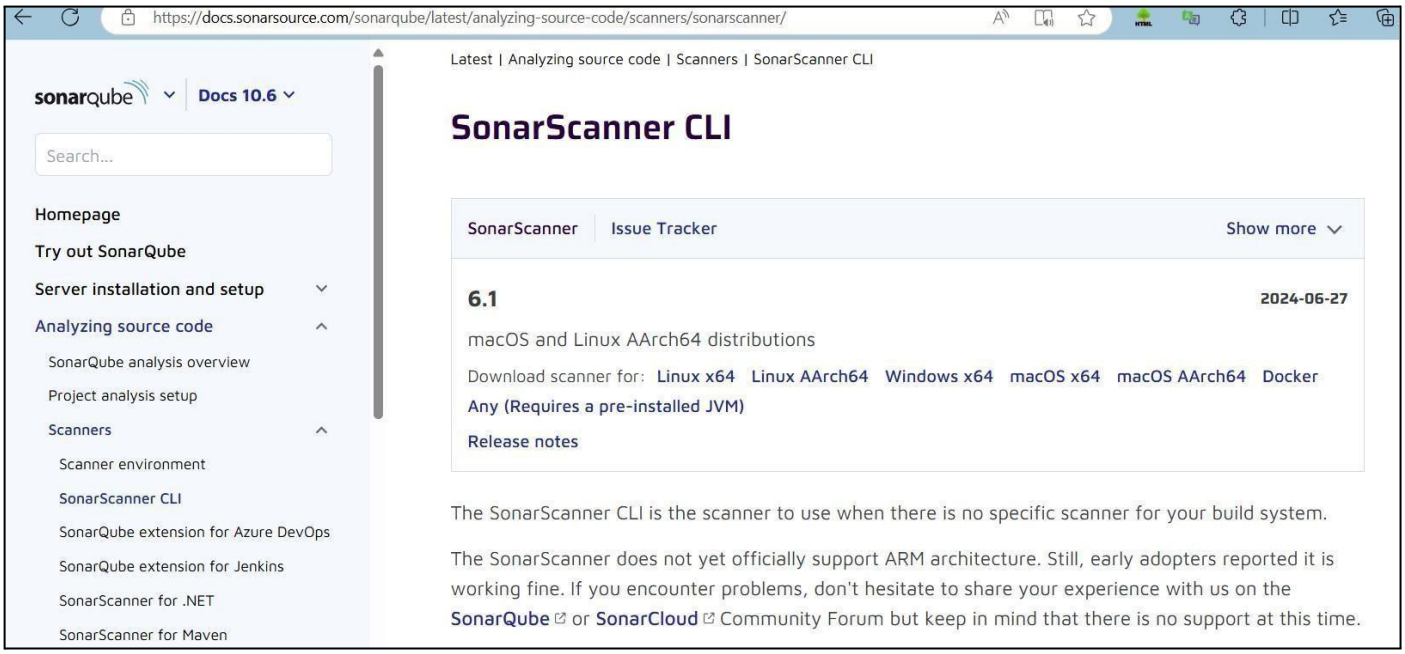
In this way, we have integrated Jenkins with SonarQube for SAST.

ADVANCE DEVOPS EXP 8

Name:Soham Satpute
Class:D15A Roll
No:52

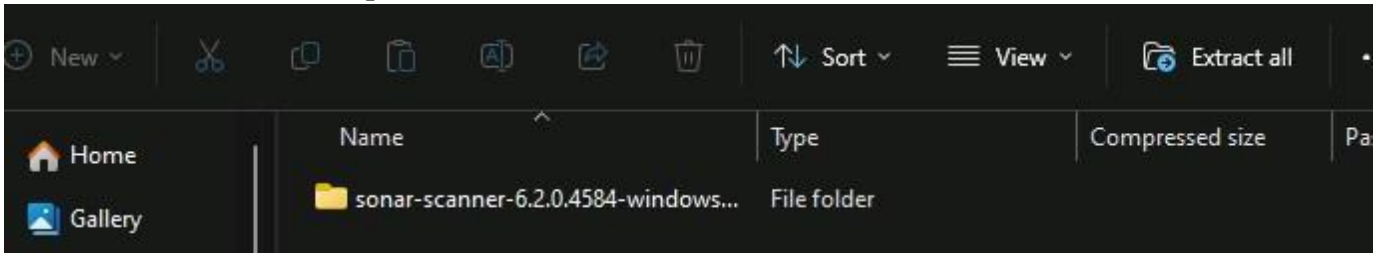
Aim: Create a Jenkins CICD Pipeline with SonarQube / GitLab Integration to perform a static analysis of the code to detect bugs, code smells, and security vulnerabilities on a sample Web / Java / Python application.

Step 1: Download sonar scanner https://docs.sonarsource.com/sonarqube/latest/analyzing-source-code/scanners/sonarscanner

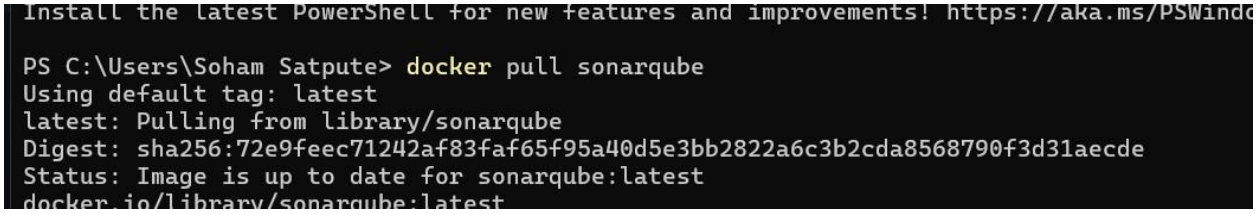


ner/ Visit this link and download the sonarqube scanner CLI.

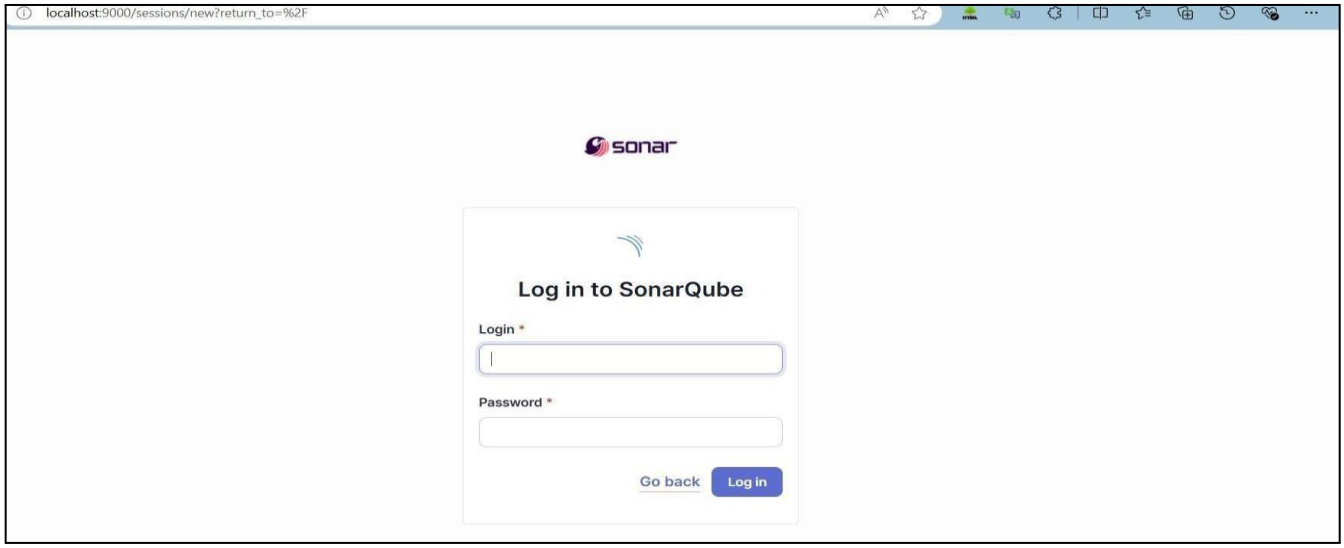
Extract the downloaded zip file in a folder.



1. Install sonarqube image Command: **docker pull sonarqube**

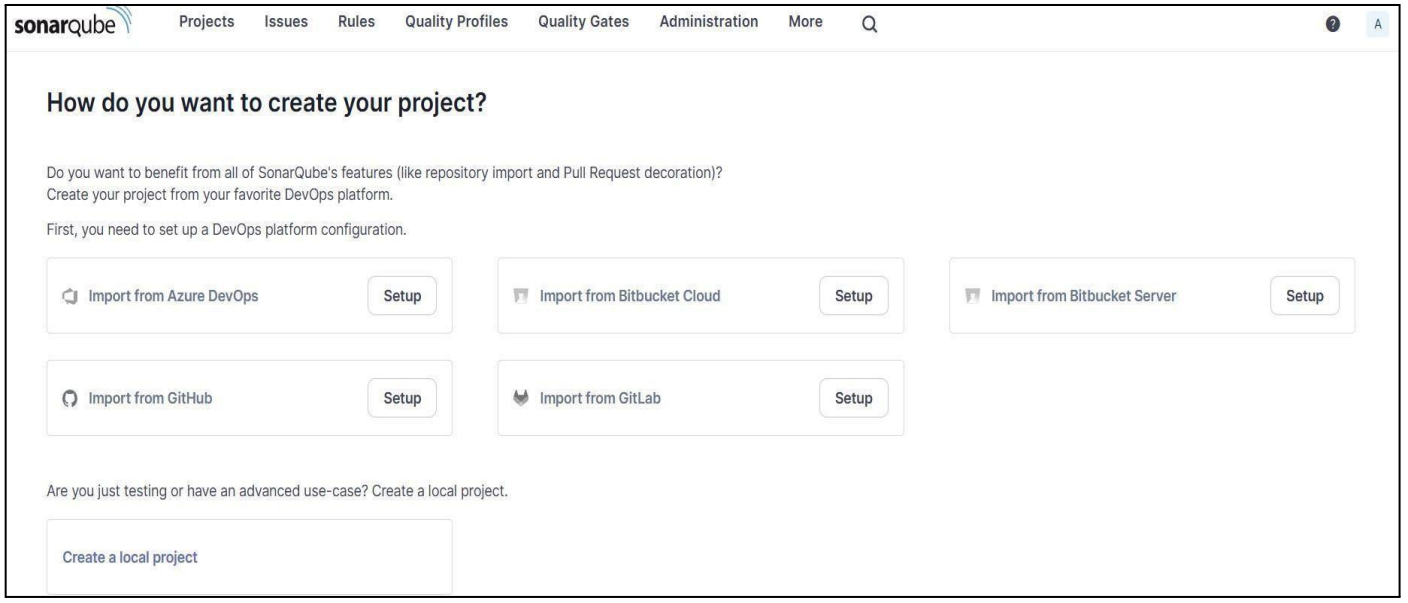

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindo
PS C:\Users\Soham Satpute> docker pull sonarqube
Using default tag: latest
latest: Pulling from library/sonarqube
Digest: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31aecde
Status: Image is up to date for sonarqube:latest
docker.io/library/sonarqube:latest

2. Once the container is up and running, you can check the status of

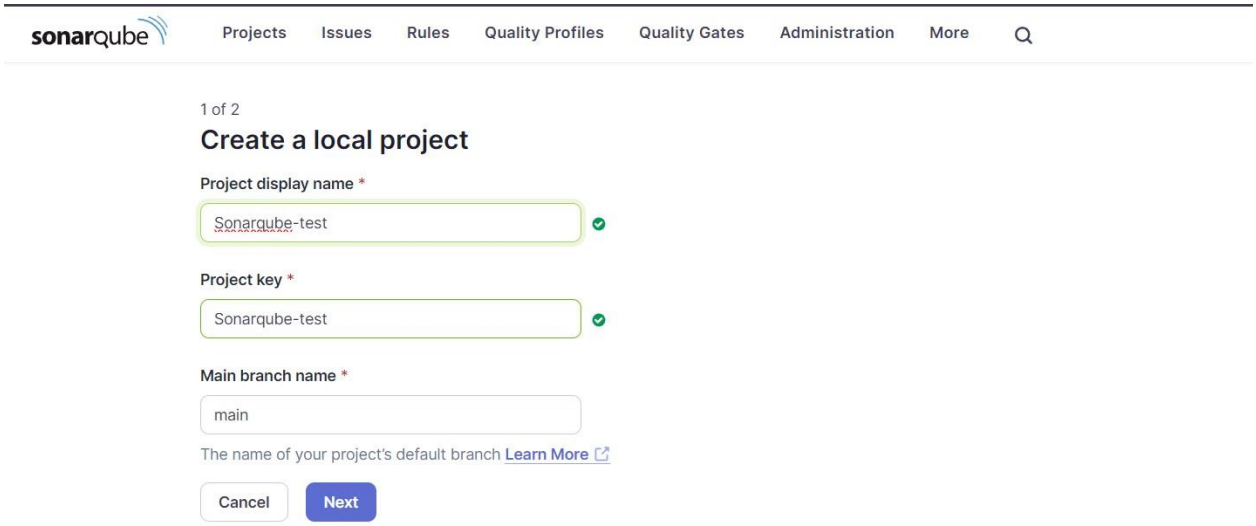


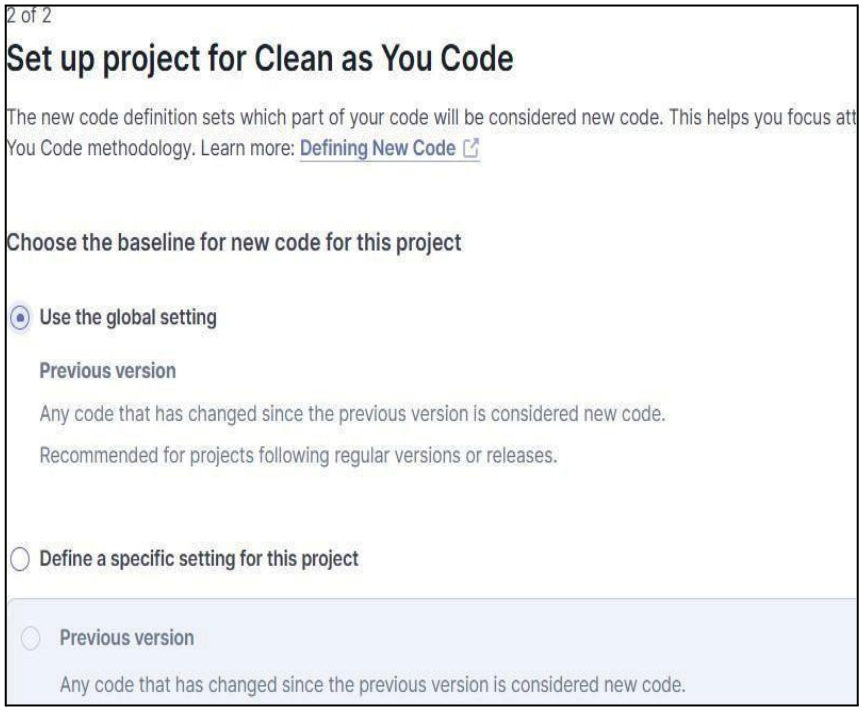
SonarQube at localhost port 9000.

3. Login to SonarQube using username admin and password admin.

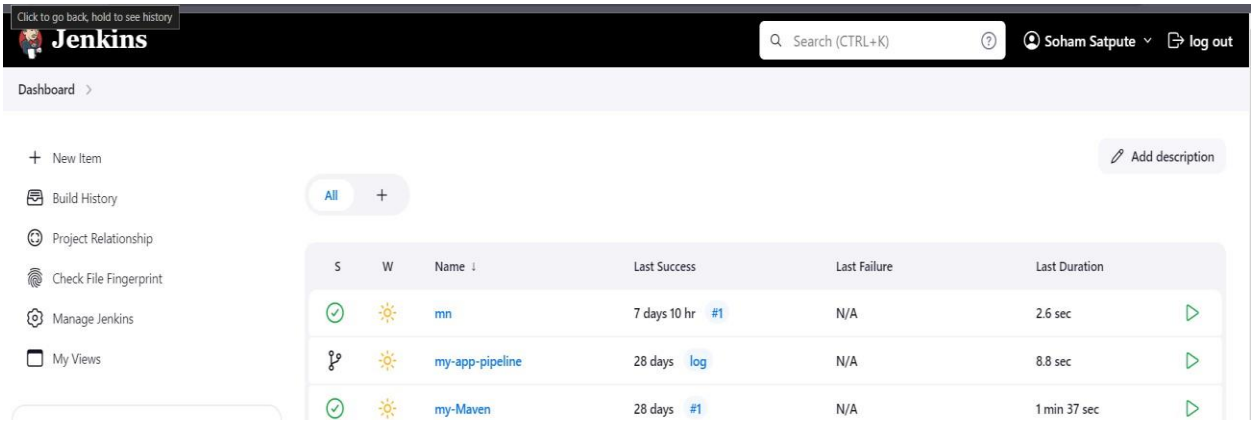


4. Create a manual project in SonarQube with the name sonarqube

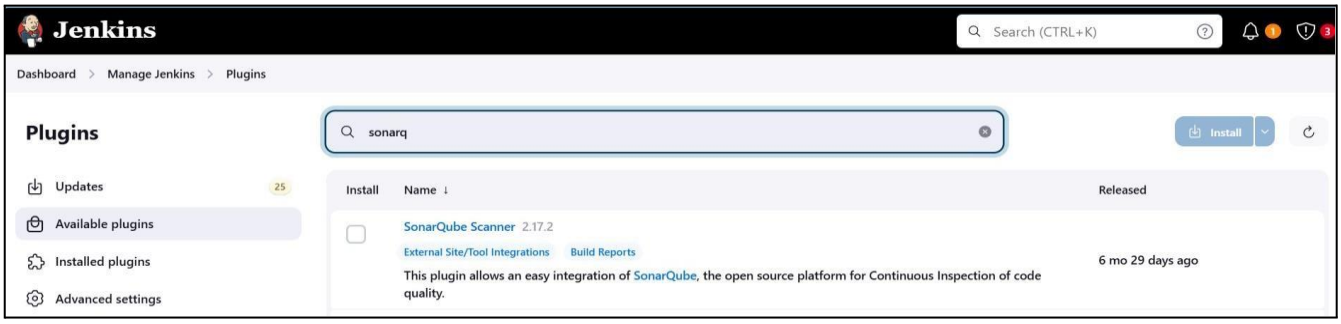


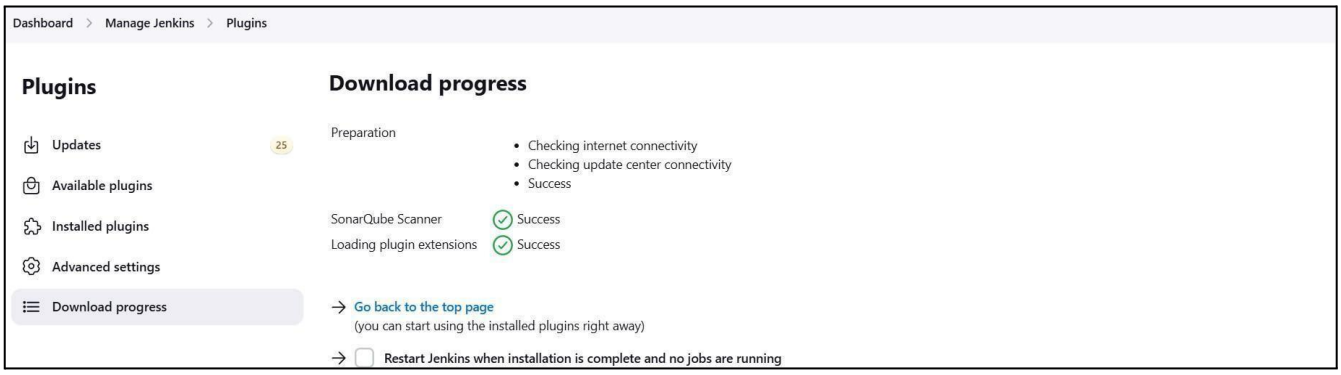


5. Open up Jenkins Dashboard on localhost, port 8080 or whichever port it is at for you.



6. Go to Manage Jenkins and search for SonarQube Scanner for Jenkins and install it.





7. Under Jenkins 'Manage Jenkins' then go to 'system', scroll and look for **SonarQube Servers** and enter
the details.

Enter the Server Authentication token if needed.

