

## Experiment.1

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

Theory:

Benefits of Cloud Infrastructure and AWS Cloud9 IDE

### 1. Benefits of Cloud Infrastructure:

- Scalability: Cloud infrastructure allows resources to scale up or down as needed, providing flexibility and supporting growing business demands.
- Cost Efficiency: With a pay-as-you-go model, businesses reduce upfront costs on hardware and maintenance, paying only for what they use.
- Global Accessibility: Cloud services can be accessed from anywhere with an internet connection, enabling remote collaboration and operations.
- High Availability: Cloud providers ensure high uptime and redundancy, offering 24/7 availability of data and applications.
- Enhanced Security: Cloud platforms provide advanced security features like encryption, identity management, and constant monitoring.
- Disaster Recovery: Built-in backup and disaster recovery options help maintain business continuity during failures.

### 2. AWS Cloud9 IDE Setup and Launch:

- Login to AWS Console: Access AWS Cloud9 through the AWS Management Console.
- Create an Environment: Set up an AWS Cloud9 environment by selecting a name, EC2 instance, and network configuration.
- Launch IDE: After creation, the IDE opens in the browser with pre-installed tools (AWS CLI, Git, etc.), ready for coding.

### 3. AWS Cloud9 IDE Features:

- Cloud-Based Development: No local setup is needed, as AWS Cloud9 runs entirely in the cloud, accessible from any device.
- Multi-Language Support: The IDE supports various programming languages like JavaScript, Python, and more.

- Serverless Development: Easily work on serverless applications using AWS Lambda, without managing servers.

The screenshot shows the AWS EC2 Dashboard in the N. Virginia region. The left sidebar includes sections for EC2 Global View, Events, Console-to-Code Preview, Instances (with sub-options like Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations), and Images (AMIs, AMI Catalog). The main panel displays a summary of resources: Instances (running) 0, Auto Scaling Groups 0, Dedicated Hosts 0, Elastic IPs 0, Instances 0, Key pairs 1, Load balancers 0, Placement groups 0, Security groups 1, Snapshots 0, and Volumes 0. Below this is a 'Launch instance' button. To the right, the 'Account attributes' section shows the Default VPC (vpc-0abcb5b3b841b9f7) and various settings like Data protection and security, Zones, EC2 Serial Console, Default credit specification, and EC2 console preferences. A 'Explore AWS' sidebar on the right promotes AWS Graviton2 instances.

This screenshot shows the 'Quick Start' interface for selecting an AMI. It lists several options: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, and SUSE. The Ubuntu option is selected. Below this, the 'Amazon Machine Image (AMI)' section details the chosen Ubuntu Server 24.04 LTS (HVM), SSD Volume Type AMI (ami-04a81a99f5ec58529). The interface also shows the instance type (t2.micro), which is highlighted with a blue border. On the right, a 'Summary' panel provides details about the instance launch, including the number of instances (1), software image (Canonical, Ubuntu, 24.04 LTS), virtual server type (t2.micro), firewall (New security group), and storage (1 volume(s) - 8 GiB). A 'Free tier' notification is visible in the summary panel. At the bottom right is a 'Launch instance' button.

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D15A 54

**▼ Network settings** [Info](#)

[Edit](#)

Network | [Info](#)  
vpc-0abedb5b3b841b9f7

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-1' with the following rules:

Allow SSH traffic from [Anywhere](#) 0.0.0.0/0

Allow HTTPS traffic from the internet [To set up an endpoint, for example when creating a web server](#)

**▼ Summary**

Number of instances | [Info](#)  
1

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](#)

**▼ Configure storage** [Info](#) [Advanced](#)

1x  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](#)