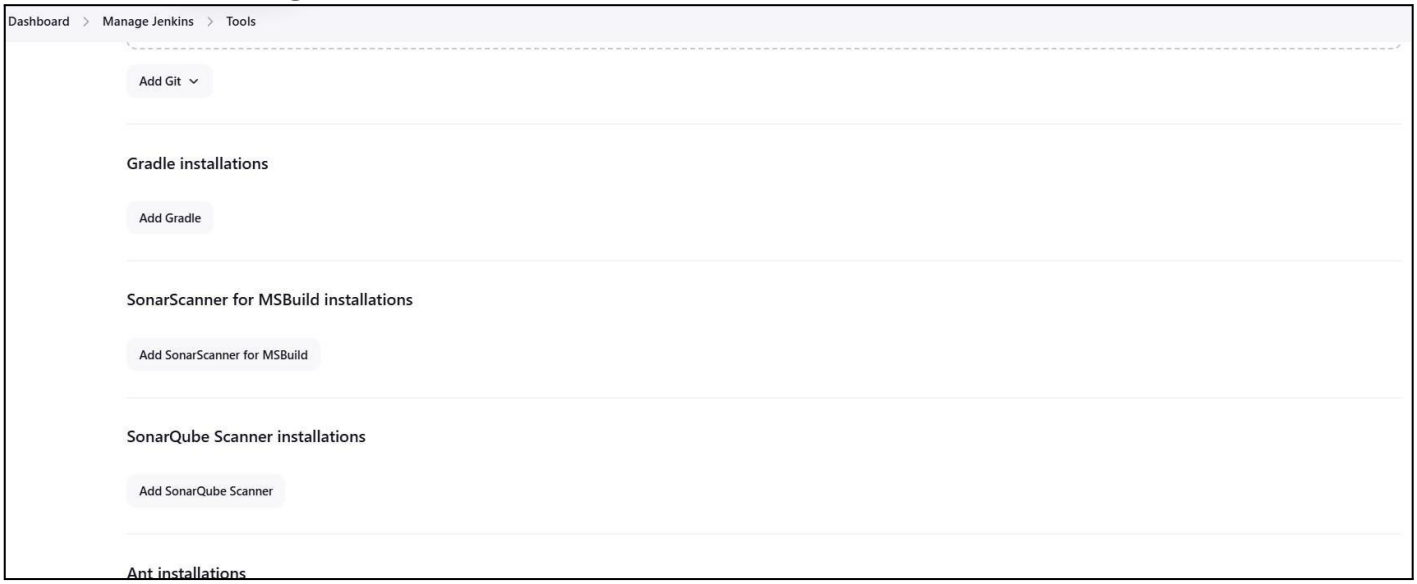
In SonarQube installations: Under **Name** add <project name of sonarqube> for me **adv_devops_7_sonarqube**

In **Server URL** Default is **http://localhost:9000**

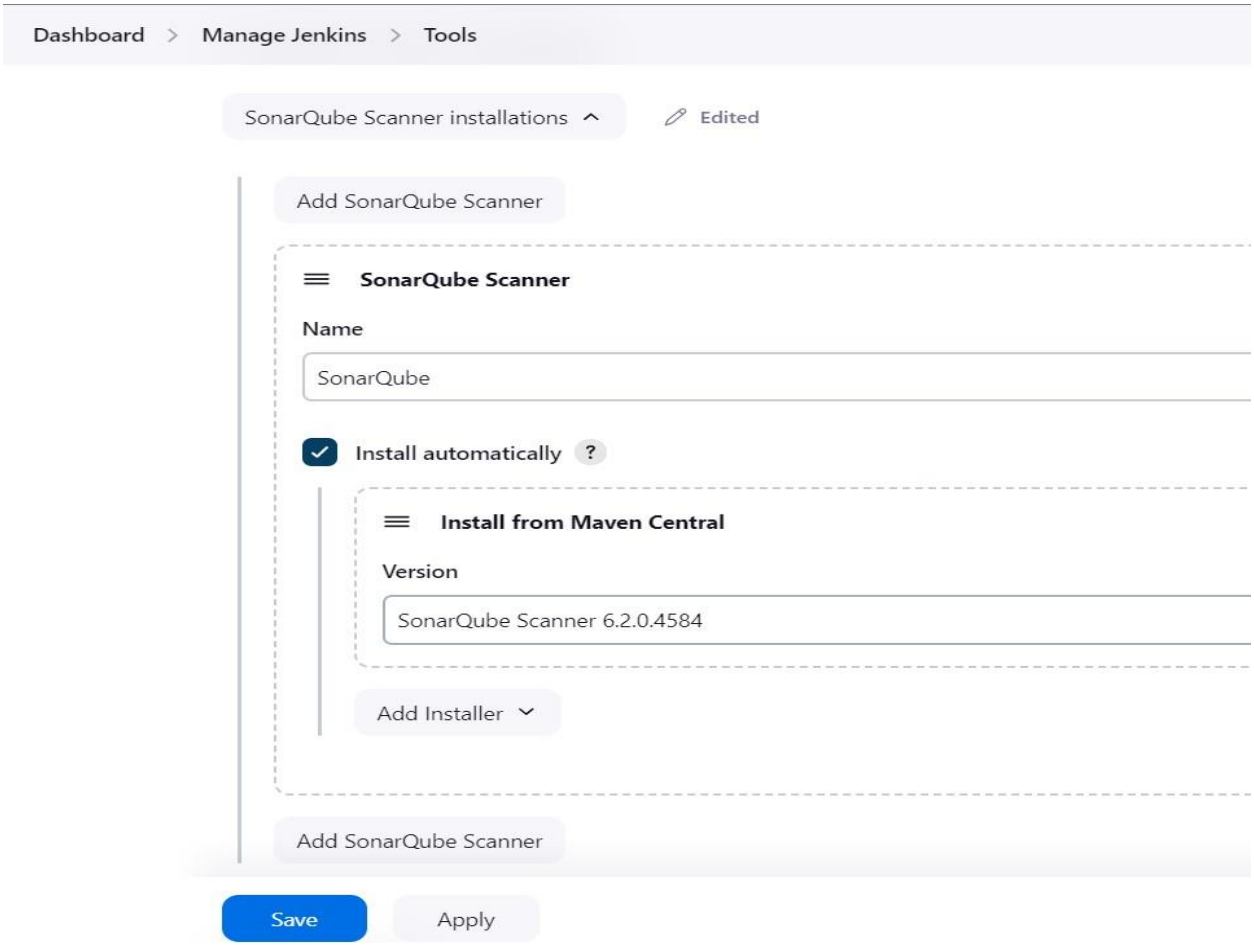
8. Search for SonarQube Scanner under Global Tool Configuration.

Choose the latest configuration and choose Install automatically.

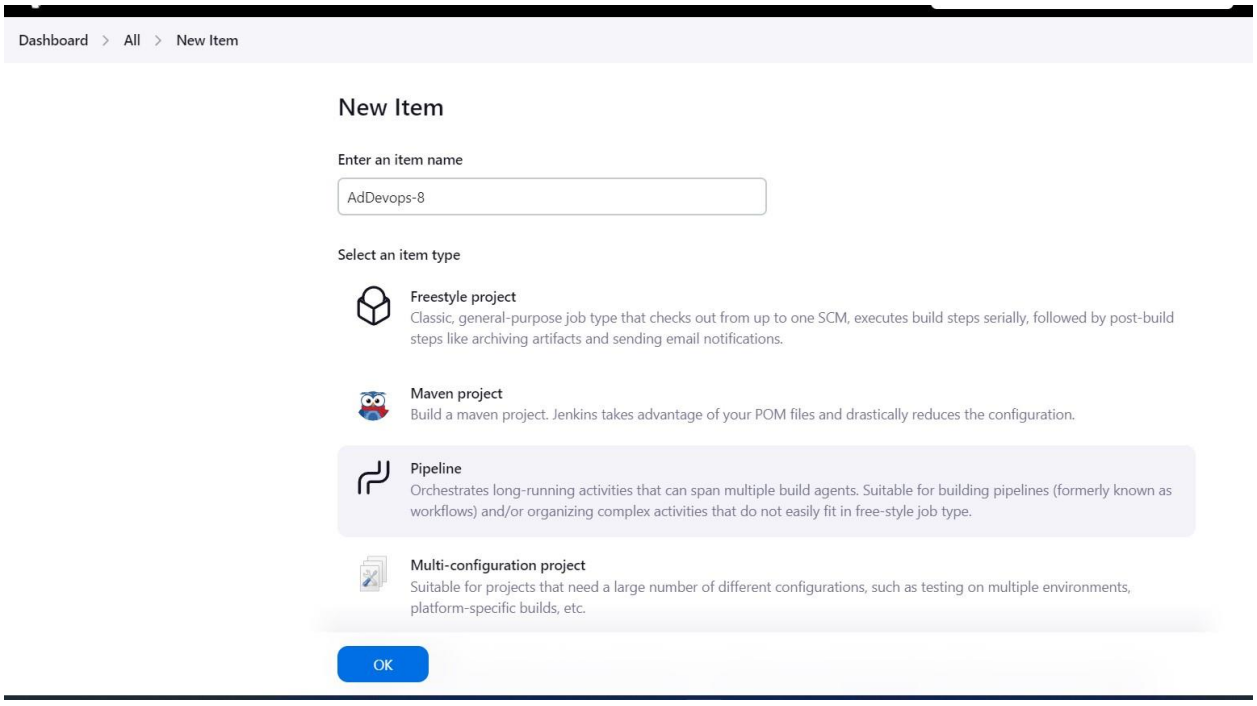
Dashboard > Manage Jenkins > Tools



Check the “Install automatically” option. → Under name any name as identifier → Check



9. After configuration, create a New Item → choose a pipeline project.

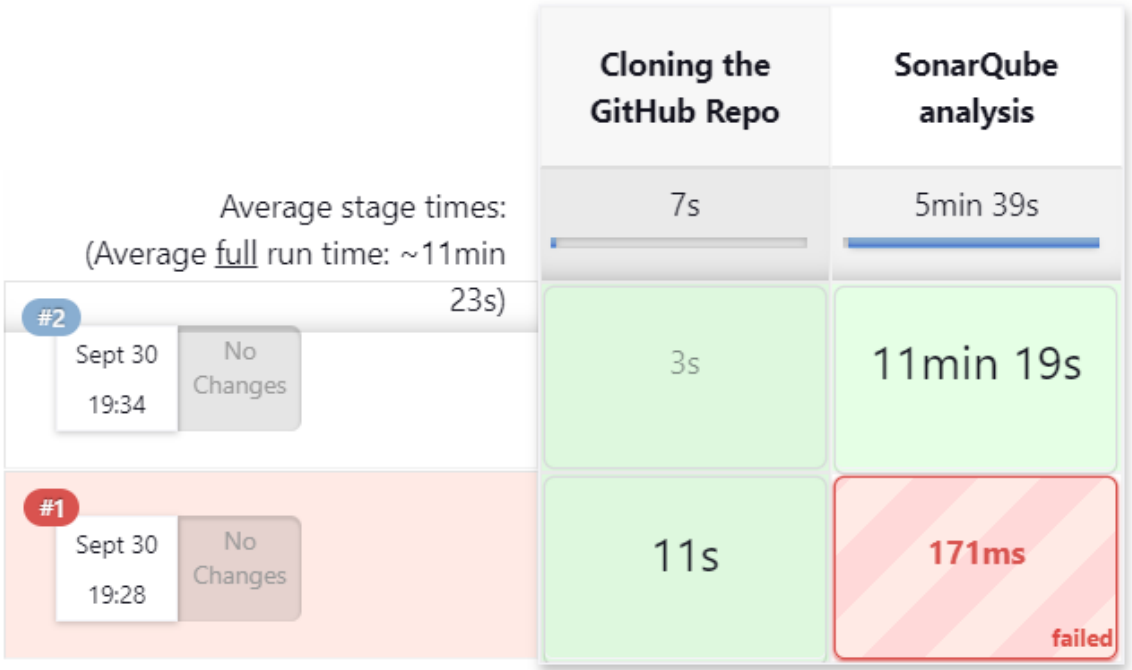


10. Under Pipeline script, enter the following:

```
        node {
    stage('Cloning the GitHub Repo') { git
      'https://github.com/shazforiot/GOL.git'
    } stage('SonarQube

    analysis') {

      withSonarQubeEnv('<Name_of_SonarQube_environment_on_Jenk
      i ns>') { sh """
            <PATH_TO_SONARQUBE_SCANNER_FOLDER>/bin/sonar-scanner \
            -D sonar.login=<SonarQube_USERNAME> \
            -D sonar.password=<SonarQube_PASSWORD> \
            -D sonar.projectKey=<Project_KEY> \
            -D sonar.exclusions=vendor/**,resources/**,**/*.java \
            -D sonar.host.url=<SonarQube_URL>(default: http://localhost:9000/)
        """
      }
    }
}
```

It is a java sample project which has a lot of repetitions and issues that will be detected by SonarQube.

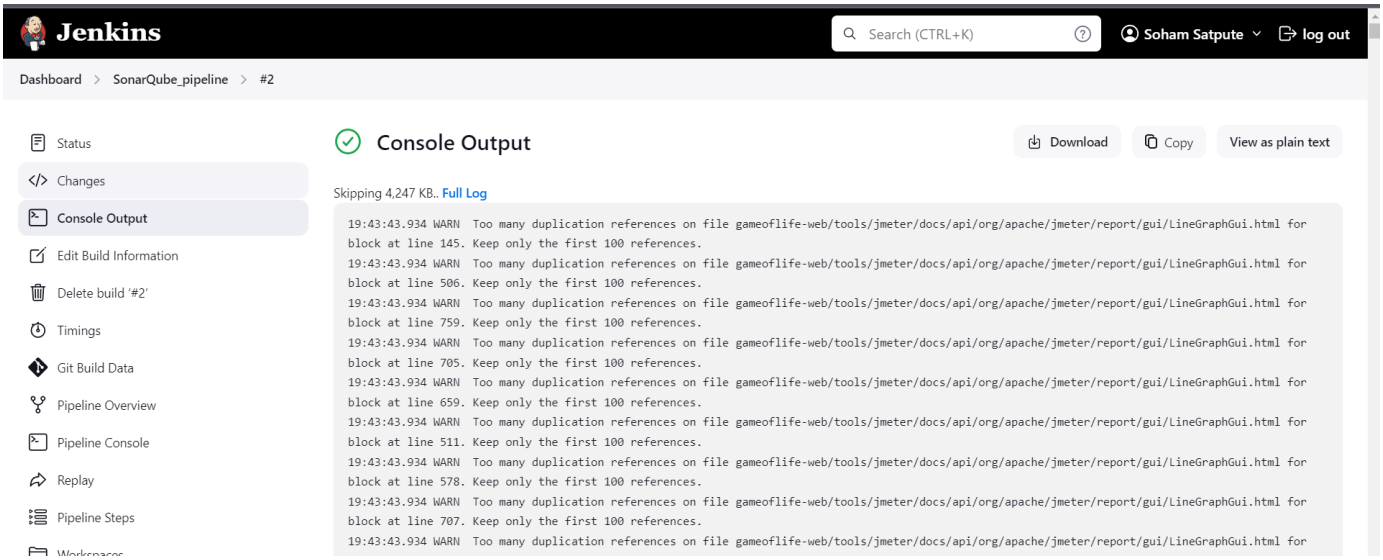
Stage View



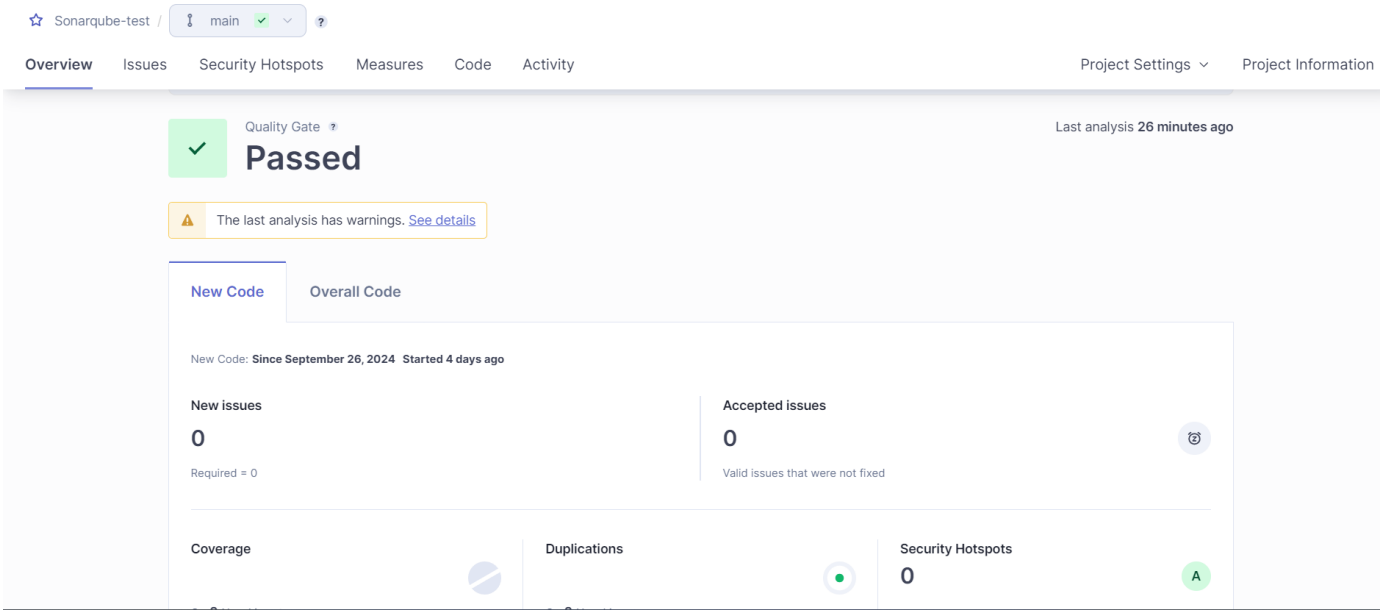
Permalinks

- Last build (#1), 5 min 59 sec ago
- Last failed build (#1), 5 min 59 sec ago

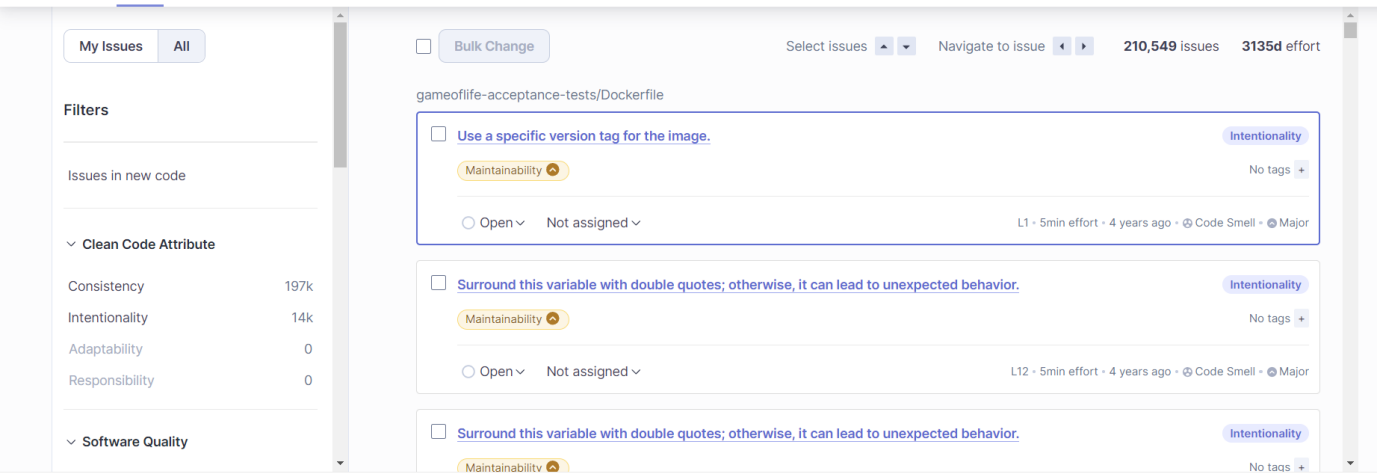
11.Check console



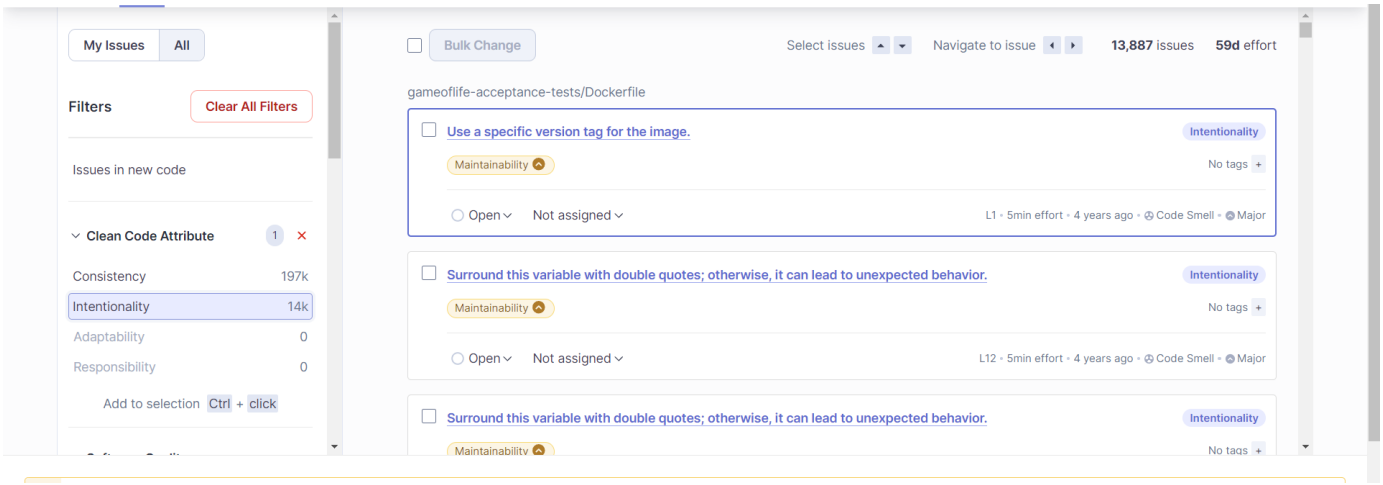
12.Now, check the project in SonarQube:



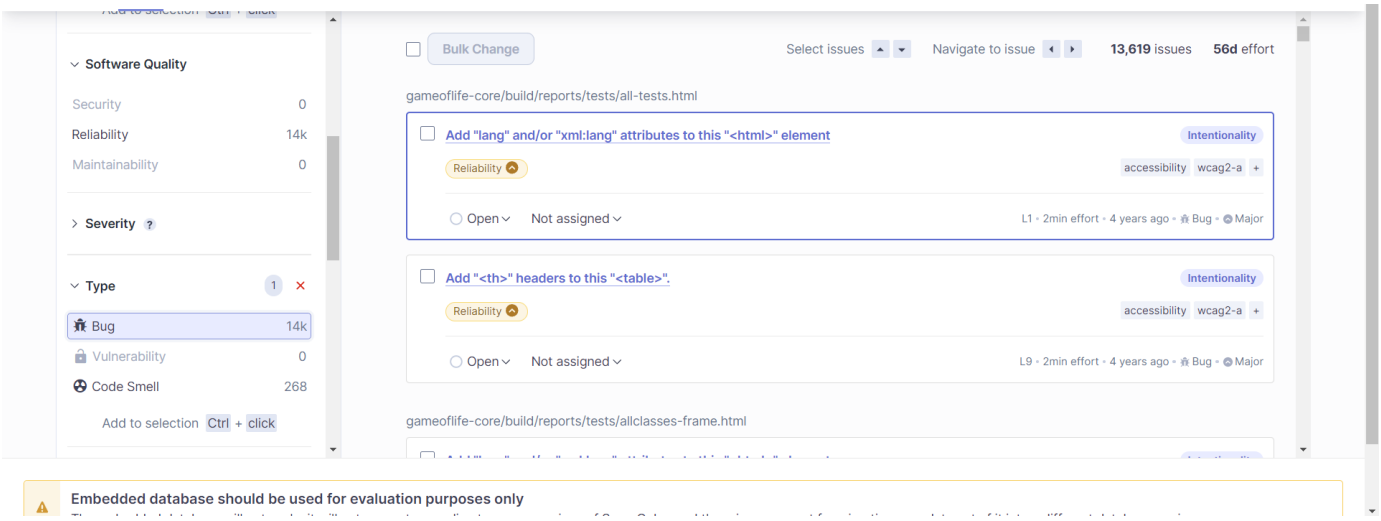
13.code problems consistency:



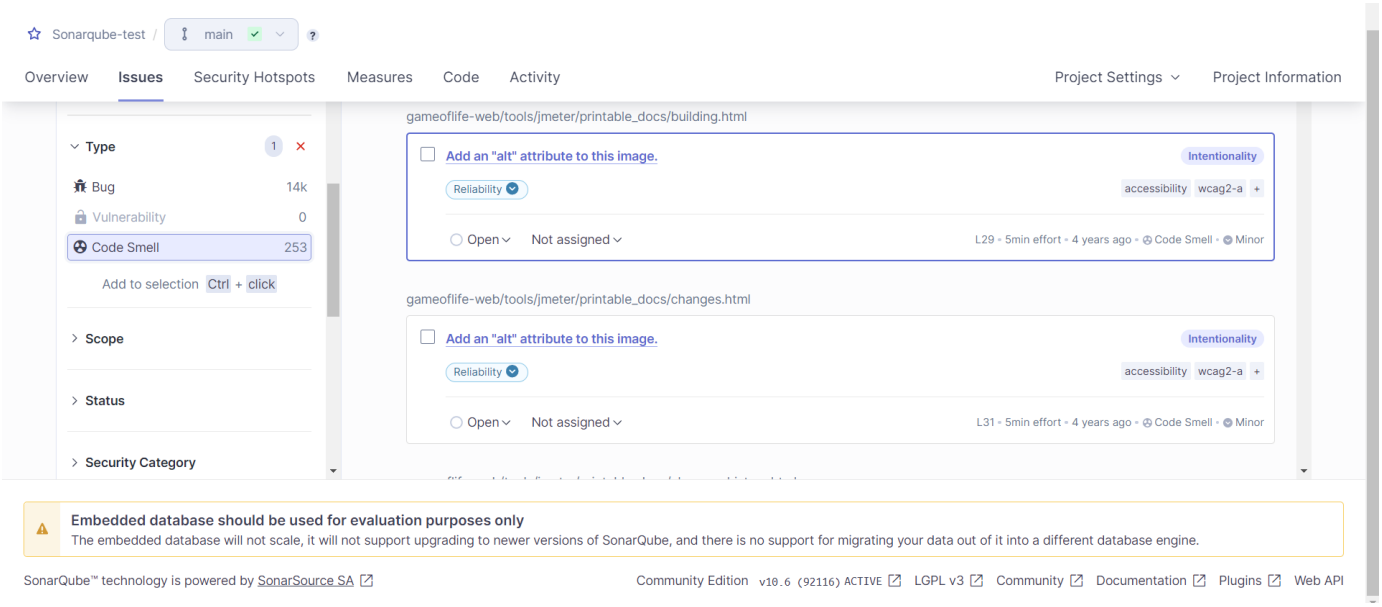
14.Intentionality:



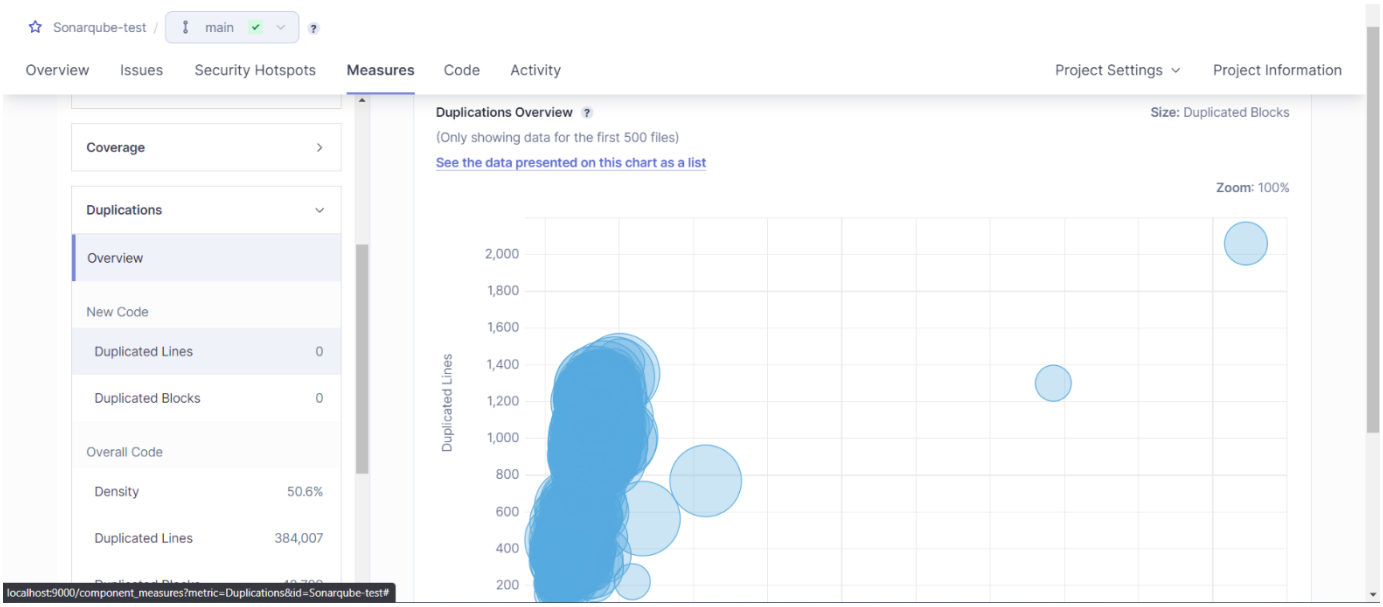
15.Bugs



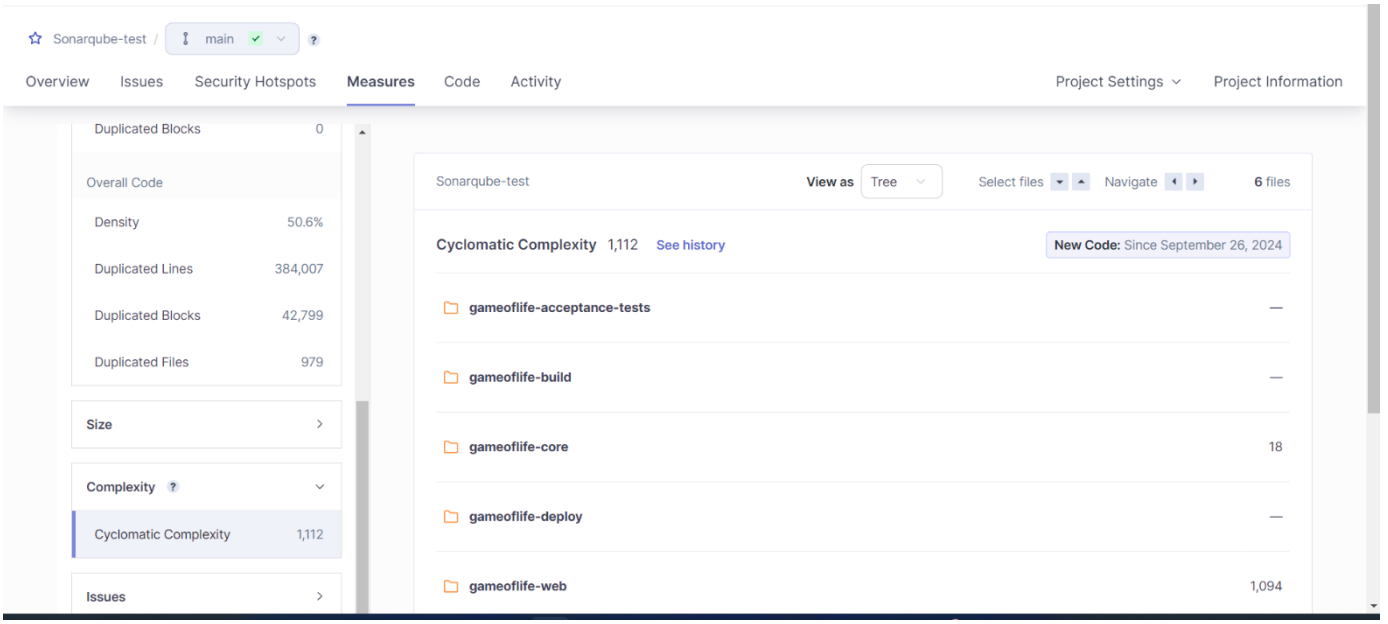
Code smells:



Duplications:



Cyclomatic Complexities:



In this way, we have integrated Jenkins with SonarQube for SAST.

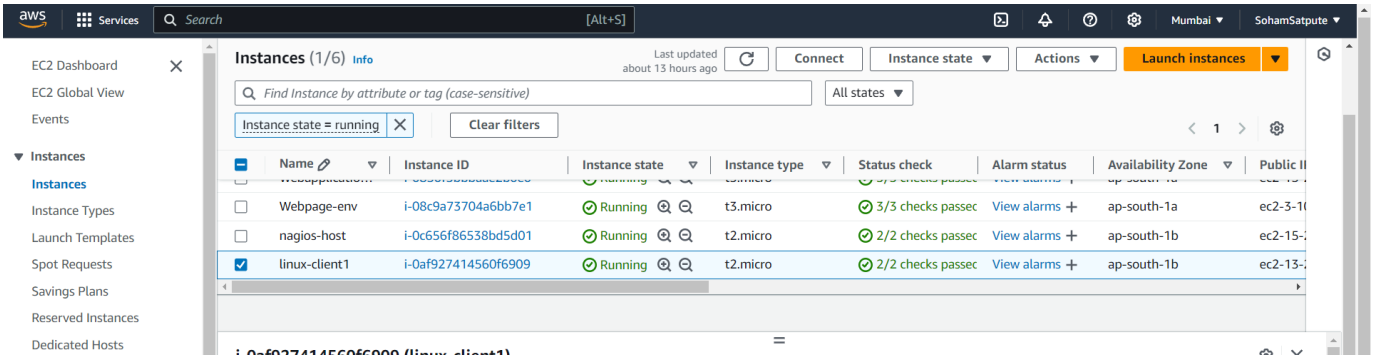
ADVANCE DEVOPS EXP 9

Name :- Soham Satpute

Roll_no :- 52

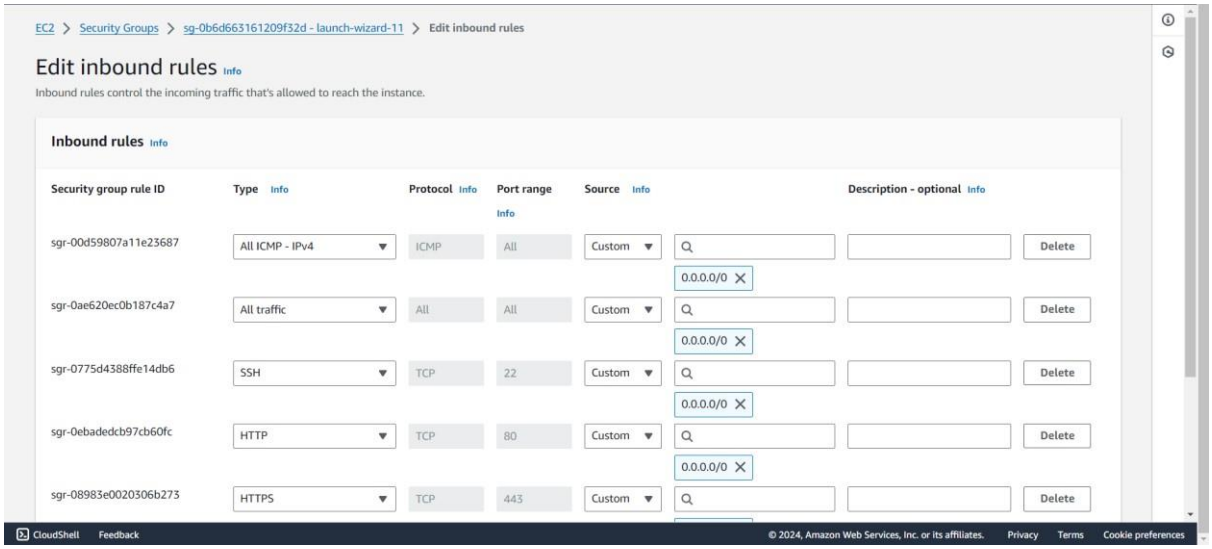
Aim :- To Understand Continuous monitoring and Installation and configuration of Nagios Core, Nagios Plugins and NRPE (Nagios Remote Plugin Executor) on Linux Machine.

1. Create an Amazon Linux EC2 Instance



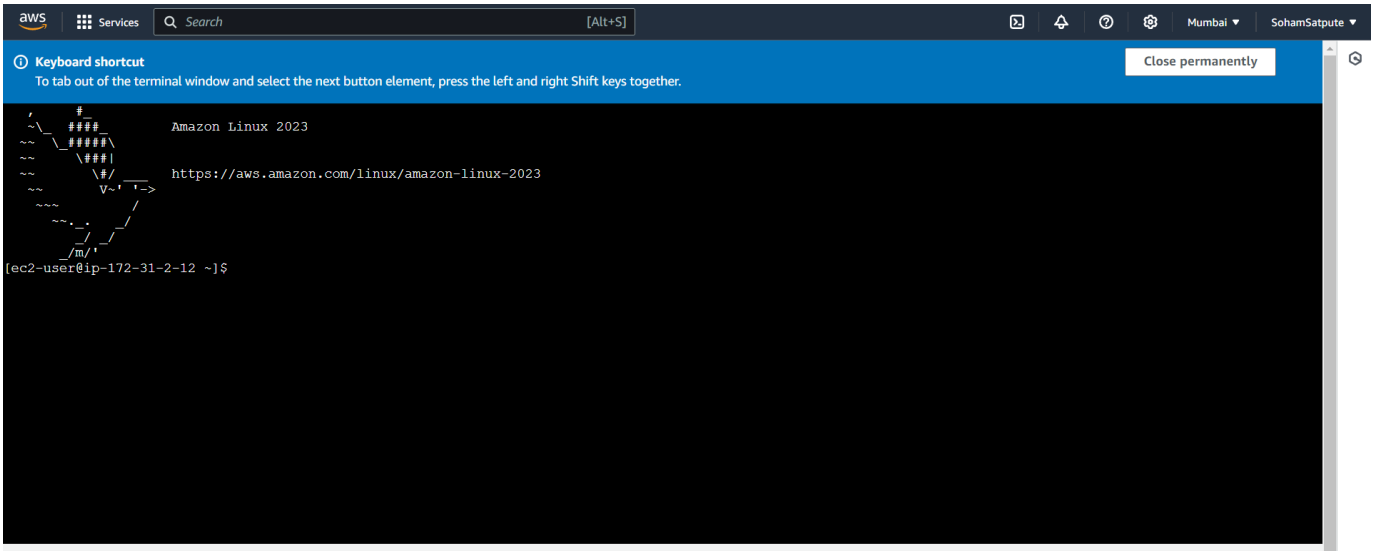
2. Configure Security Group

- Ensure HTTP, HTTPS, SSH, and ICMP are open from everywhere.
- Edit the inbound rules of the specified Security Group

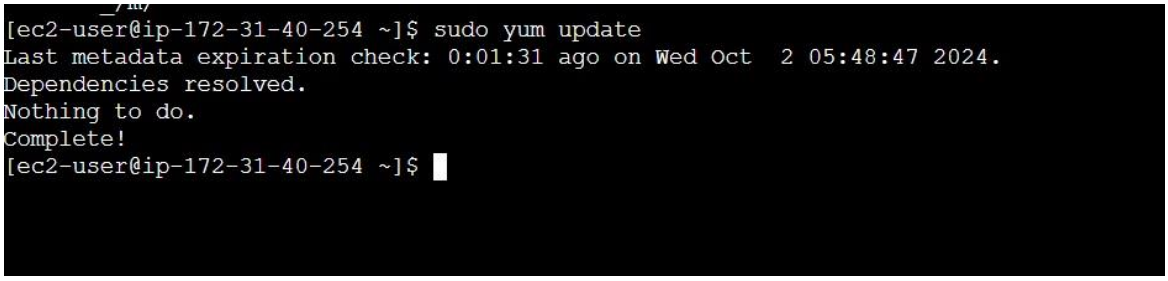


You have to edit the inbound rules of the specified Security Group for this.

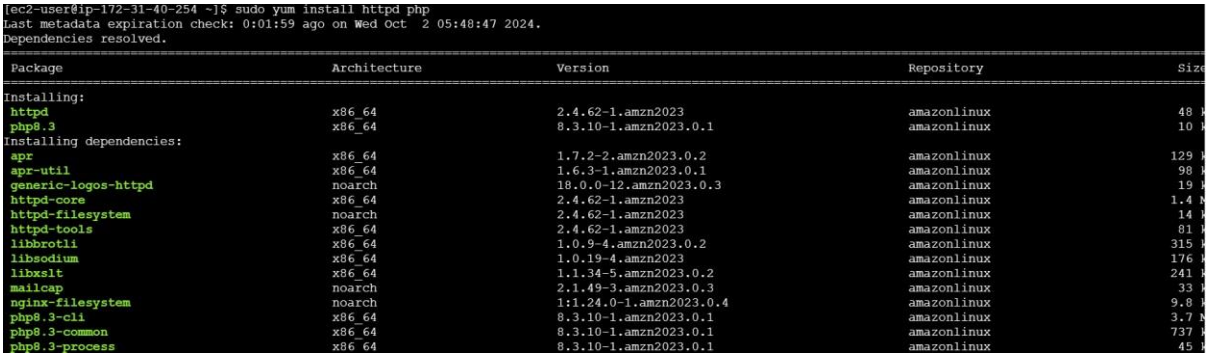
3. SSH into Your EC2 instance or simply use EC2 Instance Connect from the browser.



4. Update the package indices and install the following packages using yum sudo yum update



sudo yum install httpd php



sudo yum install gcc glibc glibc-common

```
[ec2-user@ip-172-31-40-254 ~]$ sudo yum install gcc glibc glibc-common
Last metadata expiration check: 0:02:41 ago on Wed Oct  2 05:48:47 2024.
Package glibc-2.34-52.amzn2023.0.11.x86_64 is already installed.
Package glibc-common-2.34-52.amzn2023.0.11.x86_64 is already installed.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
Installing:				
gcc	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	32 M
Installing dependencies:				
annobin-docs	noarch	10.93-1.amzn2023.0.1	amazonlinux	92 k
annobin-plugin-gcc	x86_64	10.93-1.amzn2023.0.1	amazonlinux	887 k
cpp	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	10 M
gc	x86_64	8.0.4-5.amzn2023.0.2	amazonlinux	105 k
glibc-devel	x86_64	2.34-52.amzn2023.0.11	amazonlinux	27 k
glibc-headers-x86	noarch	2.34-52.amzn2023.0.11	amazonlinux	427 k
guile22	x86_64	2.2.7-2.amzn2023.0.3	amazonlinux	6.4 M
kernel-headers	x86_64	6.1.109-118.189.amzn2023	amazonlinux	1.4 M
libmpc	x86_64	1.2.1-2.amzn2023.0.2	amazonlinux	62 k
libtool-ltdl	x86_64	2.4.7-1.amzn2023.0.3	amazonlinux	38 k
libxcrypt-devel	x86_64	4.4.33-7.amzn2023	amazonlinux	32 k
make	x86_64	1:4.3-5.amzn2023.0.2	amazonlinux	534 k
Transaction Summary				

sudo yum install gd gd-devel

```
[ec2-user@ip-172-31-40-254 ~]$ sudo yum install gd gd-devel
Last metadata expiration check: 0:03:46 ago on Wed Oct  2 05:48:47 2024.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
Installing:				
gd	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	139 k
gd-devel	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	38 k
Installing dependencies:				
brotli	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	314 k
brotli-devel	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	31 k
bzip2-devel	x86_64	1.0.8-6.amzn2023.0.2	amazonlinux	214 k
cairo	x86_64	1.17.6-2.amzn2023.0.1	amazonlinux	684 k
cmake-filesystem	x86_64	3.22.2-1.amzn2023.0.4	amazonlinux	16 k
fontconfig	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	273 k
fontconfig-devel	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	128 k
fonts-filesystem	noarch	1:2.0.5-12.amzn2023.0.2	amazonlinux	9.5 k
freetype	x86_64	2.13.2-5.amzn2023.0.1	amazonlinux	423 k
freetype-devel	x86_64	2.13.2-5.amzn2023.0.1	amazonlinux	912 k
glib2-devel	x86_64	2.74.7-689.amzn2023.0.2	amazonlinux	486 k
google-noto-fonts-common	noarch	20201206-2.amzn2023.0.2	amazonlinux	15 k
google-noto-sans-vf-fonts	noarch	20201206-2.amzn2023.0.2	amazonlinux	492 k
graphite2	x86_64	1.3.14-7.amzn2023.0.2	amazonlinux	97 k
graphite2-devel	x86_64	1.3.14-7.amzn2023.0.2	amazonlinux	21 k
harfbuzz	x86_64	7.0.0-2.amzn2023.0.1	amazonlinux	868 k
harfbuzz-devel	x86_64	7.0.0-2.amzn2023.0.1	amazonlinux	404 k
harfbuzz-icu	x86_64	7.0.0-2.amzn2023.0.1	amazonlinux	18 k

5. **Create a new Nagios User with its password. You'll have to enter the password twice for confirmation.** sudo adduser -m nagios sudo passwd nagios

```
[ec2-user@ip-172-31-40-254 ~]$ sudo adduser -m nagios
[ec2-user@ip-172-31-40-254 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
BAD PASSWORD: The password is a palindrome
Retype new password:
Sorry, passwords do not match.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-40-254 ~]$
```

6. **Create a new user group** sudo groupadd nagcmd

```
[ec2-user@ip-172-31-40-254 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-40-254 ~]$
```

7. **Use these commands so that you don't have to use sudo for Apache and Nagios**

sudo usermod -a -G nagcmd nagios sudo
usermod -a -G nagcmd apache

```
[ec2-user@ip-172-31-40-254 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-40-254 ~]$ sudo usermod -a -G nagcmd nagios
sudo usermod -a -G nagcmd apache
[ec2-user@ip-172-31-40-254 ~]$
```

8. **Create a new directory for Nagios downloads** mkdir ~/downloads cd ~/downloads

```
[ec2-user@ip-172-31-40-254 ~]$ mkdir ~/downloads
cd ~/downloads
[ec2-user@ip-172-31-40-254 downloads]$
```

9. **Use wget to download the source zip files.**

Wget https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.4.6.tar.gz wget

```
[ec2-user@ip-172-31-40-254 downloads]$ Wget https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.4.6.tar.gz
wget https://nagios-plugins.org/download/nagios-plugins-2.3.3.tar.gz
-bash: Wget: command not found
--2024-10-02 06:15:45--  https://nagios-plugins.org/download/nagios-plugins-2.3.3.tar.gz
Resolving nagios-plugins.org (nagios-plugins.org)... 45.56.123.251
Connecting to nagios-plugins.org (nagios-plugins.org)|45.56.123.251|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2782610 (2.7M) [application/x-gzip]
Saving to: 'nagios-plugins-2.3.3.tar.gz'

nagios-plugins-2.3.3.tar.gz               0%[                                                                                 ]       0  --.-KB/s
nagios-plugins-2.3.3.tar.gz              23%[=================>                                                               ] 632.00K  3.02MB/s
nagios-plugins-2.3.3.tar.gz             100%[=============================================================================>]   2.65M  8.10MB/s    in 0.3s

2024-10-02 06:15:46 (8.10 MB/s) - 'nagios-plugins-2.3.3.tar.gz' saved [2782610/2782610]

[ec2-user@ip-172-31-40-254 downloads]$
```

https://nagios-plugins.org/download/nagios-plugins-2.3.3.tar.gz

```
[ec2-user@ip-172-31-40-254 downloads]$ wget https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.4.6.tar.gz
--2024-10-02 06:17:24--  https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.4.6.tar.gz
Resolving assets.nagios.com (assets.nagios.com)... 45.79.49.120, 2600:3c00::f03c:92ff:fef7:45ce
Connecting to assets.nagios.com (assets.nagios.com)|45.79.49.120|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11333414 (11M) [application/x-gzip]
Saving to: 'nagios-4.4.6.tar.gz'

nagios-4.4.6.tar.gz                       0%[                                                                                 ]       0  --.-KB/s
nagios-4.4.6.tar.gz                       4%[==>                                                                              ] 495.62K  2.40MB/s
nagios-4.4.6.tar.gz                      30%[=========>                                                                       ]   3.26M  7.99MB/s
nagios-4.4.6.tar.gz                      63%[====================================================>                                ]   6.91M  11.0MB/s
nagios-4.4.6.tar.gz                      96%[=============================================================================>     ]  10.46M  12.6MB/s
nagios-4.4.6.tar.gz                     100%[=============================================================================>]  10.81M  12.9MB/s    in 0.8s

2024-10-02 06:17:25 (12.9 MB/s) - 'nagios-4.4.6.tar.gz' saved [11333414/11333414]

[ec2-user@ip-172-31-40-254 downloads]$
```

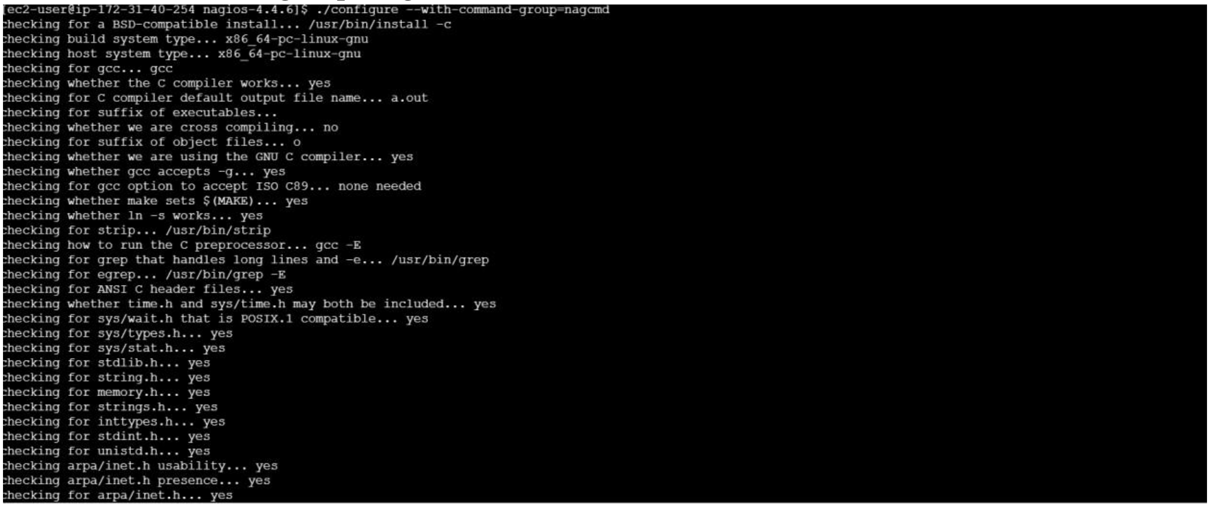
10. **Use tar to unzip and change to that directory.**

tar zxvf nagios-4.4.6.tar.gz cd
nagios-4.4.6

```
[ec2-user@ip-172-31-40-254 downloads]$ tar zxvf nagios-4.4.6.tar.gz
nagios-4.4.6/
nagios-4.4.6/.gitignore
nagios-4.4.6/.travis.yml
nagios-4.4.6/CONTRIBUTING.md
nagios-4.4.6/Changelog
nagios-4.4.6/INSTALLING
nagios-4.4.6/LEGAL
nagios-4.4.6/LICENSE
nagios-4.4.6/Makefile.in
nagios-4.4.6/README.md
nagios-4.4.6/THANKS
nagios-4.4.6/UPGRADING
nagios-4.4.6/aclocal.m4
nagios-4.4.6/autoconf-macros/
nagios-4.4.6/autoconf-macros/.gitignore
nagios-4.4.6/autoconf-macros/CHANGELOG.md
nagios-4.4.6/autoconf-macros/LICENSE
nagios-4.4.6/autoconf-macros/LICENSE.md
nagios-4.4.6/autoconf-macros/README.md
nagios-4.4.6/autoconf-macros/add_group_user
nagios-4.4.6/autoconf-macros/ax_nagios_get_distrib
nagios-4.4.6/autoconf-macros/ax_nagios_get_files
nagios-4.4.6/autoconf-macros/ax_nagios_get_inetd
nagios-4.4.6/autoconf-macros/ax_nagios_get_init
nagios-4.4.6/autoconf-macros/ax_nagios_get_os
nagios-4.4.6/autoconf-macros/ax_nagios_get_paths
nagios-4.4.6/autoconf-macros/ax_nagios_get_ssl
nagios-4.4.6/base/
nagios-4.4.6/base/.gitignore
nagios-4.4.6/base/Makefile.in
nagios-4.4.6/base/broker.c
```

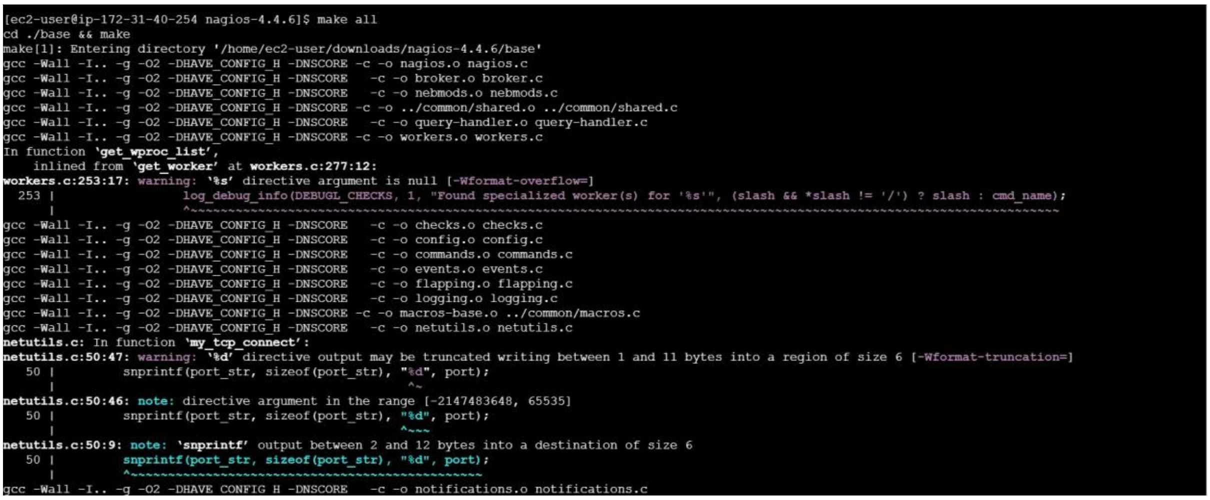
11. Run the configuration script with the same group name you previously created.

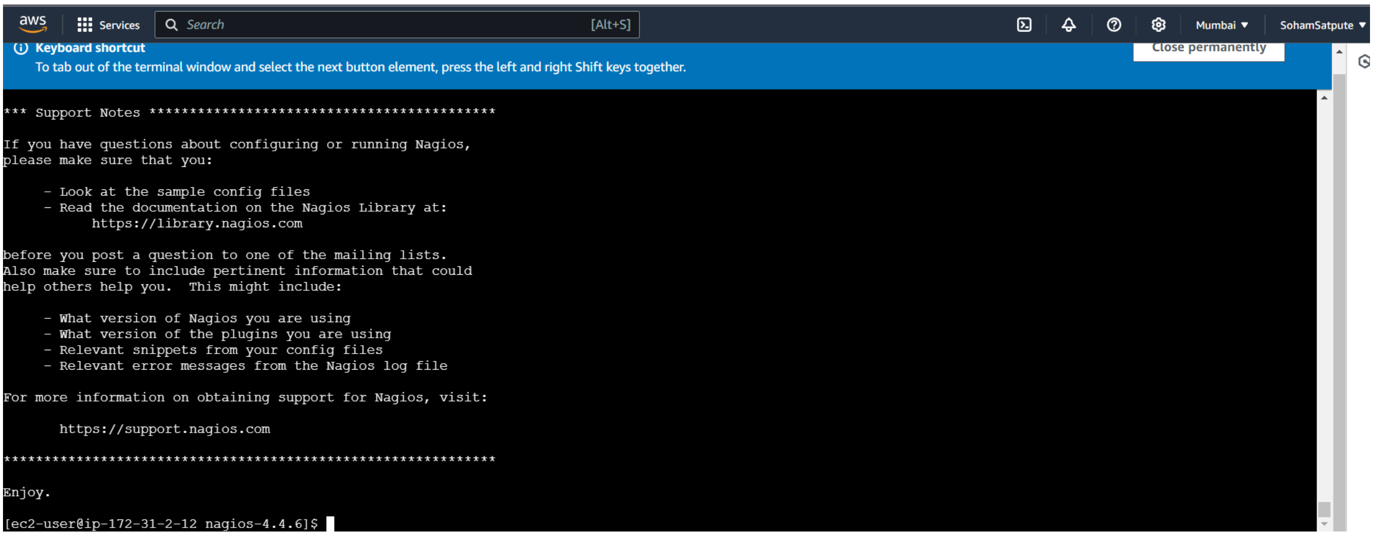
./configure --with-command-group=nagcmd



12. Compile the source code.

make all





13. Install binaries, init script and sample config files. Lastly, set permissions on the external command directory.

./sudo make install sudo make install-init sudo make install-config sudo make install-commandmode

```
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ ./sudo make install
sudo make install-init
sudo make install-config
sudo make install-commandmode
-bash: ./sudo: No such file or directory
/usr/bin/install -c -m 755 -d -o root -g root /lib/systemd/system
/usr/bin/install -c -m 755 -o root -g root startup/default-service /lib/systemd/system/nagios.service
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/etc
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/etc/objects
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/nagios.cfg /usr/local/nagios/etc/nagios.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/cgi.cfg /usr/local/nagios/etc/cgi.cfg
/usr/bin/install -c -b -m 660 -o nagios -g nagios sample-config/resource.cfg /usr/local/nagios/etc/resource.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/templates.cfg /usr/local/nagios/etc/objects/templates.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/commands.cfg /usr/local/nagios/etc/objects/commands.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/contacts.cfg /usr/local/nagios/etc/objects/contacts.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/timeperiods.cfg /usr/local/nagios/etc/objects/timeperiods.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/localhost.cfg /usr/local/nagios/etc/objects/localhost.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/windows.cfg /usr/local/nagios/etc/objects/windows.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/printer.cfg /usr/local/nagios/etc/objects/printer.cfg
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/switch.cfg /usr/local/nagios/etc/objects/switch.cfg

*** Config files installed ***

Remember, these are *SAMPLE* config files.  You'll need to read
the documentation for more information on how to actually define
services, hosts, etc. to fit your particular needs.

/usr/bin/install -c -m 775 -o nagios -g nagcmd -d /usr/local/nagios/var/rw
chmod g+s /usr/local/nagios/var/rw

*** External command directory configured ***
```

14. Edit the config file and change the email address.

sudo nano /usr/local/nagios/etc/objects/contacts.cfg

```
  GNU nano 5.8                                  /usr/local/nagios/etc/objects/contacts.cfg                                  Modified
# Just one contact defined by default - the Nagios admin (that's you)
# This contact definition inherits a lot of default values from the
# 'generic-contact' template which is defined elsewhere.

define contact {

    contact_name            nagiosadmin             ; Short name of user
    use                     generic-contact         ; Inherit default values from generic-contact template (defined above)
    alias                   Nagios Admin            ; Full name of user
    email                   bhagyeshpatil0702@gmail.com ; <<***** CHANGE THIS TO YOUR EMAIL ADDRESS ******
}



###############################################################################
#
# CONTACT GROUPS
#
###############################################################################

# We only have one contact in this simple configuration file, so there is
# no need to create more than one contact group.

define contactgroup {

^G Help       ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark  M-] To Bracket  M-Q Previous
^X Exit       ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line M-E Redo      M-6 Copy      ^Q Where Was    M-W Next
```

15. Configure the web interface.

sudo make install-webconf

```
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ sudo make install-webconf
/usr/bin/install -c -m 644 sample-config/httpd.conf /etc/httpd/conf.d/nagios.conf
if [ 0 -eq 1 ]; then \
        ln -s /etc/httpd/conf.d/nagios.conf /etc/apache2/sites-enabled/nagios.conf; \
fi

*** Nagios/Apache conf file installed ***

[ec2-user@ip-172-31-40-254 nagios-4.4.6]$
```

16. Create a nagiosadmin account for nagios login along with password. You'll have to specify the password twice. sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin

```
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin
New password:
Re-type new password:
Adding password for user nagiosadmin
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$
```

17. Restart Apache sudo systemctl restart httpd

```
Adding password for user nagiosadmin
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ sudo systemctl restart httpd
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$
```

cd ~/downloads tar zxvf nagios-

plugins-2.3.3.tar.gz cd nagios-

plugins-2.3.3

```
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ sudo systemctl restart httpd
[ec2-user@ip-172-31-40-254 nagios-4.4.6]$ cd ~/downloads
tar zxvf nagios-plugins-2.3.3.tar.gz
 cd nagios-plugins-2.3.3
nagios-plugins-2.3.3/
nagios-plugins-2.3.3/perlmods/
nagios-plugins-2.3.3/perlmods/Config-Tiny-2.14.tar.gz
nagios-plugins-2.3.3/perlmods/parent-0.226.tar.gz
nagios-plugins-2.3.3/perlmods/Test-Simple-0.98.tar.gz
nagios-plugins-2.3.3/perlmods/Makefile.in
nagios-plugins-2.3.3/perlmods/version-0.9903.tar.gz
nagios-plugins-2.3.3/perlmods/Makefile.am
nagios-plugins-2.3.3/perlmods/Module-Runtime-0.013.tar.gz
nagios-plugins-2.3.3/perlmods/Module-Metadata-1.000014.tar.gz
nagios-plugins-2.3.3/perlmods/Params-Validate-1.08.tar.gz
nagios-plugins-2.3.3/perlmods/Class-Accessor-0.34.tar.gz
nagios-plugins-2.3.3/perlmods/Try-Tiny-0.18.tar.gz
nagios-plugins-2.3.3/perlmods/Module-Implementation-0.07.tar.gz
nagios-plugins-2.3.3/perlmods/Makefile
nagios-plugins-2.3.3/perlmods/Perl-OSType-1.003.tar.gz
nagios-plugins-2.3.3/perlmods/install_order
nagios-plugins-2.3.3/perlmods/Nagios-Plugin-0.36.tar.gz
nagios-plugins-2.3.3/perlmods/Math-Calc-Units-1.07.tar.gz
nagios-plugins-2.3.3/perlmods/Module-Build-0.4007.tar.gz
nagios-plugins-2.3.3/ABOUT-NLS
nagios-plugins-2.3.3/configure.ac
nagios-plugins-2.3.3/Makefile.in
nagios-plugins-2.3.3/config.h.in
nagios-plugins-2.3.3/ChangeLog
nagios-plugins-2.3.3/AUTHORS
nagios-plugins-2.3.3/lib/
nagios-plugins-2.3.3/lib/parse_ini.h
nagios-plugins-2.3.3/lib/extra_opts.c
nagios-plugins-2.3.3/lib/Makefile.in
```

18. Go back to the downloads folder and unzip the plugins zip file. ./configure --with-nagios-user=nagios --with-nagios-

group=nagios make sudo make install

```
[ec2-user@ip-172-31-80-22 nagios-plugins-2.3.3]$ ./configure --with-nagios-user=nagios --with-nagios-group=nagios
make
sudo make install
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking whether to disable maintainer-specific portions of Makefiles... yes
checking build system type... x86_64-unknown-linux-gnu
checking host system type... x86_64-unknown-linux-gnu
checking for gcc... gcc
checking for C compiler default output file name... a.out
checking whether the C compiler works... yes
checking whether we are cross compiling... no
checking for suffix of executables...
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking for style of include used by make... GNU
checking dependency style of gcc... gcc3
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /usr/bin/grep
```

19. Compile and install plugins sudo chkconfig --add nagios sudo chkconfig nagios on

sudo /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg sudo

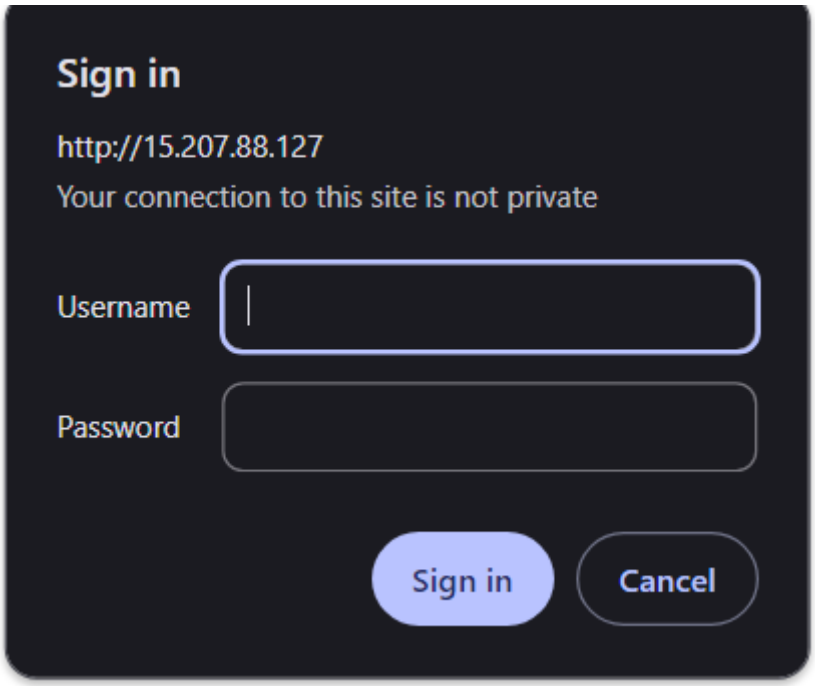
systemctl start nagios

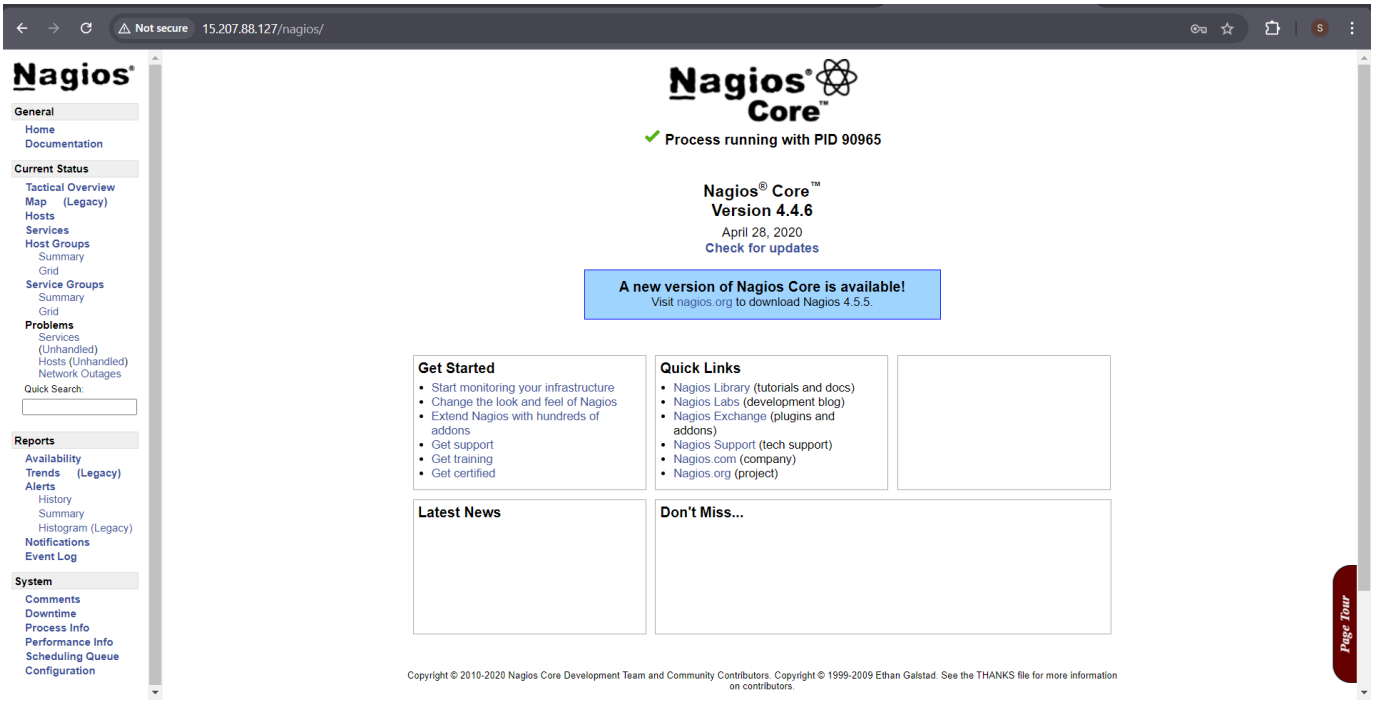
```
[ec2-user@ip-172-31-80-22 nagios-plugins-2.3.3]$ sudo chkconfig --add nagios
sudo chkconfig nagios on
sudo /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg
sudo systemctl start nagios
Error reading information on service nagios: No such file or directory
Note: Forwarding request to 'systemctl enable nagios.service'.
Created symlink /etc/systemd/system/multi-user.target.wants/nagios.service → /usr/lib/systemd/system/nagios.service.

Nagios Core 4.4.6
Copyright (c) 2009-present Nagios Core Development Team and Community Contributors
Copyright (c) 1999-2009 Ethan Galstad
Last Modified: 2020-04-28
License: GPL

Website: https://www.nagios.org
Reading configuration data...
   Read main config file okay...
   Read object config files okay...

Running pre-flight check on configuration data...

Checking objects...
       Checked 8 services.
       Checked 1 hosts.
       Checked 1 host groups.
```