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D15A 54

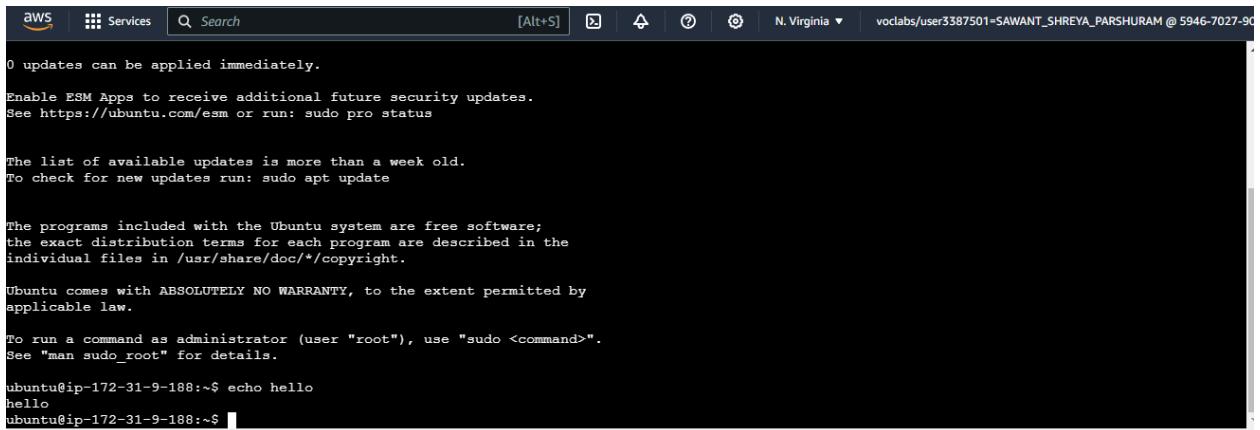
The screenshot shows the AWS EC2 Instances "Launch an instance" page. At the top, a green success banner displays: "Success" and "Successfully initiated launch of instance (i-0c5c8c0f74e8cffdd)". Below the banner is a "Launch log" link. A "Next Steps" section contains a search bar with placeholder text "What would you like to do next with this instance, for example "create alarm" or "create backup"" and a navigation bar with pages 1 through 6. The main content area has four cards:

- Create billing and free tier usage alerts**: To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds. Includes a "Create billing alerts" button.
- Connect to your instance**: Once your instance is running, log into it from your local computer. Includes a "Connect to instance" button and a "Learn more" link.
- Connect an RDS database**: Configure the connection between an EC2 instance and a database to allow traffic flow between them. Includes a "Connect an RDS database" button and a "Create a new RDS database" link.
- Create EBS snapshot policy**: Create a policy that automates the creation, retention, and deletion of EBS snapshots. Includes a "Create EBS snapshot policy" button.

Below this is the EC2 Instances list view, which shows one instance: i-0c5c8c0f74e8cffdd, which is Running, t2.micro, and Initializing. The status bar indicates us-east-1d availability. The sidebar on the left lists various EC2 services and features.

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D15A 54



The screenshot shows the AWS Lambda function configuration page. At the top, there's a search bar and navigation links for services and regions. Below the header, there's a message about ESM Apps and a terminal window showing a basic Ubuntu shell session.

```
aws Services Search [Alt+S] N. Virginia vocabs/user3387501=SAWANT_SHREYA_PARSHURAM @ 5946-7027-90

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

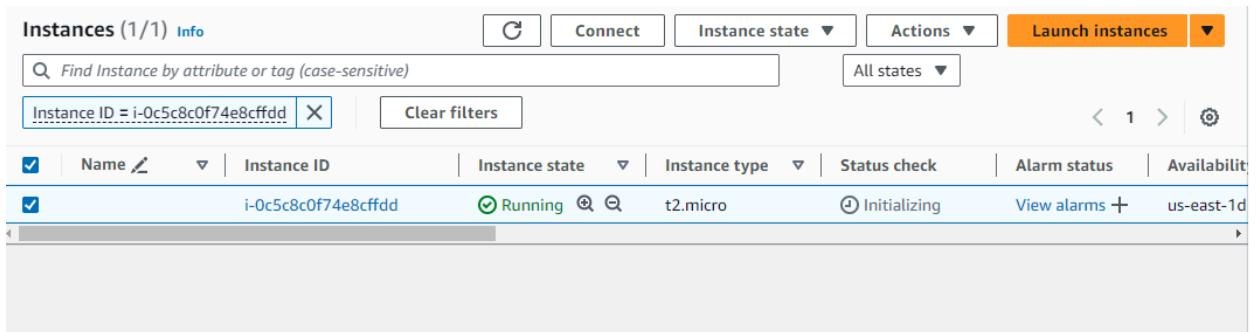
The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-9-188:~$ echo hello
hello
ubuntu@ip-172-31-9-188:~$
```



This screenshot shows the 'Instances' tab of the Lambda function configuration. It lists one instance named 'i-0c5c8c0f74e8cffdd'. The instance is running, has an 't2.micro' type, and is in the 'us-east-1d' availability zone. There are buttons for launching new instances and managing alarms.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
i-0c5c8c0f74e8cffdd	i-0c5c8c0f74e8cffdd	Running	t2.micro	Initializing	View alarms +	us-east-1d

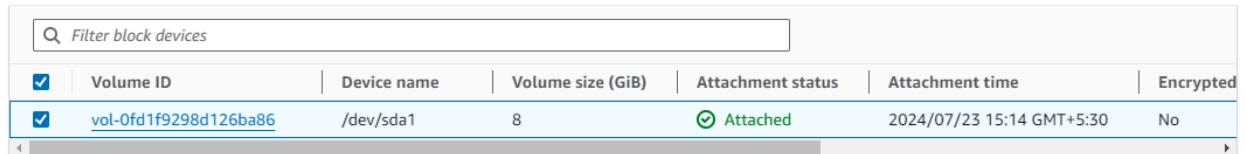
i-0c5c8c0f74e8cffdd

Root device name  
/dev/sda1

Root device type  
EBS

EBS optimization  
disabled

▼ Block devices



This screenshot shows the 'Block devices' section. It lists a single volume attached to the instance. The volume has a volume ID of 'vol-0fd1f9298d126ba86', a device name of '/dev/sda1', a size of 8 GiB, and is currently attached.

Volume ID	Device name	Volume size (GiB)	Attachment status	Attachment time	Encrypted
vol-0fd1f9298d126ba86	/dev/sda1	8	Attached	2024/07/23 15:14 GMT+5:30	No

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D15A 54

```
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.
```

```
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```

```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

```
ubuntu@ip-172-31-9-188:~$ echo hello
hello
ubuntu@ip-172-31-9-188:~$ cat> myfile
HELLO!!!
ubuntu@ip-172-31-9-188:~$ cat myfile
HELLO!!!
ubuntu@ip-172-31-9-188:~$ 
```

```
ubuntu@ip-172-31-9-188:~$ cat myfile
HELLO!!!
ubuntu@ip-172-31-9-188:~$ mkdir
mkdir: missing operand
Try 'mkdir --help' for more information.
ubuntu@ip-172-31-9-188:~$ mkdir myfile
mkdir: cannot create directory 'myfile': File exists
ubuntu@ip-172-31-9-188:~$ mkdir file
ubuntu@ip-172-31-9-188:~$ ls
file myfile
ubuntu@ip-172-31-9-188:~$ mkdir>file
-bash: file: Is a directory
ubuntu@ip-172-31-9-188:~$ 
```

```
Last login: Tue Jul 30 08:30:11 2024 from 18.206.107.27
ubuntu@ip-172-31-9-188:~$ sudo su
root@ip-172-31-9-188:/home/ubuntu# apt install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
apache2 is already the newest version (2.4.58-1ubuntu8.4).
0 upgraded, 0 newly installed, 0 to remove and 26 not upgraded.
root@ip-172-31-9-188:/home/ubuntu# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-07-30 08:58:14 UTC; 12min ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 2975 (apache2)
    Tasks: 55 (limit: 1130)
   Memory: 5.3M (peak: 5.5M)
      CPU: 73ms
     CGroup: /system.slice/apache2.service
             ├─2975 /usr/sbin/apache2 -k start
             ├─2978 /usr/sbin/apache2 -k start
```