20. Check the status of Nagios

```
Things look okay - No serious problems were detected during the pre-flight check
[ec2-user@ip-172-31-45-178 nagios-plugins-2.3.3]$ sudo systemctl status nagios
● nagios.service - Nagios Core 4.4.6
     Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
     Active: active (running) since Wed 2024-10-02 05:37:36 UTC; 14s ago
       Docs: https://www.nagios.org/documentation
    Process: 67990 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
    Process: 67991 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
   Main PID: 67992 (nagios)
      Tasks: 6 (limit: 1112)
     Memory: 2.0M
        CPU: 16ms
     CGroup: /system.slice/nagios.service
             ├─67992 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─67993 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─67994 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─67995 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─67996 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             └─67997 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Oct 02 05:37:36 ip-172-31-45-178.ec2.internal nagios[67992]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfully initialized
Oct 02 05:37:36 ip-172-31-45-178.ec2.internal nagios[67992]: qh: core query handler registered
```

23. Open up your browser and look for http://<your_public_ip_address>/nagios


Sign in
http://15.207.88.127
Your connection to this site is not private
Username
Password
Sign in
Cancel


Not secure
15.207.88.127/nagios/
Nagios
General
Home
Documentation
Current Status
Tactical Overview
Map (Legacy)
Hosts
Services
Host Groups
Summary
Grid
Service Groups
Summary
Grid
Problems
Services (Unhandled)
Hosts (Unhandled)
Network Outages
Quick Search:
Reports
Availability
Trends (Legacy)
Alerts
History
Summary
Histogram (Legacy)
Notifications
Event Log
System
Comments
Downtime
Process Info
Performance Info
Scheduling Queue
Configuration
Nagios Core
Process running with PID 90965
Nagios® Core™
Version 4.4.6
April 28, 2020
Check for updates
A new version of Nagios Core is available!
Visit nagios.org to download Nagios 4.5.5.
Get Started
Start monitoring your infrastructure
Change the look and feel of Nagios
Extend Nagios with hundreds of addons
Get support
Get training
Get certified
Quick Links
Nagios Library (tutorials and docs)
Nagios Labs (development blog)
Nagios Exchange (plugins and addons)
Nagios Support (tech support)
Nagios.com (company)
Nagios.org (project)
Latest News
Don't Miss...
Page Tour
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Advance DevOps Exp 10

Name:- Soham Satpute

Roll :- 52

Aim: To perform Port, Service monitoring, Windows/Linux server monitoring using Nagios.

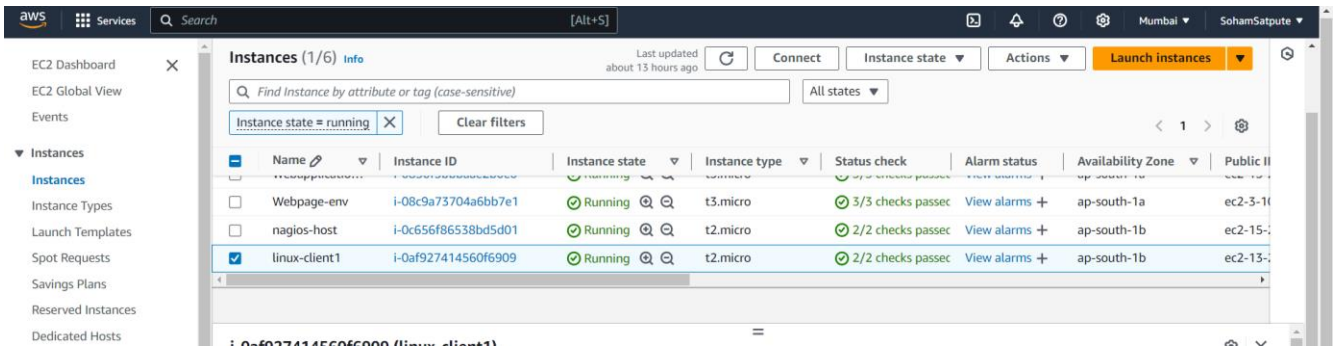
Procedure:-

Check if the nagios service is running by executing following command
sudo systemctl status nagios

```
ubuntu@ip-172-31-89-161:~$ sudo systemctl status nagios
● nagios.service - Nagios Core 4.4.6
     Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: enabled)
     Active: active (running) since Sat 2024-09-28 16:08:58 UTC; 1min 2s ago
       Docs: https://www.nagios.org/documentation
    Process: 15743 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
    Process: 15753 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
   Main PID: 15764 (nagios)
      Tasks: 6 (limit: 1130)
     Memory: 2.4M (peak: 3.2M)
        CPU: 29ms
     CGroup: /system.slice/nagios.service
             ├─15764 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─15765 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─15766 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─15767 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─15768 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             └─15769 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfully initialized
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: qh: core query handler registered
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: qh: echo service query handler registered
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: qh: help for the query handler registered
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: wproc: Successfully registered manager as @wproc with query handler
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: wproc: Registry request: name=Core Worker 15765;pid=15765
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: wproc: Registry request: name=Core Worker 15766;pid=15766
Sep 28 16:08:58 ip-172-31-89-161 nagios[15764]: wproc: Registry request: name=Core Worker 15767;pid=15767
```

Now, create a new EC2 instance on AWS



Now perform the following commands on nagios-host EC2 instance.On the server, run this command

ps -ef | grep nagios

```
ubuntu@ip-172-31-89-161:~$ ps -ef | grep nagios
nagios     15764       1  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios     15765   15764  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     15766   15764  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     15767   15764  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     15768   15764  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios     15769   15764  0 16:08 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
ubuntu     15957    1342  0 16:13 pts/0    00:00:00 grep --color=auto nagios
ubuntu@ip-172-31-89-161:~$
```

Sudo su

mkdir /usr/local/nagios/etc/objects/monitorhosts

mkdir /usr/local/nagios/etc/objects/monitorhosts/linuxhosts

```
ubuntu@ip-172-31-89-161:~$ sudo su
mkdir /usr/local/nagios/etc/objects/monitorhosts
mkdir /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
root@ip-172-31-89-161:/home/ubuntu#
```

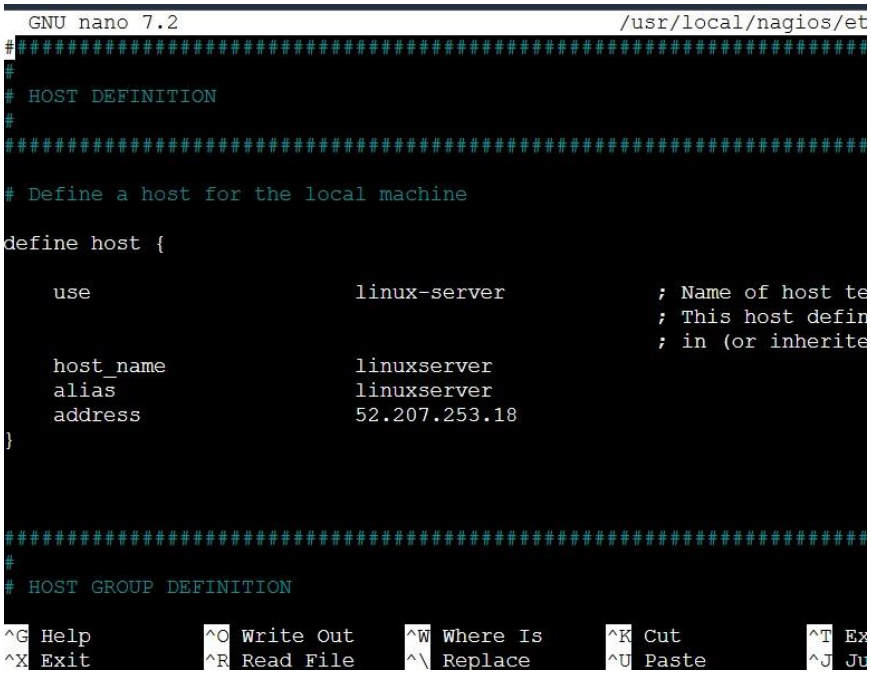
Copy localhost.cfg file to the mentioned location

cp /usr/local/nagios/etc/objects/localhost.cfg/usr/local/nagios/etc/objects/monitorhosts/linuxhosts

```
root@ip-172-31-89-161:/usr/local/nagios/etc/objects# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
cp: cannot create regular file '/usr/local/nagios/etc/objects/monitorhosts/linuxhosts': No such file or directory
root@ip-172-31-89-161:/usr/local/nagios/etc/objects# sudo mkdir -p /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
root@ip-172-31-89-161:/usr/local/nagios/etc/objects# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
root@ip-172-31-89-161:/usr/local/nagios/etc/objects#
```

Open the nano editor for localhost.cfg file and make these changes. Add the Ip address of the linux-client for the address field.

nano/usr/local/nagios/etc/objects/monitorhosts/linuxhosts/localhost.cfg



Note - Here replace hostname with linuxserver

nano /usr/local/nagios/etc/nagios.cfg

Add the following line to the nagios.cfg file

cfg_dir=/usr/local/nagios/etc/objects/monitorhosts/

```
# Definitions for monitoring a router/switch
#cfg_file=/usr/local/nagios/etc/objects/switch.cfg

# Definitions for monitoring a network printer
#cfg_file=/usr/local/nagios/etc/objects/printer.cfg


# You can also tell Nagios to process all config files (with a .cfg
# extension) in a particular directory by using the cfg_dir
# directive as shown below:

#cfg_dir=/usr/local/nagios/etc/servers
#cfg_dir=/usr/local/nagios/etc/printers
#cfg_dir=/usr/local/nagios/etc/switches
#cfg_dir=/usr/local/nagios/etc/routers

cfg_dir=/usr/local/nagios/etc/objects/monitorhosts/
```

After making the changes in nagios.cfg file now check validate the file by typing the following command in the terminal.

/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg

```
License: GPL

Website: https://www.nagios.org
Reading configuration data...
   Read main config file okay...
   Read object config files okay...

Running pre-flight check on configuration data...

Checking objects...
        Checked 16 services.
        Checked 2 hosts.
        Checked 2 host groups.
        Checked 0 service groups.
        Checked 1 contacts.
        Checked 1 contact groups.
        Checked 24 commands.
        Checked 5 time periods.
        Checked 0 host escalations.
        Checked 0 service escalations.
Checking for circular paths...
        Checked 2 hosts
        Checked 0 service dependencies
        Checked 0 host dependencies
        Checked 5 timeperiods
Checking global event handlers...
Checking obsessive compulsive processor commands...
Checking misc settings...

Total Warnings: 0
Total Errors:   0

Things look okay - No serious problems were detected during the pre-flight check
root@ip-172-31-89-161:/usr/local/nagios/etc/objects/monitorhosts/linuxhosts#
```

Now restart the service by using this command

service nagios restart

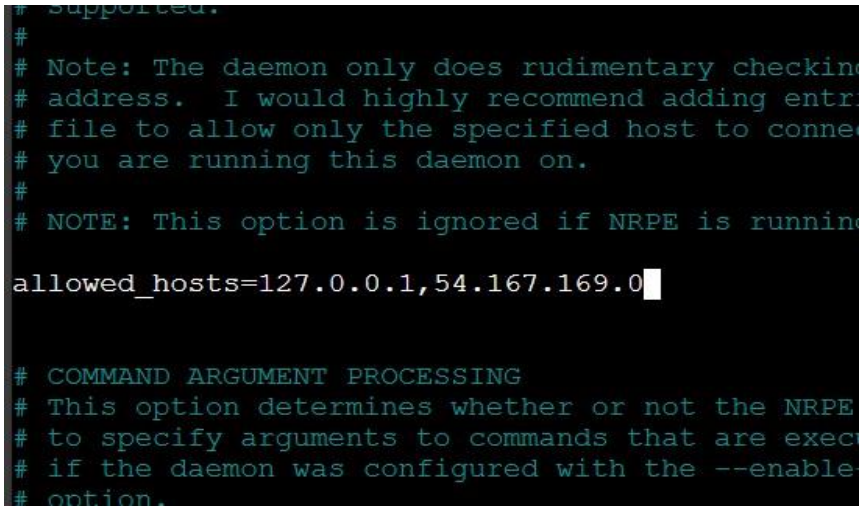
```
root@ip-172-31-89-161:/usr/local/nagios/etc/objects/monitorhosts/linuxhosts# service nagios restart
root@ip-172-31-89-161:/usr/local/nagios/etc/objects/monitorhosts/linuxhosts# systemctl status nagios
● nagios.service - Nagios Core 4.4.6
     Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: enabled)
     Active: active (running) since Sat 2024-09-28 17:36:35 UTC; 19s ago
       Docs: https://www.nagios.org/documentation
    Process: 1870 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
    Process: 1872 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
   Main PID: 1874 (nagios)
      Tasks: 8 (limit: 1130)
     Memory: 3.0M (peak: 3.2M)
        CPU: 24ms
     CGroup: /system.slice/nagios.service
             ├─1874 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─1875 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─1876 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─1877 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─1878 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
             ├─1879 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
             ├─1880 /usr/local/nagios/libexec/check_ping -H 52.207.253.18 -w 3000.0,80% -c 5000.0,100% -p 5
             └─1881 /usr/bin/ping -n -U -w 30 -c 5 52.207.253.18

Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfully initialized
Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: qh: core query handler registered
Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: qh: echo service query handler registered
Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: qh: help for the query handler registered
Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: wproc: Successfully registered manager as @wproc with query handler
Sep 28 17:36:35 ip-172-31-89-161 nagios[1874]: wproc: Registry request: name=Core Worker 1875;pid=1875
lines 1-26
```

Now using this command update the apt repository of ubuntu (linux-client), install gcc, nagios-nrpe-server and nagios-plugin sudo apt update -y sudo apt install gcc -y

sudo apt install -y nagios-nrpe-server nagios-plugins

Now open nrpe.cfg file and add the ip address of the nagios host as shown. To open the nrpe.cfg file copy this command.

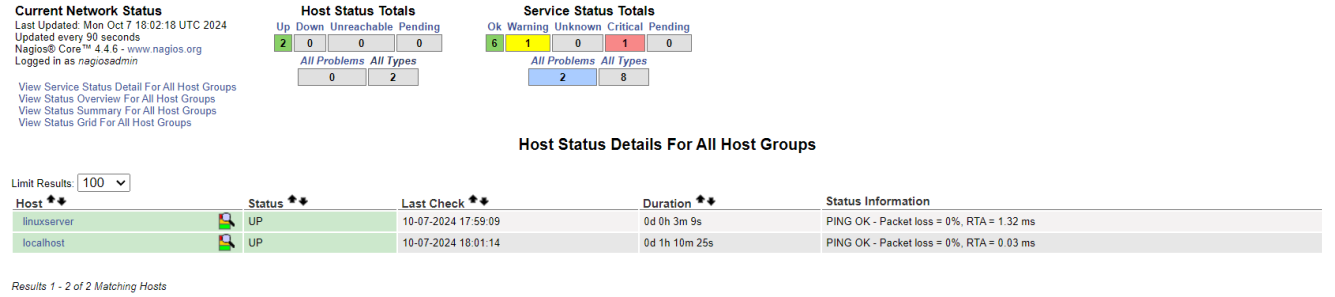


sudo nano /etc/nagios/nrpe.cfg

Now restart nrpe server by using this command

sudo systemctl restart nagios-nrpe-server

Now, check nagios dashboard, you should see linuxserver up and running, if not



Current Network Status
Last Updated: Mon Oct 7 18:02:18 UTC 2024
Updated every 90 seconds
Nagios® Core™ 4.4.6 - www.nagios.org
Logged in as *nagiosadmin*

View Service Status Detail For All Host Groups
View Status Overview For All Host Groups
View Status Summary For All Host Groups
View Status Grid For All Host Groups

Host Status Totals

Up	Down	Unreachable	Pending
2	0	0	0

All Problems	All Types
0	2

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
6	1	0	1	0

All Problems	All Types
2	8

Host Status Details For All Host Groups

Limit Results: 100

Host	Status	Last Check	Duration	Status Information
linuxserver	UP	10-07-2024 17:59:09	0d 0h 3m 9s	PING OK - Packet loss = 0%, RTA = 1.32 ms
localhost	UP	10-07-2024 18:01:14	0d 1h 10m 25s	PING OK - Packet loss = 0%, RTA = 0.03 ms

Results 1 - 2 of 2 Matching Hosts

Experiment 11

Soham Satpute D15A 52

Aim: To understand AWS Lambda, its workflow, various functions and create your first Lambda functions using Python / Java / Nodejs.
Theory:

AWS Lambda

AWS Lambda is a serverless computing service provided by Amazon Web Services (AWS). Users of AWS Lambda create functions, self-contained applications written in one of the supported languages and runtimes, and upload them to AWS Lambda, which executes those functions in an efficient and flexible manner.The Lambda functions can perform any kind of computing task, from serving web pages and processing streams of data to calling APIs and integrating with other AWS services.

The concept of "serverless" computing refers to not needing to maintain your own servers to run these functions. AWS Lambda is a fully managed service that takes care of all the infrastructure for you. And so "serverless" doesn't mean that there are no servers involved: it just means that the servers, the operating systems, the network layer and the rest of the infrastructure have already been taken care of so that you can focus on writing application code.

Features of AWS Lambda

- AWS Lambda easily scales the infrastructure without any additional configuration. It reduces the operational work involved.
- It offers multiple options like AWS S3, CloudWatch, DynamoDB, API Gateway, Kinesis, CodeCommit, and many more to trigger an event.
- You don't need to invest upfront. You pay only for the memory used by the lambda function and minimal cost on the number of requests hence cost-efficient. ● AWS Lambda is secure. It uses AWS IAM to define all the roles and security policies.
- It offers fault tolerance for both services running the code and the function. You do not have to worry about the application down.

Packaging Functions

Lambda functions need to be packaged and sent to AWS. This is usually a process of compressing the function and all its dependencies and uploading it to an S3 bucket.
And letting AWS know that you want to use this package when a specific event takes place. To help us with this process we use the Serverless Stack Framework (SST). We'll go over this in detail later on in this guide.

Execution Model

The container (and the resources used by it) that runs our function is managed completely by AWS. It is brought up when an event takes place and is turned off if it is not being used. If additional requests are made while the original event is being served, a new container is brought up to serve a request. This means that if we are undergoing a usage spike, the cloud provider simply creates multiple instances of the container with our function to serve those requests.

This has some interesting implications. Firstly, our functions are effectively stateless. Secondly, each request (or event) is served by a single instance of a Lambda function. This means that you are not going to be handling concurrent requests in your code.

AWS brings up a container whenever there is a new request. It does make some optimizations here. It will hang on to the container for a few minutes (5 - 15mins depending on the load) so it can respond to subsequent requests without a cold start.

Stateless Functions

The above execution model makes Lambda functions effectively stateless. This means that every time your Lambda function is triggered by an event it is invoked in a completely new environment. You don't have access to the execution context of the previous event.

However, due to the optimization noted above, the actual Lambda function is invoked only once per container instantiation. Recall that our functions are run inside containers. So when a function is first invoked, all the code in our handler function gets executed and the handler function gets invoked. If the container is still available for subsequent requests, your function will get invoked and not the code around it.

For example, the createNewDbConnection method below is called once per container instantiation and not every time the Lambda function is invoked. The myHandler function on the other hand is called on every invocation.

Common Use Cases for Lambda

Due to Lambda's architecture, it can deliver great benefits over traditional cloud computing setups for applications where:

1. Individual tasks run for a short time;
2. Each task is generally self-contained;
3. There is a large difference between the lowest and highest levels in the workload of the application.

Some of the most common use cases for AWS Lambda that fit these criteria are: Scalable APIs. When building APIs using AWS Lambda, one execution of a Lambda function can serve a single HTTP request. Different parts of the API can be routed to different Lambda functions via Amazon API Gateway. AWS Lambda automatically scales individual functions according to

the demand for them, so different parts of your API can scale differently according to current usage levels. This allows for cost-effective and flexible API setups.