Shreya Sawant

D15A 54

```
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-07-30 08:58:14 UTC; 12min ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 2975 (apache2)
    Tasks: 55 (limit: 1130)
   Memory: 5.3M (peak: 5.5M)
      CPU: 73ms
     CGroup: /system.slice/apache2.service
             └─2975 /usr/sbin/apache2 -k start
               ├─2978 /usr/sbin/apache2 -k start
               └─2979 /usr/sbin/apache2 -k start

Jul 30 08:58:14 ip-172-31-9-188 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Jul 30 08:58:14 ip-172-31-9-188 systemd[1]: Started apache2.service - The Apache HTTP Server.
root@ip-172-31-9-188:/home/ubuntu# cd /var/www/html/
root@ip-172-31-9-188:/var/www/html#
```



IDE Hosting-

Developer Tools

# AWS Cloud9

## A cloud IDE for writing, running, and debugging code

AWS Cloud9 allows you to write, run, and debug your code with just a browser. With AWS Cloud9, you have immediate access to a rich code editor, integrated debugger, and built-in terminal with preconfigured AWS CLI. You can get started in minutes and no longer have to spend the time to install local applications or configure your development machine.

### How it works

Create an AWS Cloud9 development environment on a new Amazon EC2 instance or connect it to your own Linux server through SSH. Once you've created an AWS Cloud9 environment, you will have immediate access to a rich code editor, integrated debugger, and built-in terminal with pre-configured AWS CLI – all within your browser.

Using the AWS Cloud9 dashboard, you can create and switch between many different AWS Cloud9 environments, each one containing the custom tools, runtimes, and files for a specific project.

[Learn more](#)

### New AWS Cloud9 environment

[Create environment](#)

### Getting started

[Before you start](#) (2 min read)

[Create an environment](#) (2 min read)

[Working with environments](#) (15 min read)

[Working with the IDE](#) (10 min read)

[Working with AWS Lambda](#) (5 min read)

[AWS Cloud9](#) > [Environments](#) > [Create environment](#)

### Create environment [Info](#)

#### Details

Name  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.

#### 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

t3.small (2 GiB RAM + 2 vCPU)  
Recommended for small web

m5.large (8 GiB RAM + 2 vCPU)  
Recommended for production and

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](#)

▶ **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.

**i** The following IAM resources will be created in your account

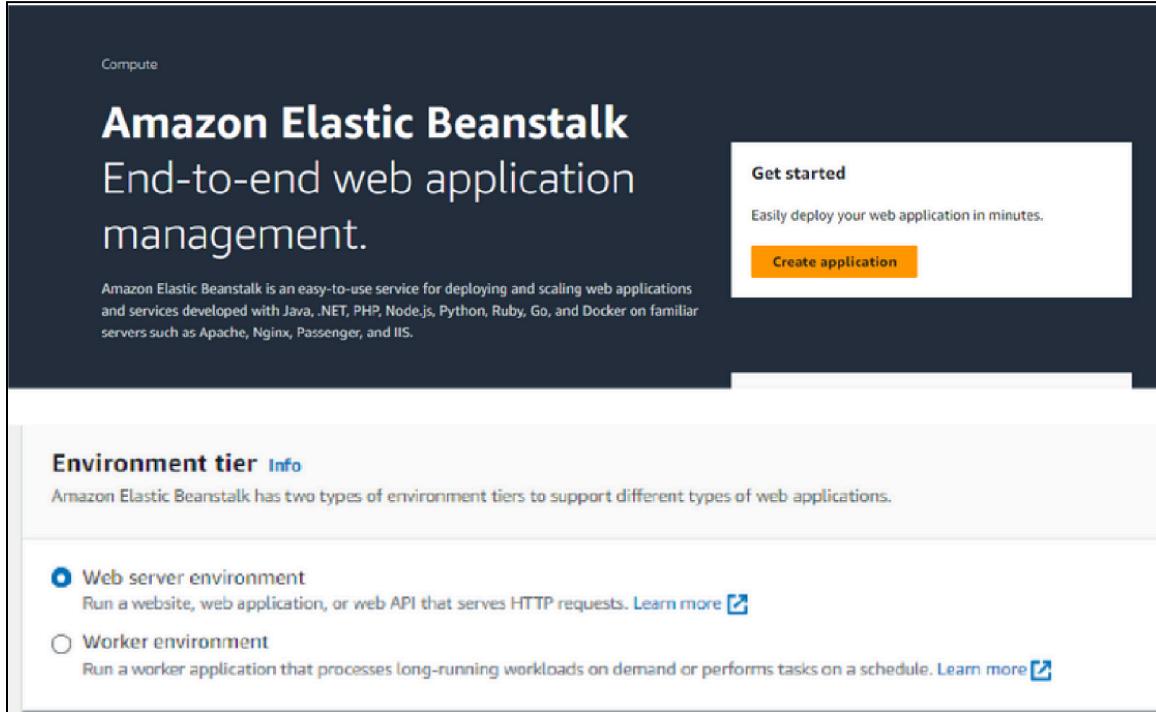
- **AWSServiceRoleForAWSCloud9** - AWS Cloud9 creates a service-linked role for you. This allows AWS Cloud9 to call other AWS services on your behalf. You can delete the role from the AWS IAM console once you no longer have any AWS Cloud9 environments. [Learn more](#)
- **AWSCloud9SSMAccessRole** and **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. [Learn more](#)

[Cancel](#) [Create](#)

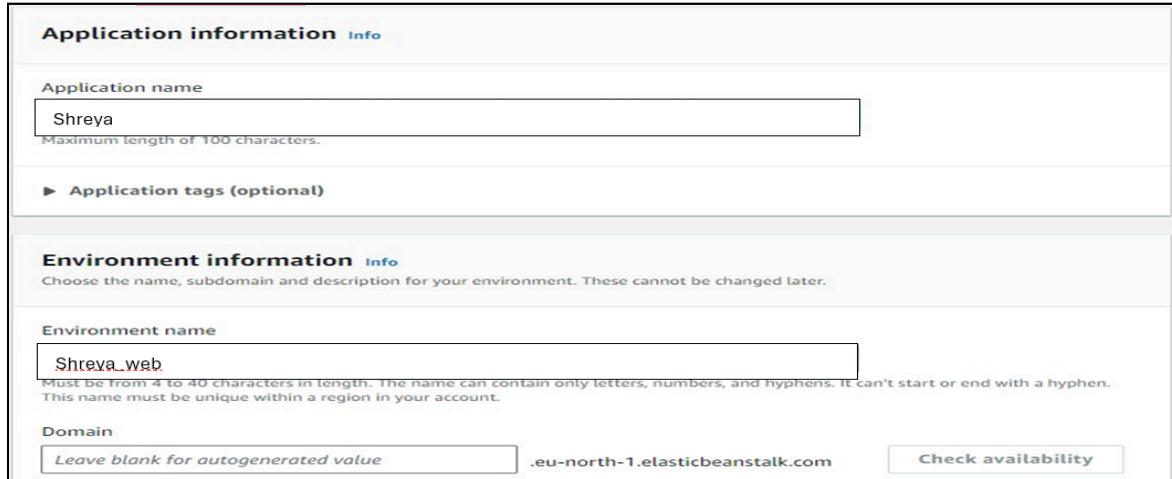
## Experiment.2

**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.

### Using elastic Beanstalk-



The screenshot shows the Amazon Elastic Beanstalk landing page. At the top, it says "Compute" and "Amazon Elastic Beanstalk End-to-end web application management." Below this, a description states: "Amazon Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS." To the right, there is a "Get started" section with a "Create application" button. The main content area is titled "Environment tier" with a "Info" link. It says: "Amazon Elastic Beanstalk has two types of environment tiers to support different types of web applications." There are two options: "Web server environment" (selected) and "Worker environment". Both options have a "Learn more" link.