Data processing. Lambda functions are optimized for event-based data processing. It is easy to integrate AWS Lambda with data sources like Amazon DynamoDB and trigger a Lambda function for specific kinds of data events. For example, you could employ Lambda to do some work every time an item in DynamoDB is created or updated, thus making it a good fit for things like notifications, counters and analytics.

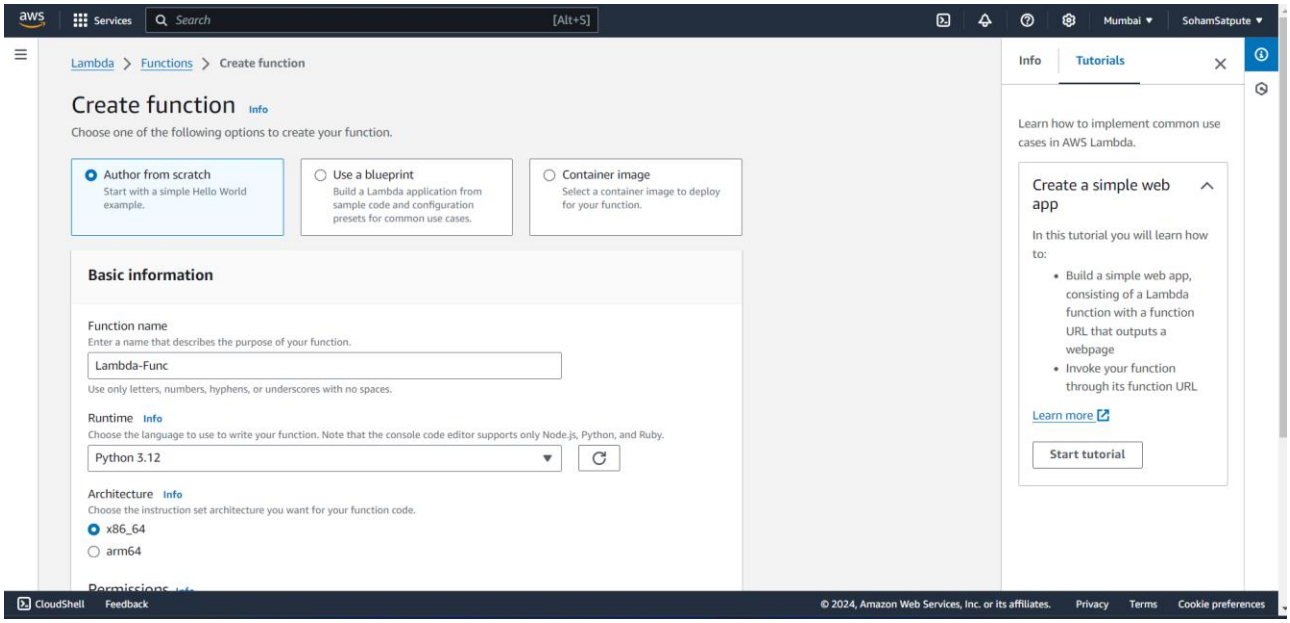
Steps to create an AWS Lambda function

Step 1: Create a Lambda Function

1.Choose a Function Creation Method: Select Author from scratch.

2. Configure the Function:
Function name: Enter a name for your function (e.g., MyFirstLambda).
Runtime: Choose Python 3.x (the latest available version).
Permissions:Choose Create a new role with basic Lambda permissions (this creates a role with the necessary permissions).

3. Click on Create function.

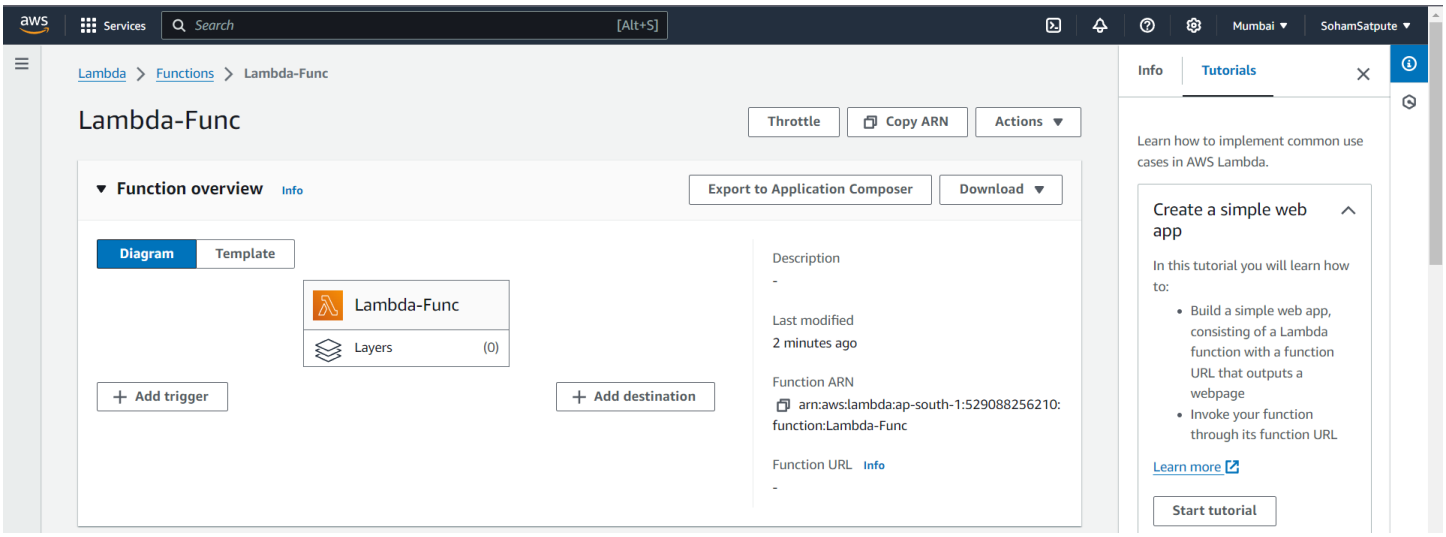


Step 2: Write Your Lambda Function Code

In the Function code section, you will see a code editor. Replace the default code with the following Python code:

python Copy code def lambda_handler(event, context): # This function returns a greeting message name = event.get('name', 'World')
    return {
        'statusCode': 200, 'body': f'Hello, {name}!'
    }

This function reads a name from the event and returns a greeting message. If no name is provided, it defaults to "World".

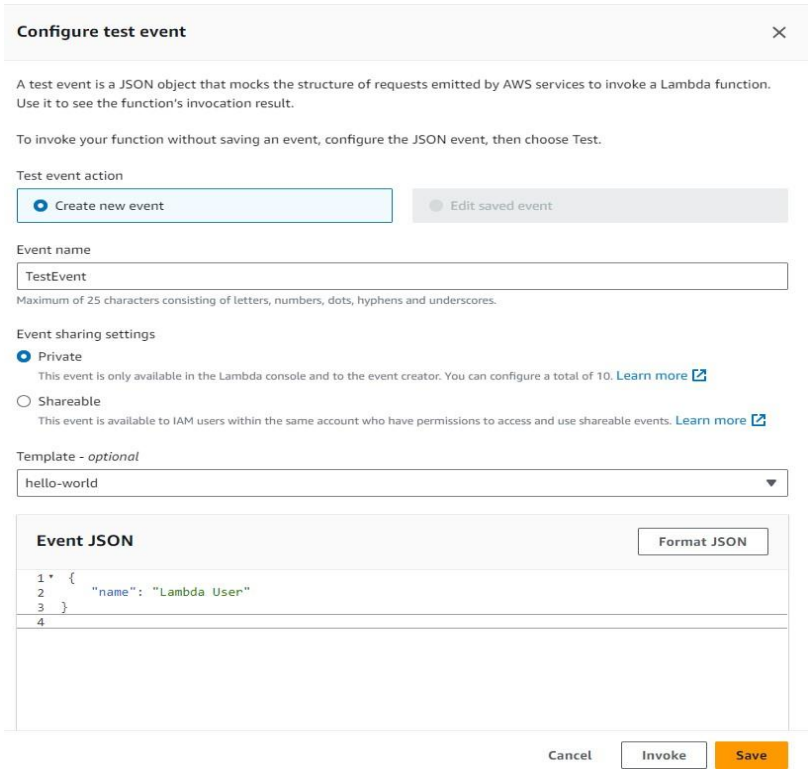


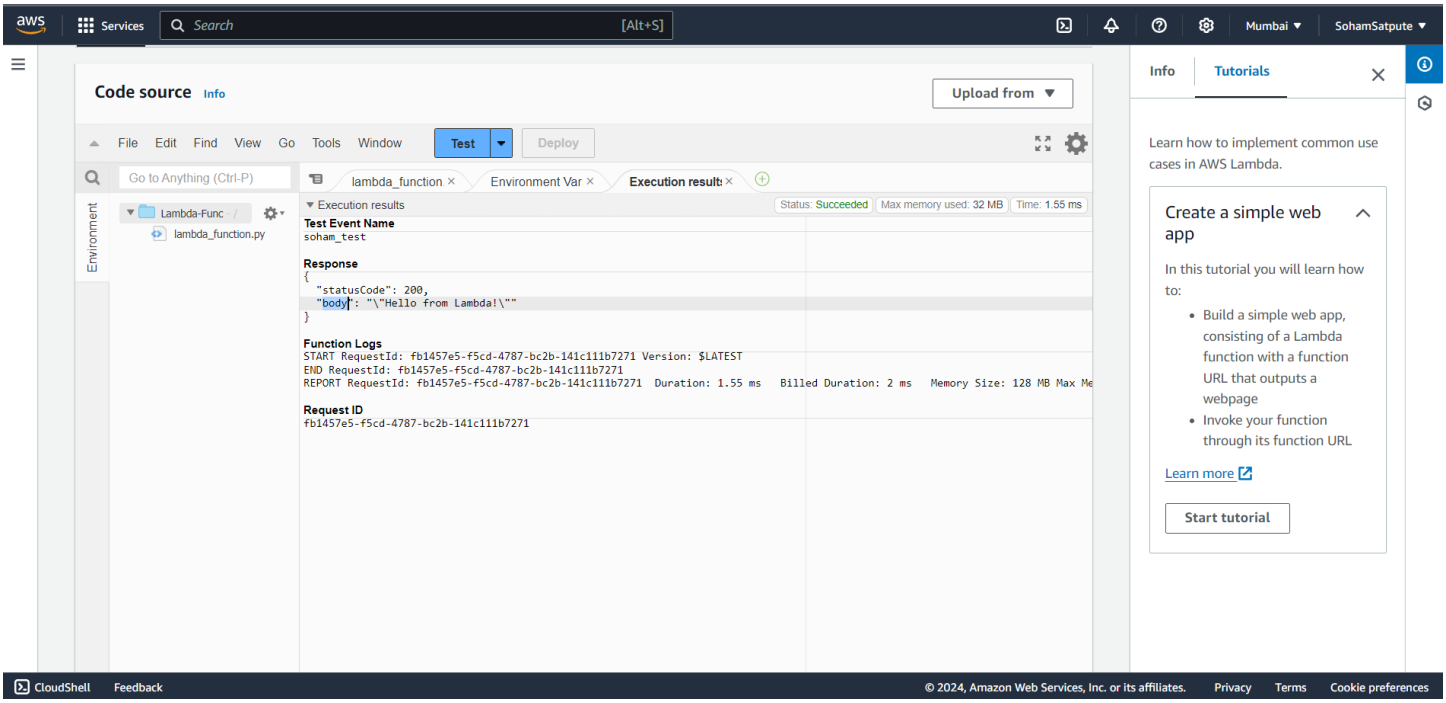
Step3: 1. Configure a Test Event:
Click on the Test button.
In the Configure test event dialog, give your event a name (e.g., TestEvent). Replace the default JSON with the following:
{
    "name": "Lambda User"

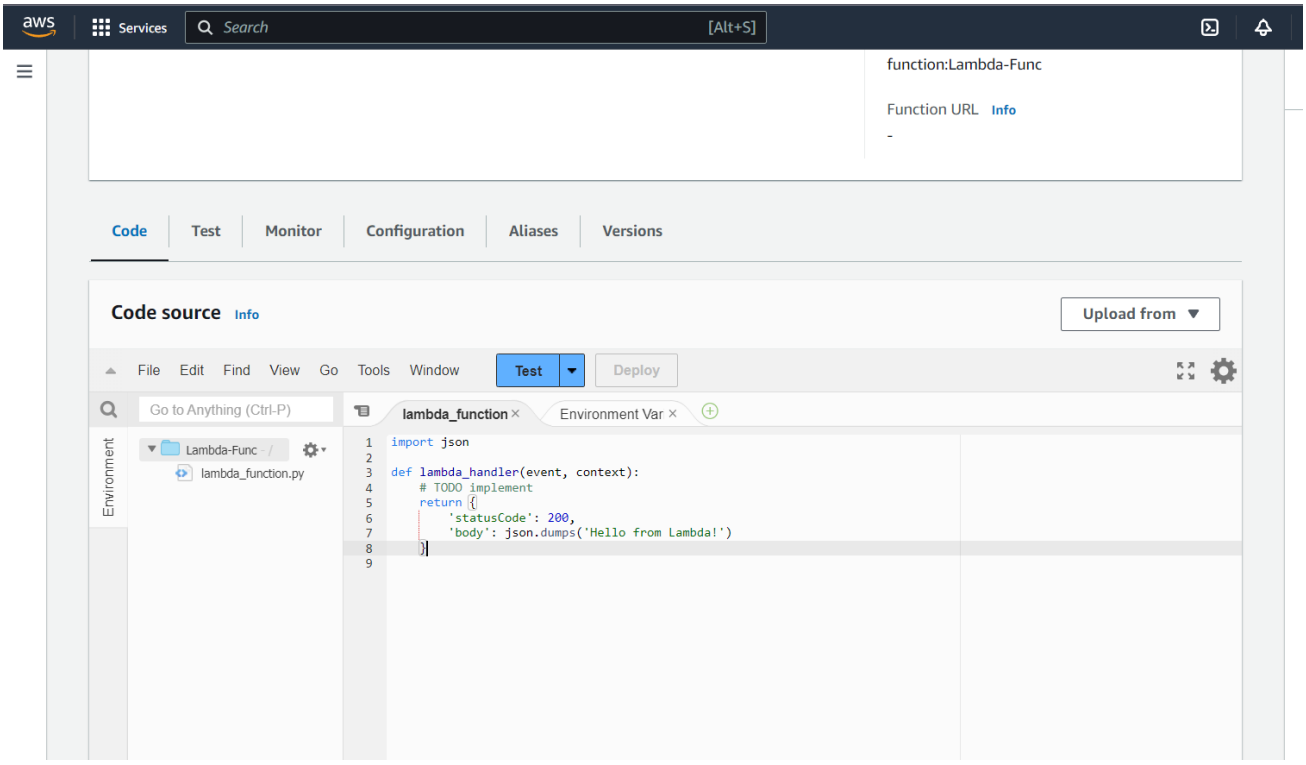
}

2. Run the Test:
Click on the Test button again to execute your Lambda function.
You should see the execution results below the code editor, including the response: json
Copy code

```
{
    "statusCode": 200,
    "body": "Hello, Lambda User!"
}
```







Conclusion:

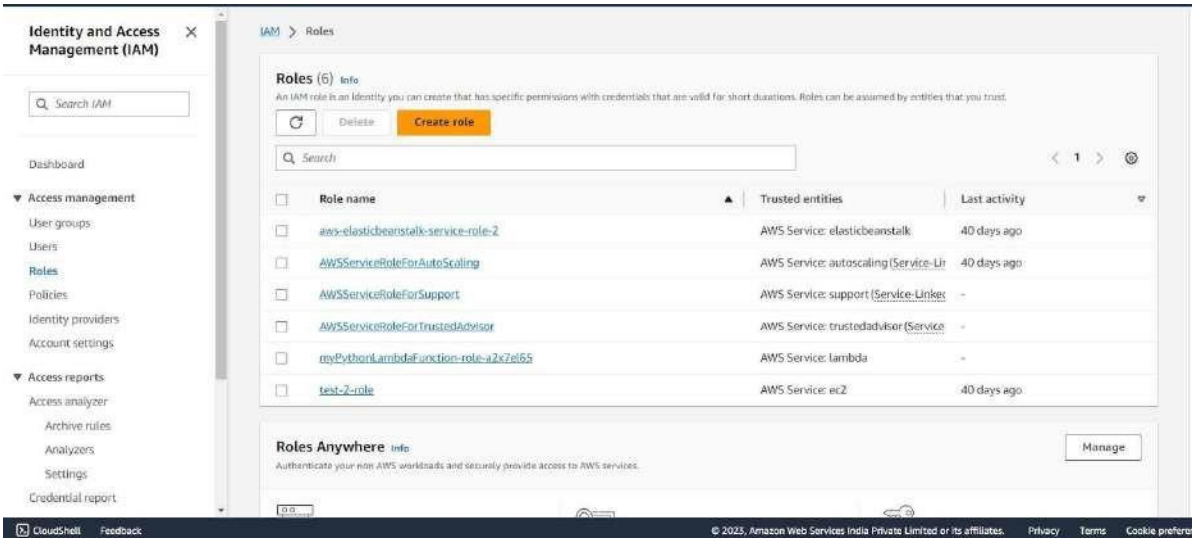
AWS Lambda is a serverless computing service that allows you to run code without managing servers, making it highly scalable, cost-effective, and easy to use. It automatically manages the compute resources, executes your code in response to specific events such as API calls, file uploads, or database updates, and scales based on the demand

Adv. DevOps Exp. 12

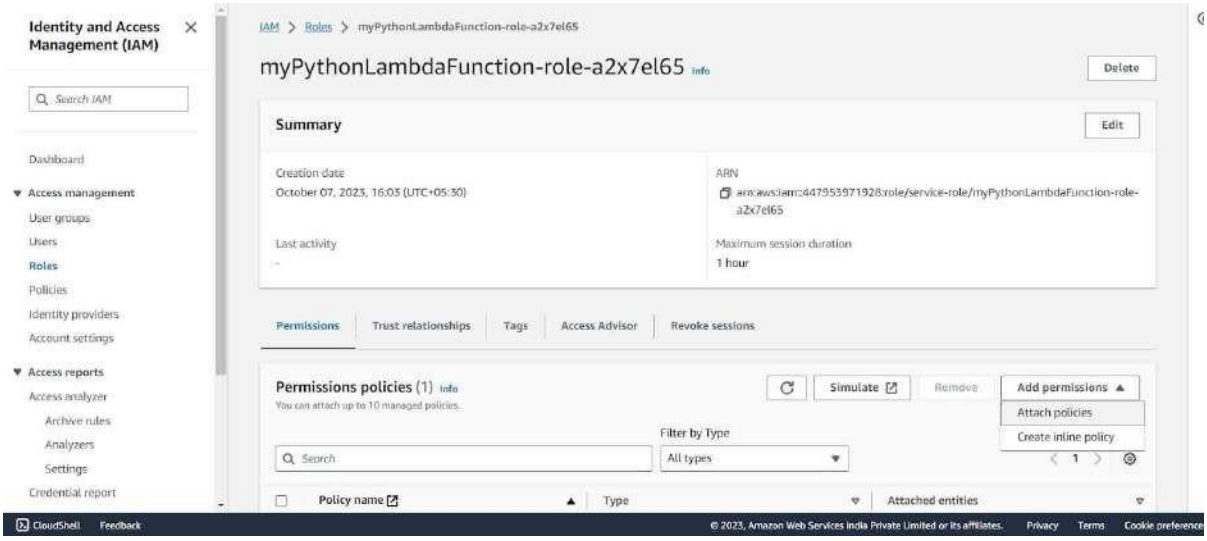
Soham Satpute

D15A - 52

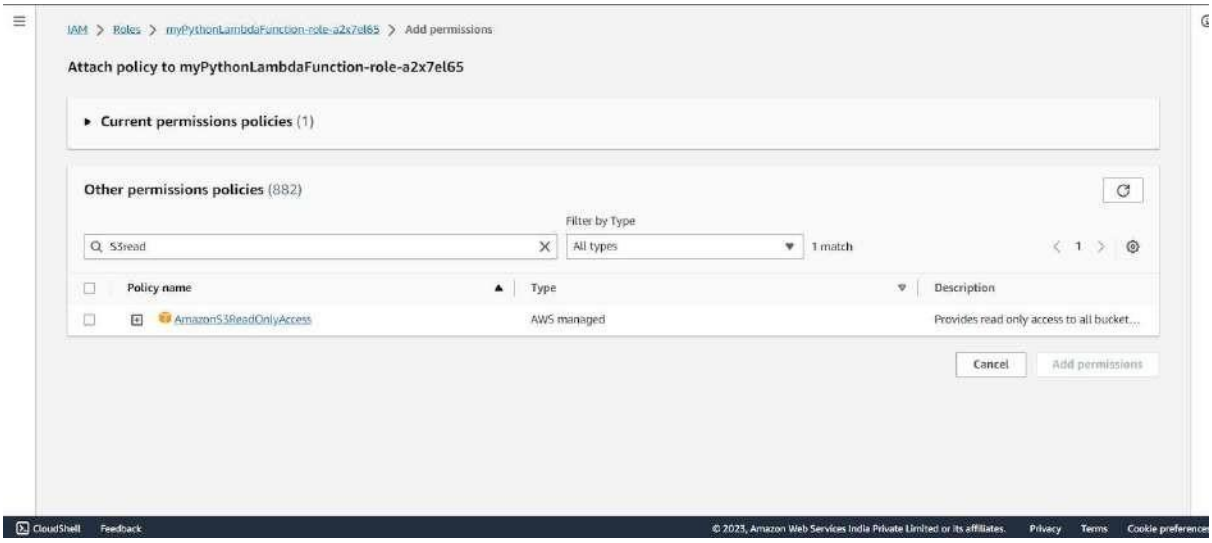
Step 1: Open the IAM (user)



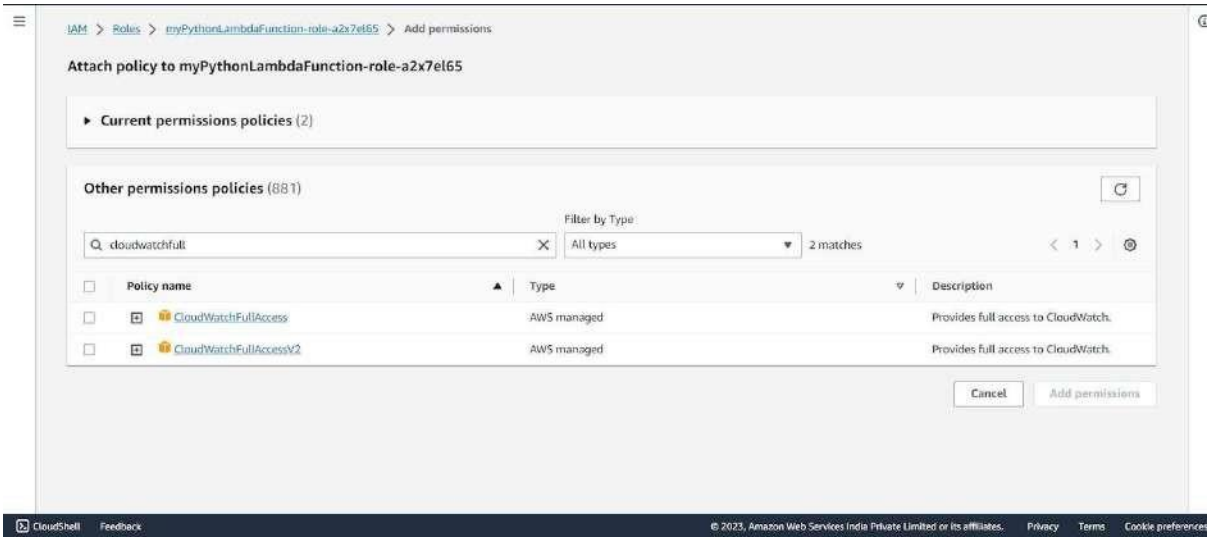
Step 2: Under Attach Policies, add S3-ReadOnly and CloudWatchFull permissions to this role.