The screenshot shows the "Create New Application" form in the Amazon Elastic Beanstalk console. The first section is "Application information" with an "Info" link. It has a field for "Application name" containing "Shreya", with a note: "Maximum length of 100 characters." The next section is "Environment information" with an "Info" link. It has a field for "Environment name" containing "Shreya\_web", with notes: "Must be from 4 to 40 characters in length. The name can contain only letters, numbers, and hyphens. It can't start or end with a hyphen. This name must be unique within a region in your account." Below this is a "Domain" field with "Leave blank for autogenerated value" and ".eu-north-1.elasticbeanstalk.com", and a "Check availability" button.

## Choose pipeline settings Info

Step 1 of 5

### Pipeline settings

**Pipeline name**  
Enter the pipeline name. You cannot edit the pipeline name after it is created.

No more than 100 characters

**Pipeline type**

**ⓘ** You can no longer create V1 pipelines through the console. We recommend you use the V2 pipeline type with improved release safety, pipeline triggers, parameterized pipelines, and a new billing model.

**Execution mode**  
Choose the execution mode for your pipeline. This determines how the pipeline is run.

**Superseded**  
A more recent execution can overtake an older one. This is the default.

**Queued (Pipeline type V2 required)**  
Executions are processed one by one in the order that they are queued.

**Parallel (Pipeline type V2 required)**  
Executions don't wait for other runs to complete before starting or finishing.

**Service role**

**New service role**  
Create a service role in your account

**Existing service role**  
Choose an existing service role from your account

**Role name**

Type your service role name

Allow AWS CodePipeline to create a service role so it can be used with this new pipeline

### Platform Info

Platform type

**Managed platform**  
Platforms published and maintained by Amazon Elastic Beanstalk. [Learn more](#) 

**Custom platform**  
Platforms created and owned by you. This option is unavailable if you have no platforms.

Platform

PHP 

Platform branch

PHP 8.3 running on 64bit Amazon Linux 2023 

Platform version

4.3.2 (Recommended) 

### 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

Developer Tools > Connections > Create connection

## Create a connection Info

### Create GitHub App connection Info

Connection name

Tags - optional

**Connect to GitHub**

CloudShell Feedback Privacy Terms Cookie preferences

## Configure service access Info

### Service access

IAM roles, assumed by Elastic Beanstalk as a service role, and EC2 instance profiles allow Elastic Beanstalk to create and manage your environment. Both the IAM role and instance profile must be attached to IAM managed policies that contain the required permissions. [Learn more](#)

Service role  Create and use new service role  Use an existing service role

Service role name  
Enter the name for an IAM role that Elastic Beanstalk will create to assume as a service role. Beanstalk will attach the required managed policies to it.  
  
[View permission details](#)

EC2 key pair  
Select an EC2 key pair to securely log in to your EC2 instances. [Learn more](#)

EC2 instance profile  
Choose an IAM instance profile with managed policies that allow your EC2 instances to perform required operations.

[View permission details](#)

[Cancel](#) [Skip to review](#) [Previous](#) **Next**

The screenshot shows the 'Create a connection' page for a GitHub App connection. At the top, the navigation path is 'Developer Tools > Connections > Create connection'. The main title is 'Create a connection' with an 'Info' link. Below it, the section 'Create GitHub App connection' has an 'Info' link. A 'Connection name' input field contains 'githubwebapp1'. A 'Tags - optional' section is present. At the bottom right is a large orange 'Connect to GitHub' button.