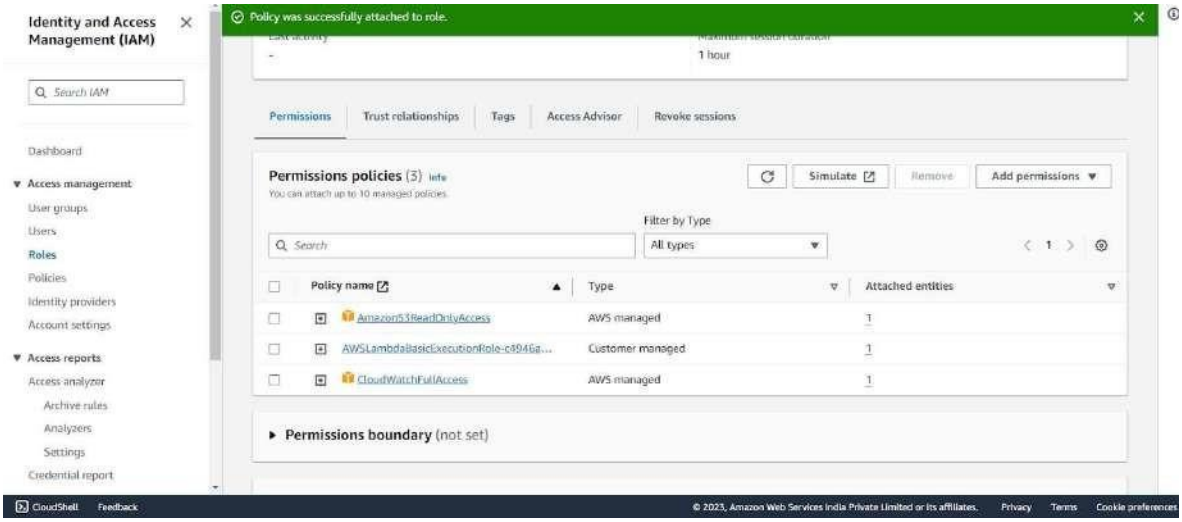
S3-ReadOnly



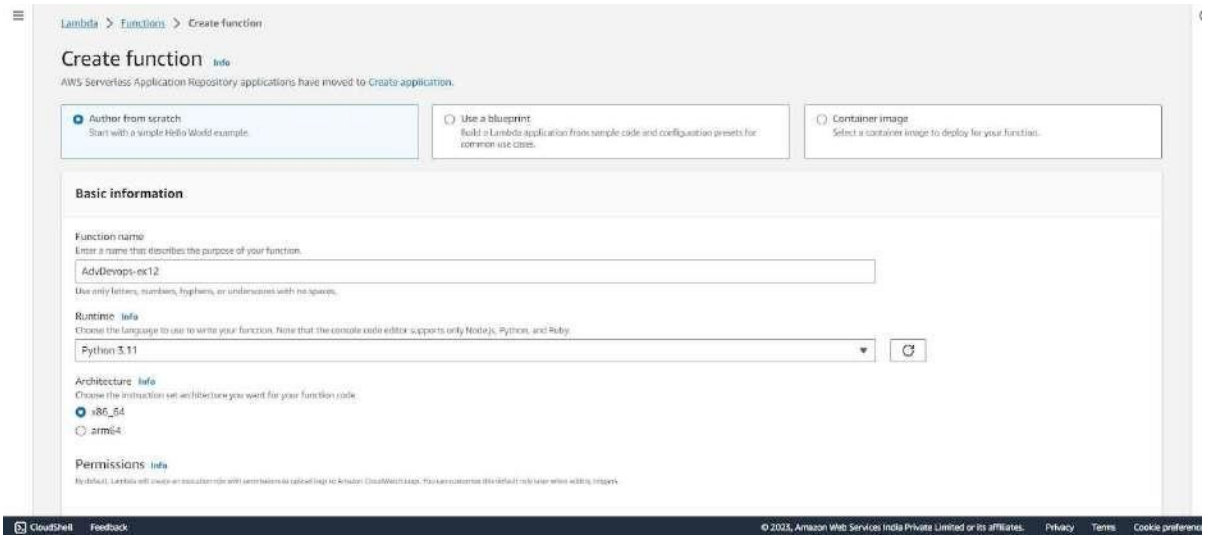
CloudWatchFull



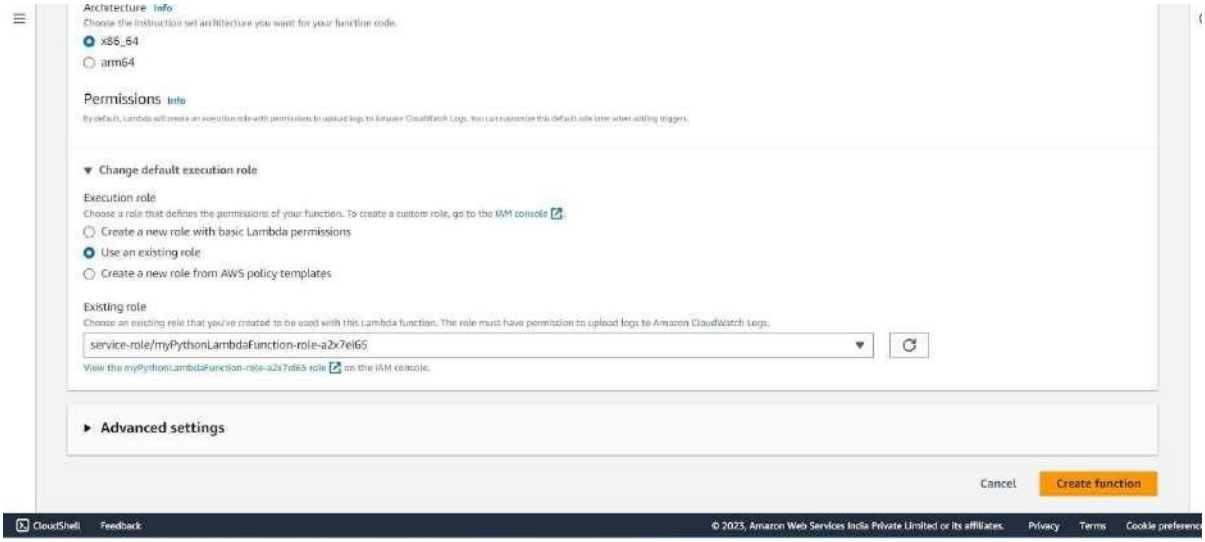
After successful attachment of policy you will see something like this you will be able to see the updated policies.



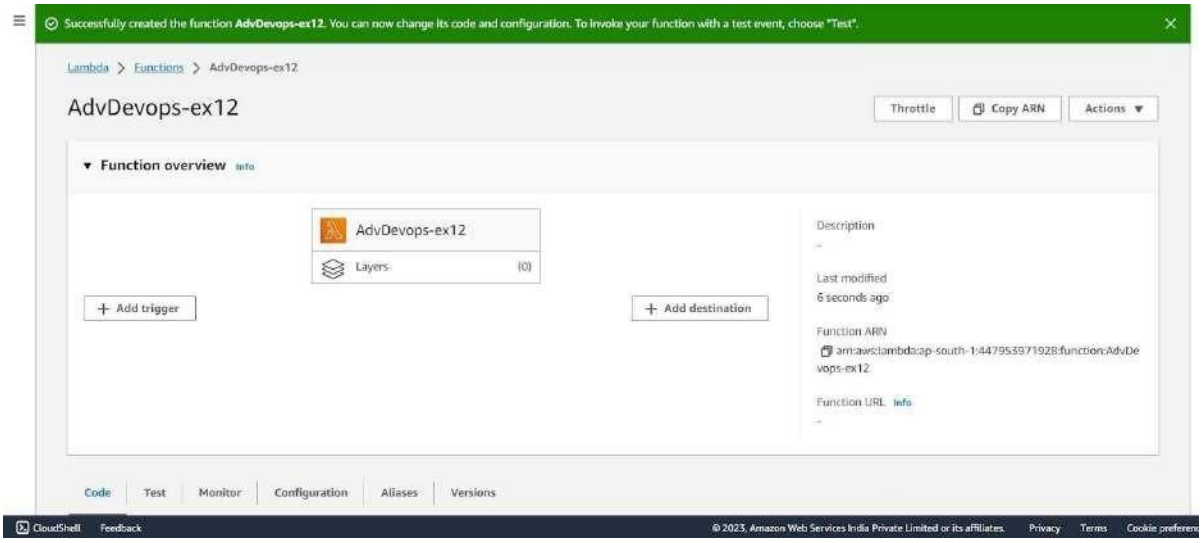
Step 3: Open up AWS Lambda and create a new Python function.



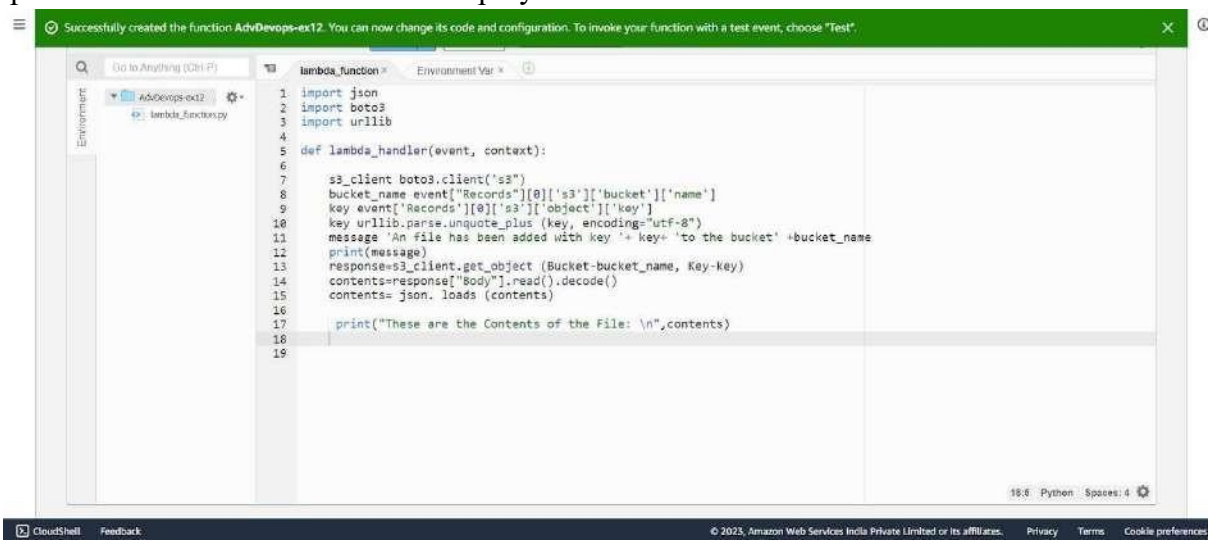
Under Execution Role, choose the existing role, then select the one which was previously created and to which we just added permissions.



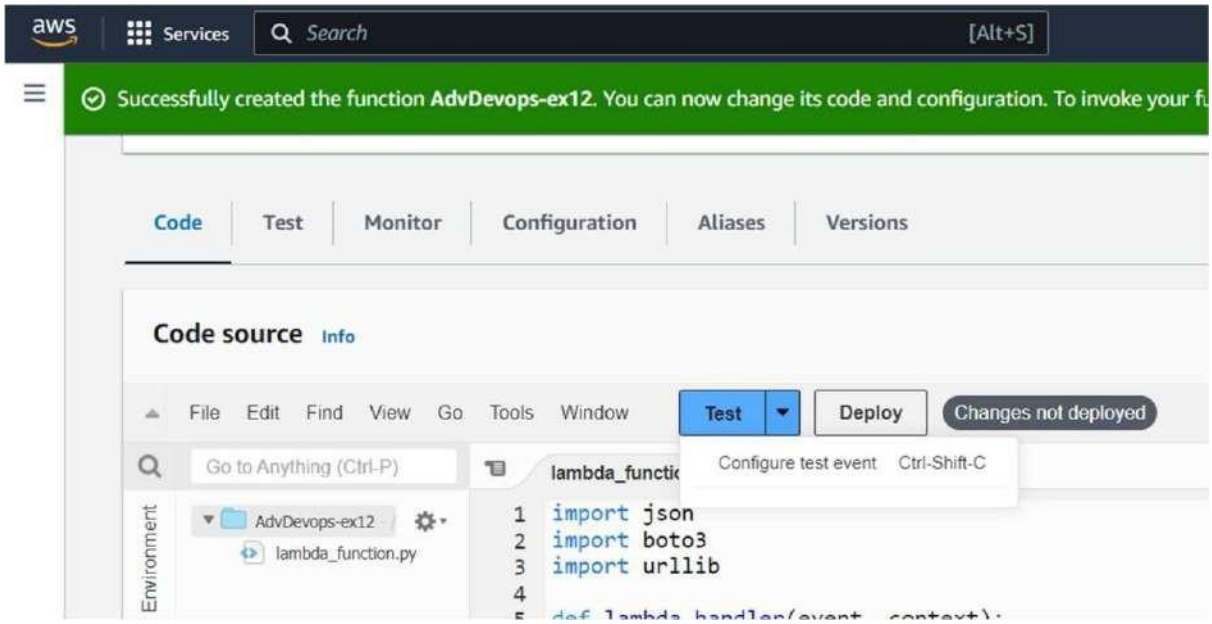
Step 4: The function is up and running.

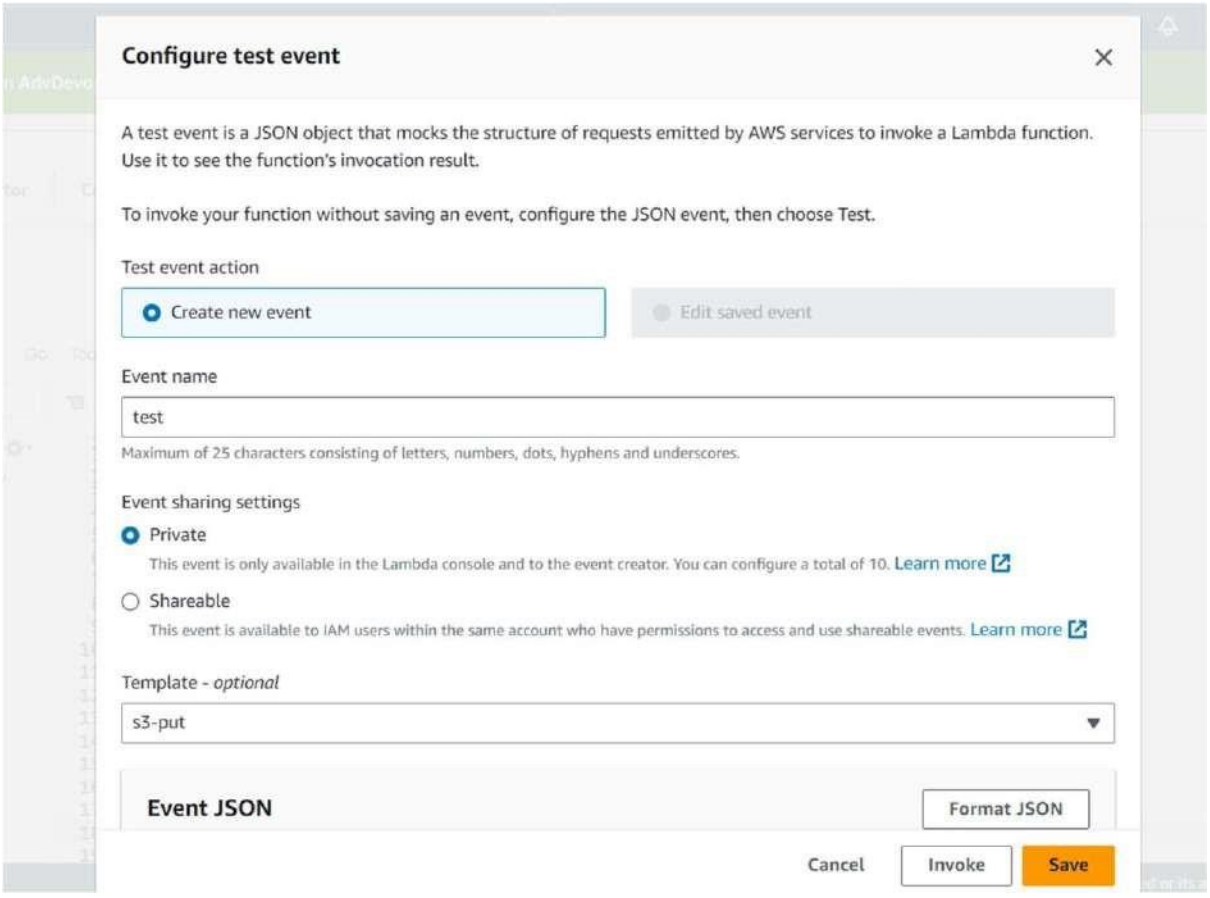


Step 5: Make the following changes to the function and click on the deploy button. This code basically logs a message and logs the contents of a JSON file which is uploaded to an S3 Bucket and then deploy the code.



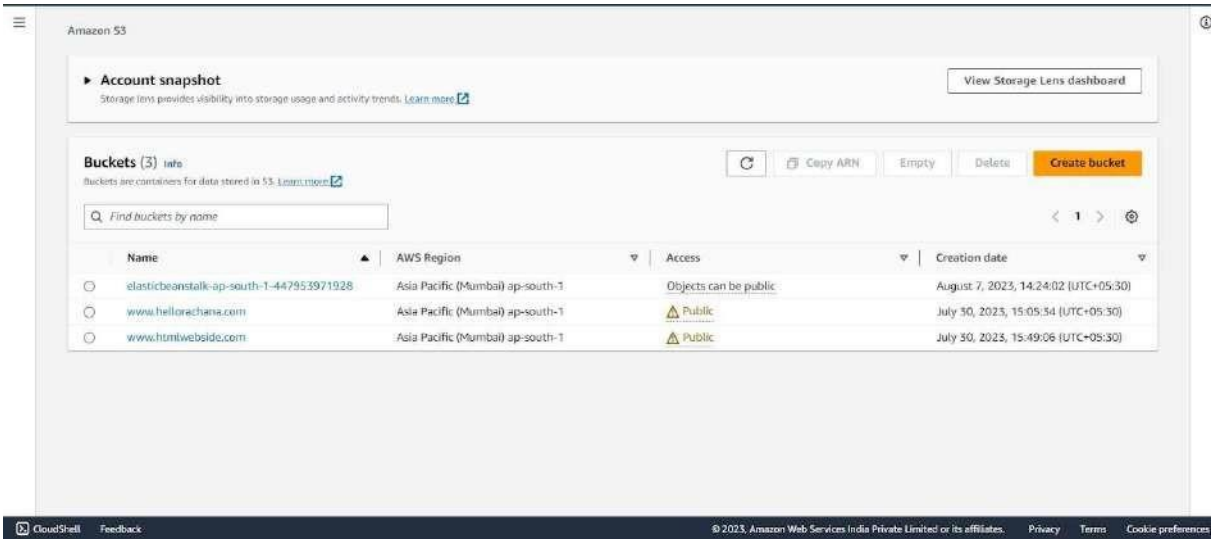
Step 6: Click on Test and choose the ‘S3 Put’ Template.



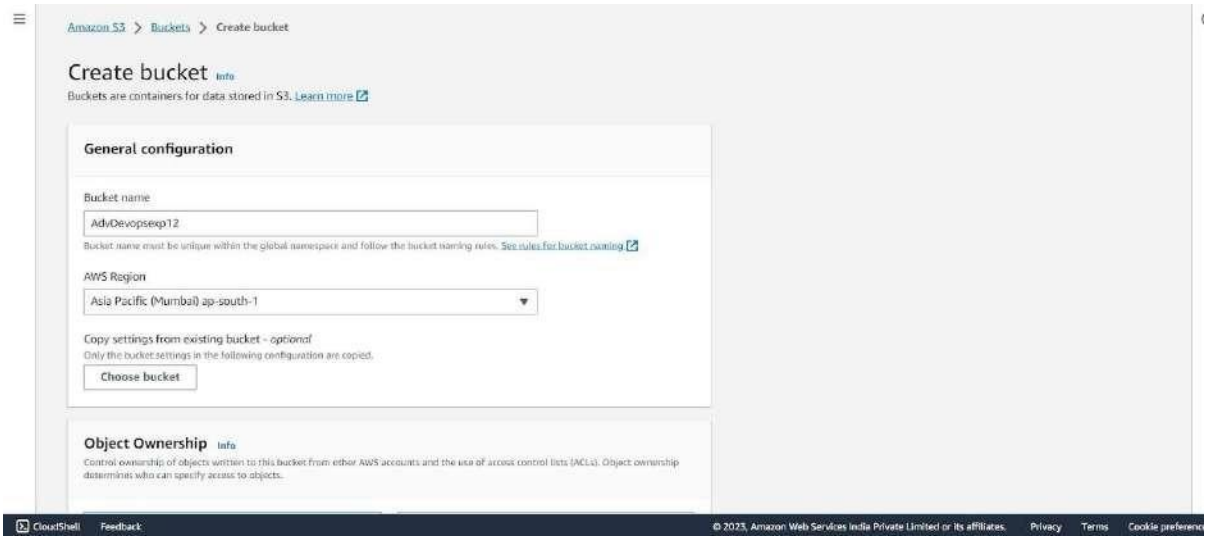


And Save it.