The screenshot shows the 'Connect to GitHub' page with a 'GitHub connection settings' dialog. The dialog header includes 'GitHub connection settings' and an 'Info' link. It contains a 'Connection name' input field with 'githubwebapp1'. An 'App installation - optional' section allows searching for an app ID ('53746790') or installing a new app. A 'Tags - optional' section is also present. At the bottom right of the dialog is an orange 'Connect' button. A blue banner at the top of the page provides a note about connection changes starting July 1, 2024.

## Source

### Source provider

This is where you stored your input artifacts for your pipeline. Choose the provider and then provide the connection details.

GitHub (Version 2) ▾



#### New GitHub version 2 (app-based) action

To add a GitHub version 2 action in CodePipeline, you create a connection, which uses GitHub Apps to access your repository. Use the options below to choose an existing connection or create a new one. [Learn more](#)

### Connection

Choose an existing connection that you have already configured, or create a new one and then return to this task.

arn:aws:codeconnections:eu-north-1:011528263675:connection/3ff01730-e1... X or [Connect to GitHub](#)



#### Ready to connect

Your GitHub connection is ready for use.

## Default branch

Default branch will be used only when pipeline execution starts from a different source or manually started.

master X

## Output artifact format

Choose the output artifact format.

### CodePipeline default

AWS CodePipeline uses the default zip format for artifacts in the pipeline. Does not include Git metadata about the repository.

### Full clone

AWS CodePipeline passes metadata about the repository that allows subsequent actions to do a full Git clone. Only supported for AWS CodeBuild actions.

## Trigger

### Trigger type

Choose the trigger type that starts your pipeline.

#### No filter

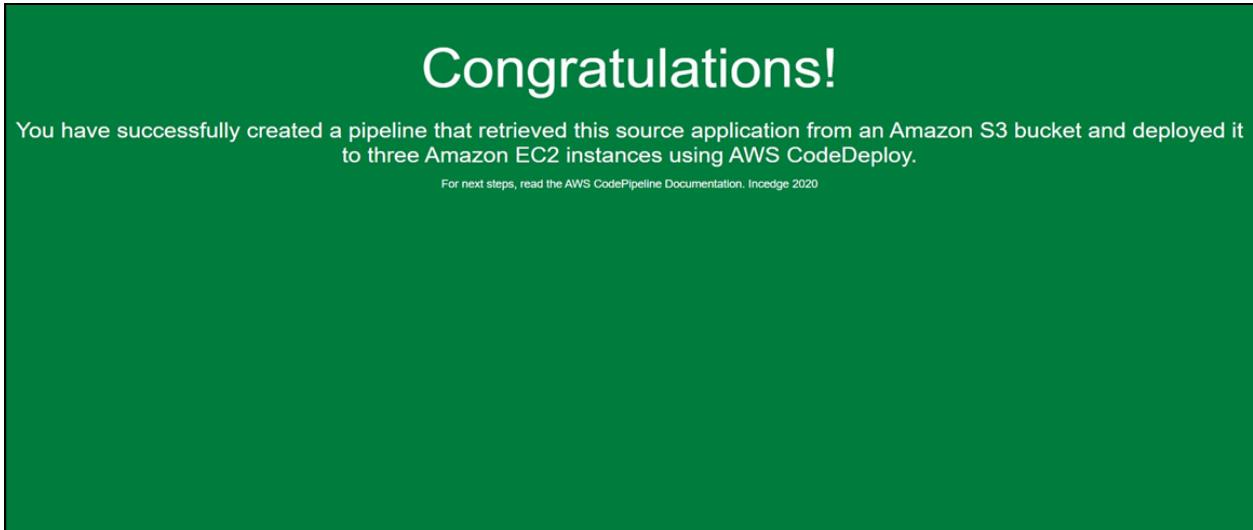
Starts your pipeline on any push and clones the HEAD.

#### Specify filter

Starts your pipeline on a specific filter and clones the exact commit. Pipeline type V2 is required.

#### Do not detect changes

Don't automatically trigger the pipeline.