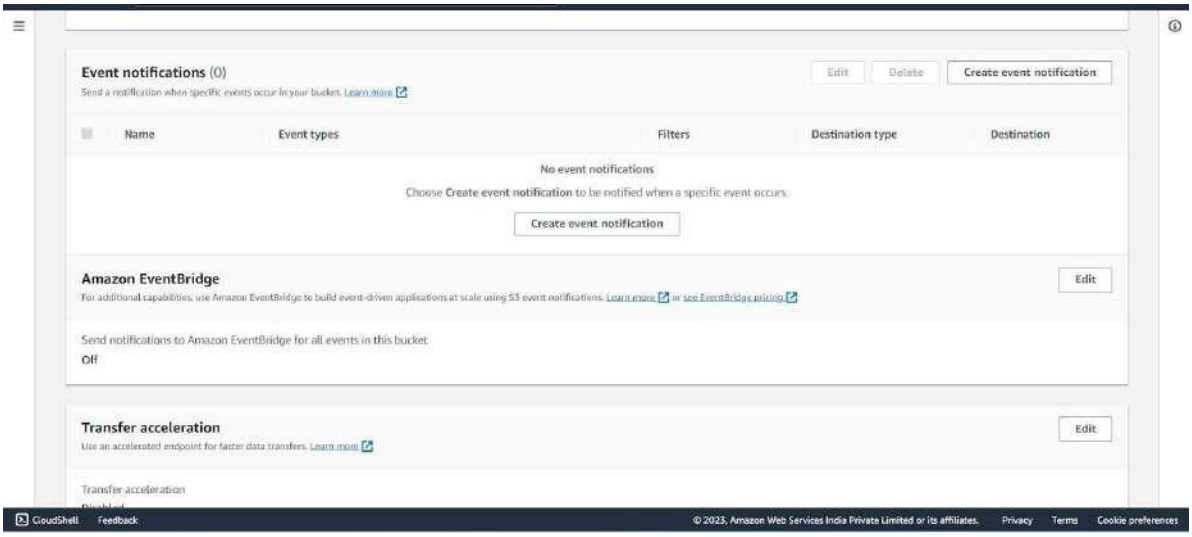
Step 7: Open up the S3 Console and create a new bucket.



Step 8: With all general settings, create the bucket in the same region as the function.

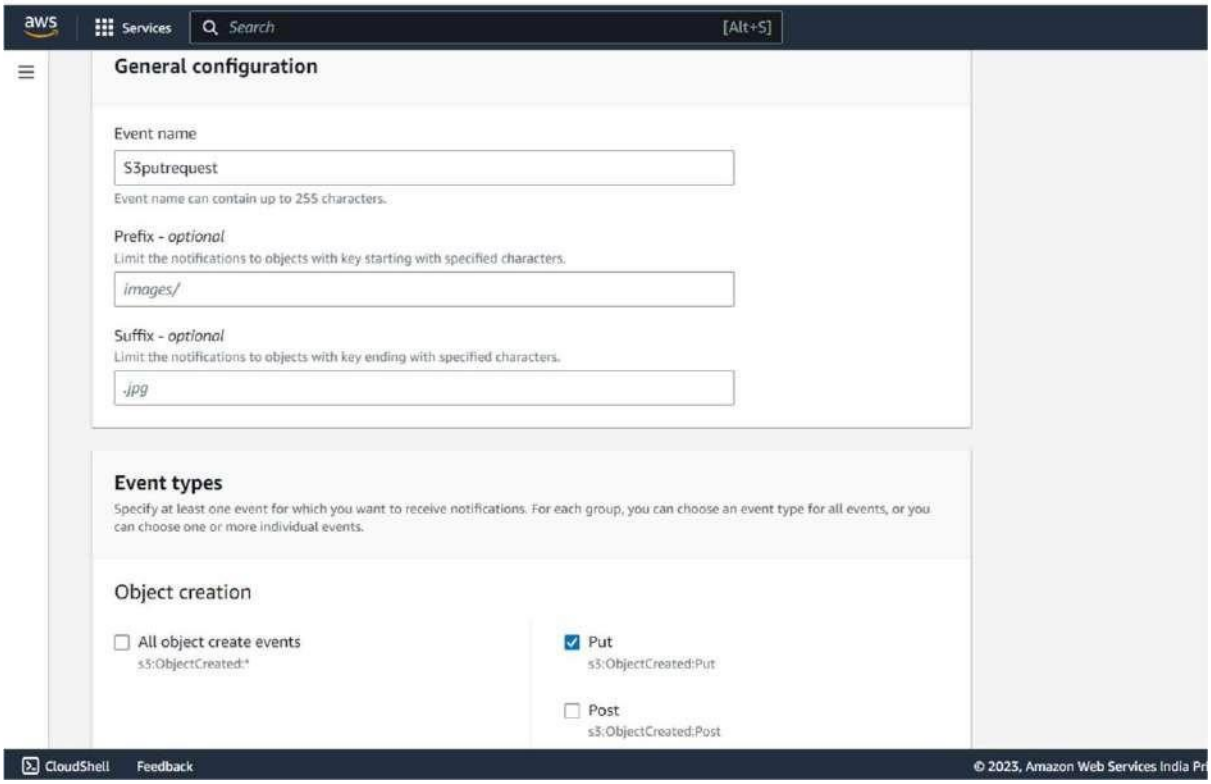


Step 9: Click on the created bucket and under properties, look for events.

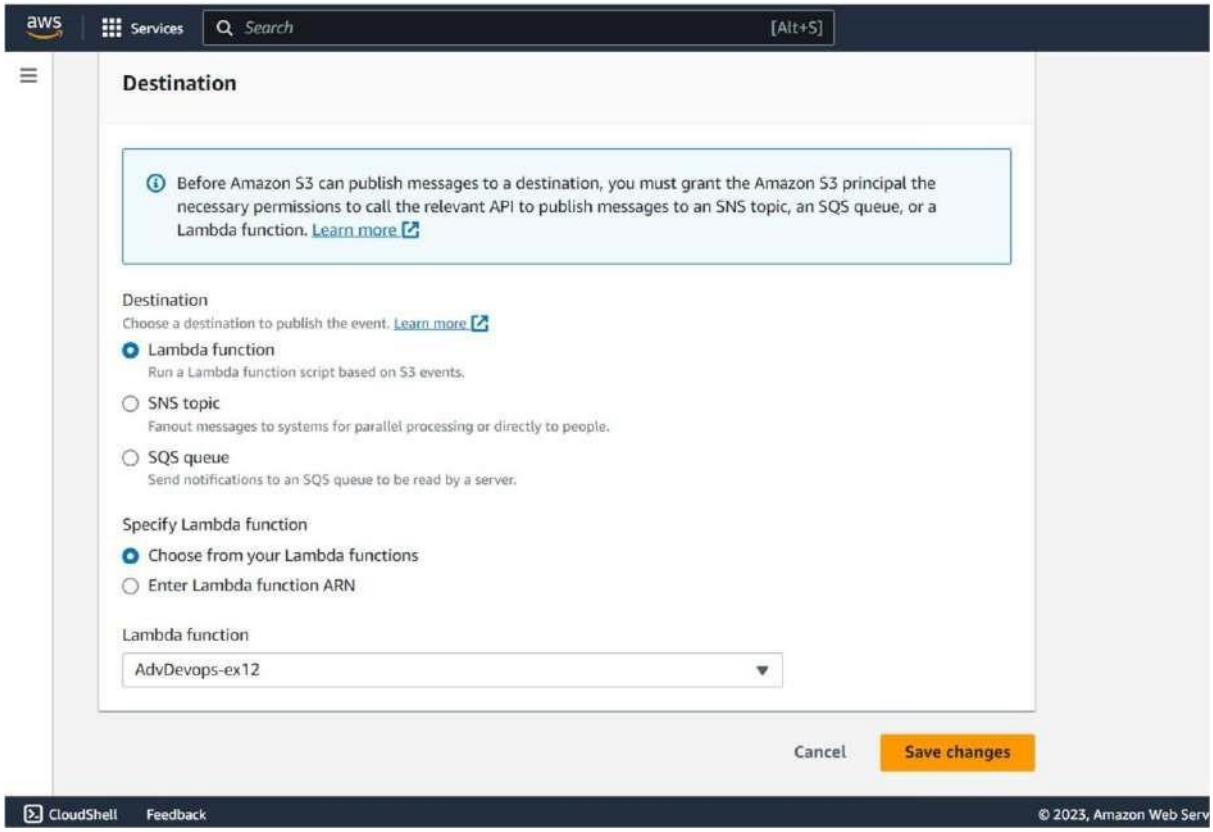


Click on Create Event Notification.

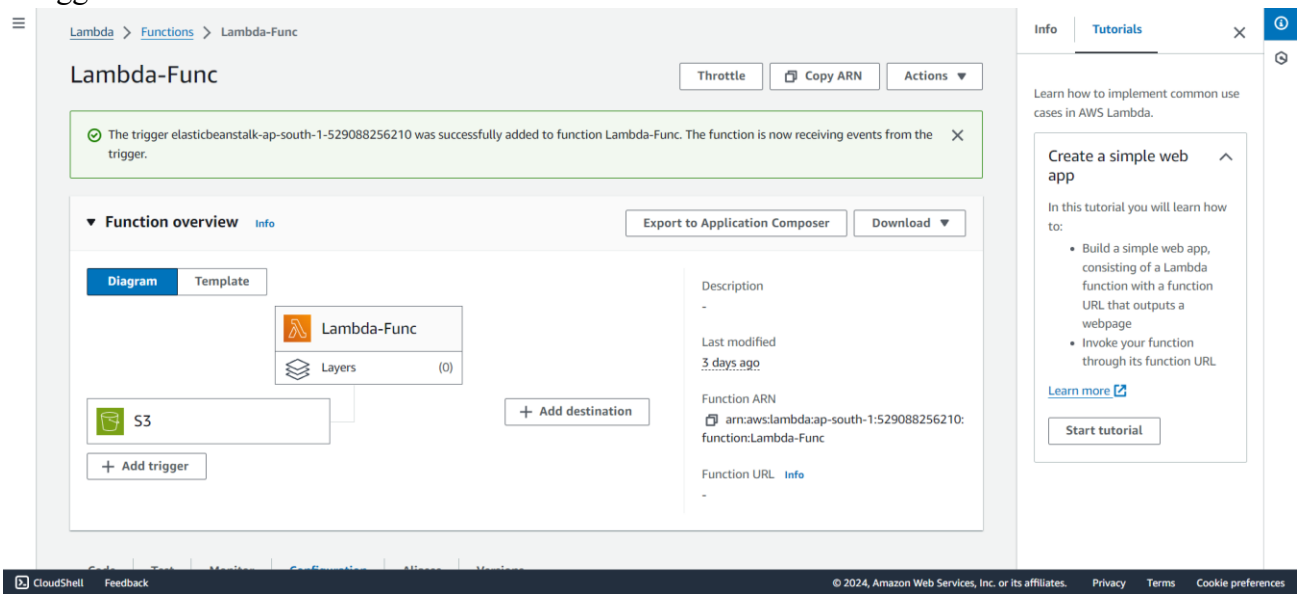
Step 10: Mention an event name and check Put under event types.



Choose Lambda function as destination and choose your lambda function and save the changes.



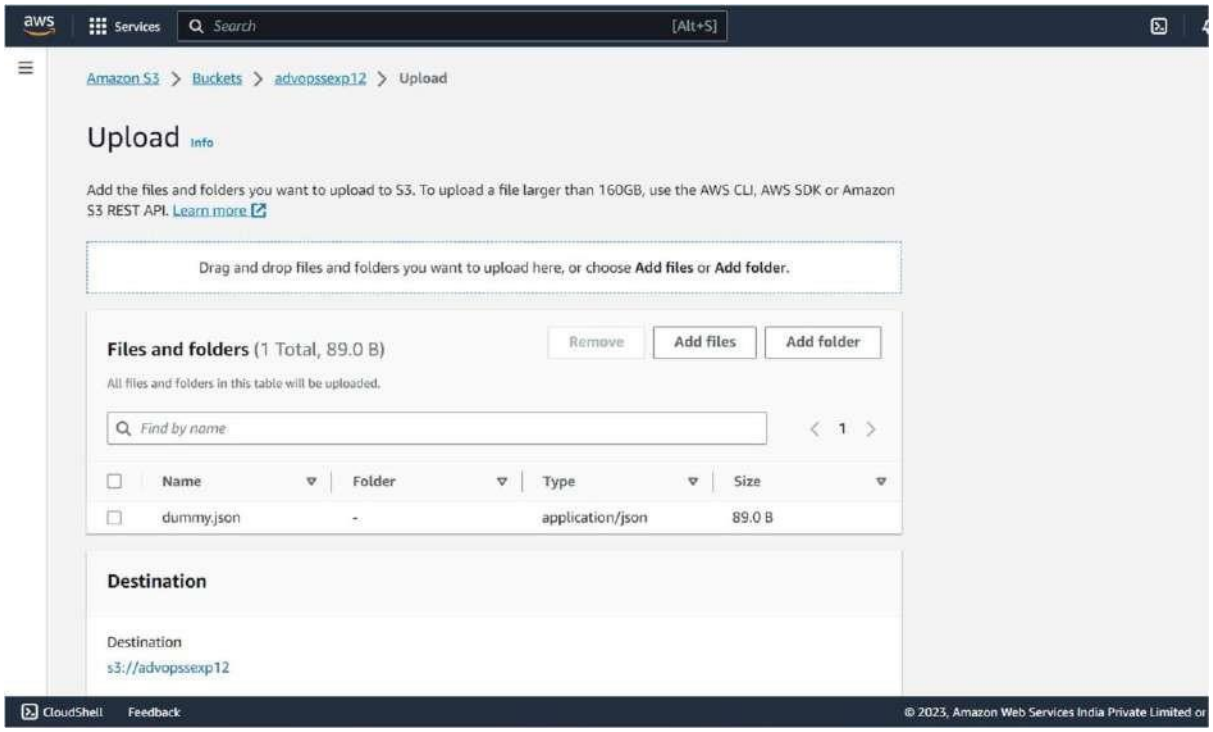
Step 11: Refresh the Lambda function console and you should be able to see an S3 Trigger in the overview.



Step 12: Now, create a dummy JSON file locally.

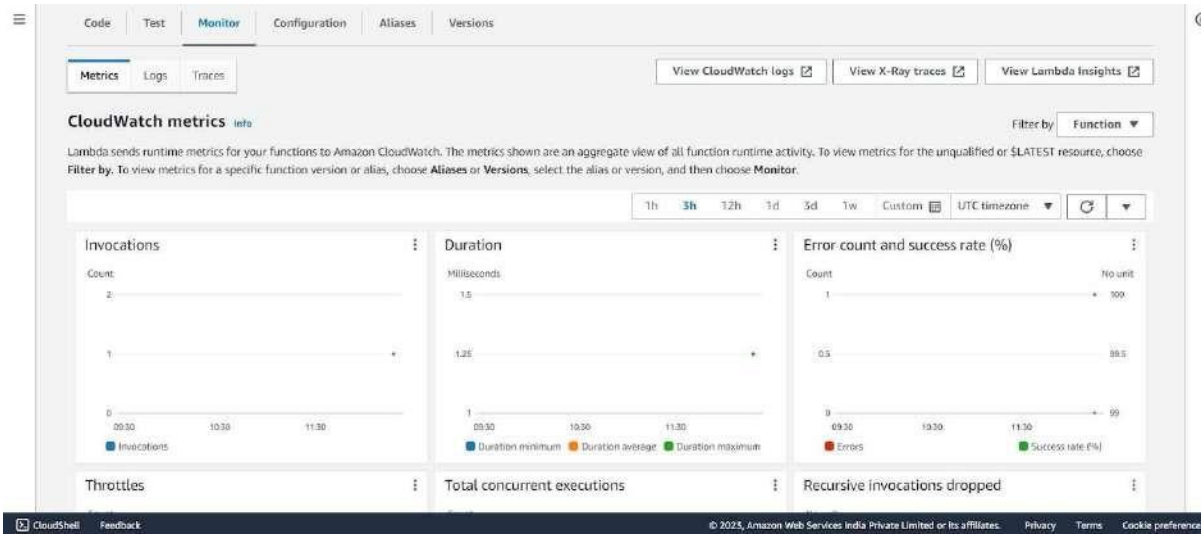
Step 13: Go back to your S3 Bucket and click on Add Files to upload a new file.

Step 14: Select the dummy data file from your computer and click Upload.

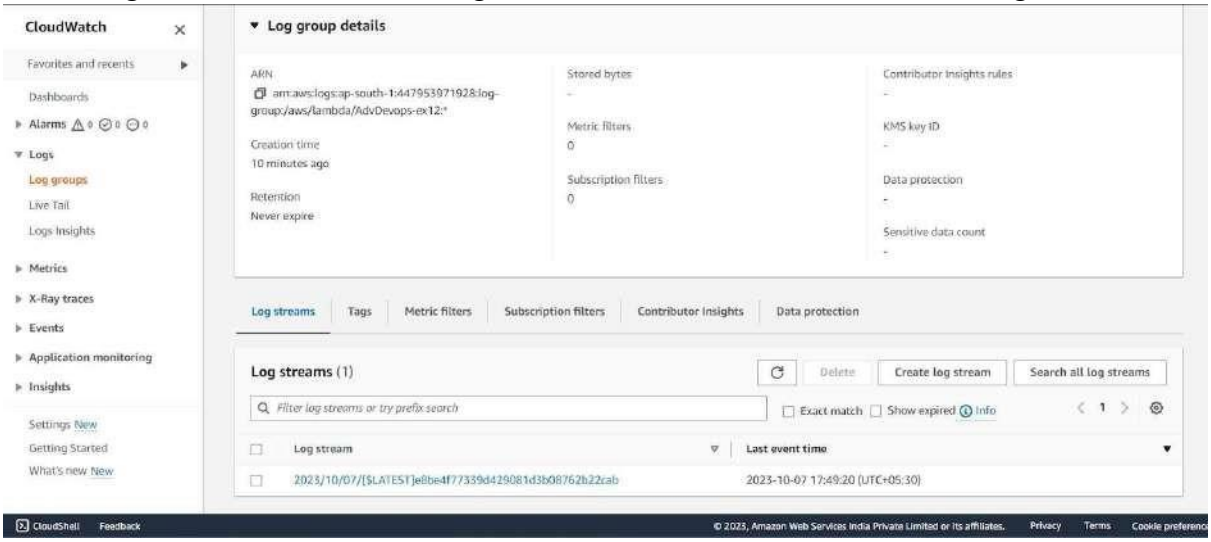


Step 15: After this make the necessary changes in the Test configuration file which we created it previously by replacing the Bucket Name and the ARN of Bucket.

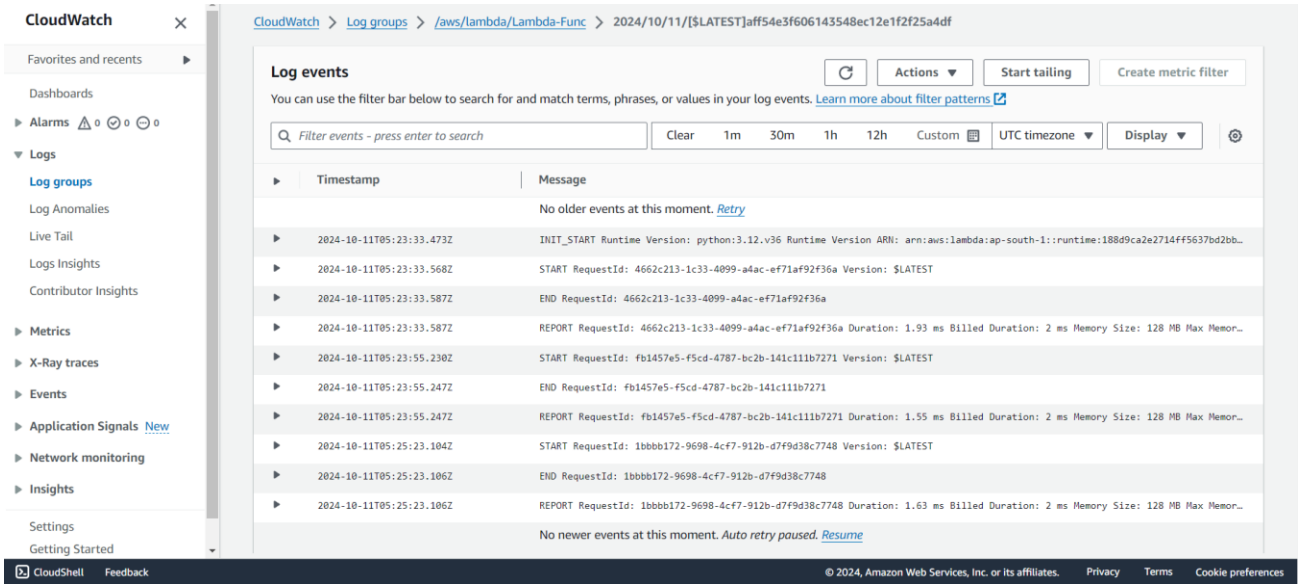
Step 16: Go back to your Lambda function , Refresh it and check the Monitor tab.



Under Log streams, click on View logs in Cloudwatch to check the Function logs.



Step 17: Click on this log Stream that was created to view what was logged by your function.



Conclusion: Thus, we have created a Lambda function which logs “An Image has been added” once you add an object to a specific bucket in S3.