Pipeline type: V2 Execution mode: QUEUED

**Source** Succeeded  
Pipeline execution ID: [9752de3e-526c-4b2b-b19a-41aa6526a5d8](#)

Source  
[GitHub \(Version 2\)](#)

Succeeded - 5 days ago  
[8fd5da54](#)

[View details](#)

[8fd5da54](#) Source: Update README.md

[Disable transition](#)

**Deploy** Succeeded  
Pipeline execution ID: [9752de3e-526c-4b2b-b19a-41aa6526a5d8](#)

Deploy  
[AWS Elastic Beanstalk](#)

Succeeded - 5 days ago  
[View details](#)

[Start rollback](#)

## Using S3 bucket-

## Create bucket Info

Buckets are containers for data stored in S3.

### General configuration

AWS Region  
Europe (Stockholm) eu-north-1

Bucket type Info

General purpose  
Recommended for most use cases and access patterns.  
General purpose buckets are the original S3 bucket type.  
They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

Directory - New  
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name Info  
Shreya\_bean

Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming Info

Copy settings from existing bucket - optional  
Only the bucket settings in the following configuration are copied.

Choose bucket

Format: s3://bucket/prefix

```
No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-41-61:/home/ubuntu# systemctl status apache2
● apache2.service - The Apache HTTP Server
    Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
    Active: active (running) since Sun 2024-08-18 12:30:09 UTC; 30s ago
      Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2442 (apache2)
     Tasks: 55 (limit: 1130)
    Memory: 5.4M (peak: 5.7M)
       CPU: 40ms
      CGroup: /system.slice/apache2.service
              └─2442 /usr/sbin/apache2 -k start
                  ├─2445 /usr/sbin/apache2 -k start
                  ├─2446 /usr/sbin/apache2 -k start

Aug 18 12:30:09 ip-172-31-41-61 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Aug 18 12:30:09 ip-172-31-41-61 systemd[1]: Started apache2.service - The Apache HTTP Server.
root@ip-172-31-41-61:/home/ubuntu# cd /var/www/html
root@ip-172-31-41-61:/var/www/html#
```

**Upload** Info

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose Add files or Add folder.

**Files and folders (1 Total, 315.0 B)**

All files and folders in this table will be uploaded.

<input type="checkbox"/>	Name	Folder	Type
<input type="checkbox"/>	index.html	-	text/html

**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**

## Edit Block public access (bucket settings) Info

### Block public access (bucket settings)

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to all your S3 buckets and objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to your buckets or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

#### **Block all public access**

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

#### **Block public access to buckets and objects granted through new access control lists (ACLs)**

S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.

#### **Block public access to buckets and objects granted through any access control lists (ACLs)**

S3 will ignore all ACLs that grant public access to buckets and objects.

#### **Block public access to buckets and objects granted through new public bucket or access point policies**

S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.

#### **Block public and cross-account access to buckets and objects through any public bucket or access point policies**

Turn off this setting if you want to allow public and cross-account access to buckets and objects.

## Object Ownership

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

#### **ACLs disabled (recommended)**

All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.

#### **ACLs enabled**

Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

**⚠️** We recommend disabling ACLs, unless you need to control access for each object individually or to have the object writer own the data they upload. Using a bucket policy instead of ACLs to share data with users outside of your account simplifies permissions management and auditing.



#### **Enabling ACLs turns off the bucket owner enforced setting for Object Ownership**

Once the bucket owner enforced setting is turned off, access control lists (ACLs) and their associated permissions are restored. Access to objects that you do not own will be based on ACLs and not the bucket policy.

I acknowledge that ACLs will be restored.

**Static website hosting**

Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting

Disable

Enable

Hosting type

Host a static website  
Use the bucket endpoint as the web address. [Learn more](#)

Redirect requests for an object  
Redirect requests to another bucket or domain. [Learn more](#)

**For your customers to access content at the website endpoint, you must make all your content publicly readable. To do so, you can edit the S3 Block Public Access settings for the bucket. For more information, see [Using Amazon S3 Block Public Access](#)**

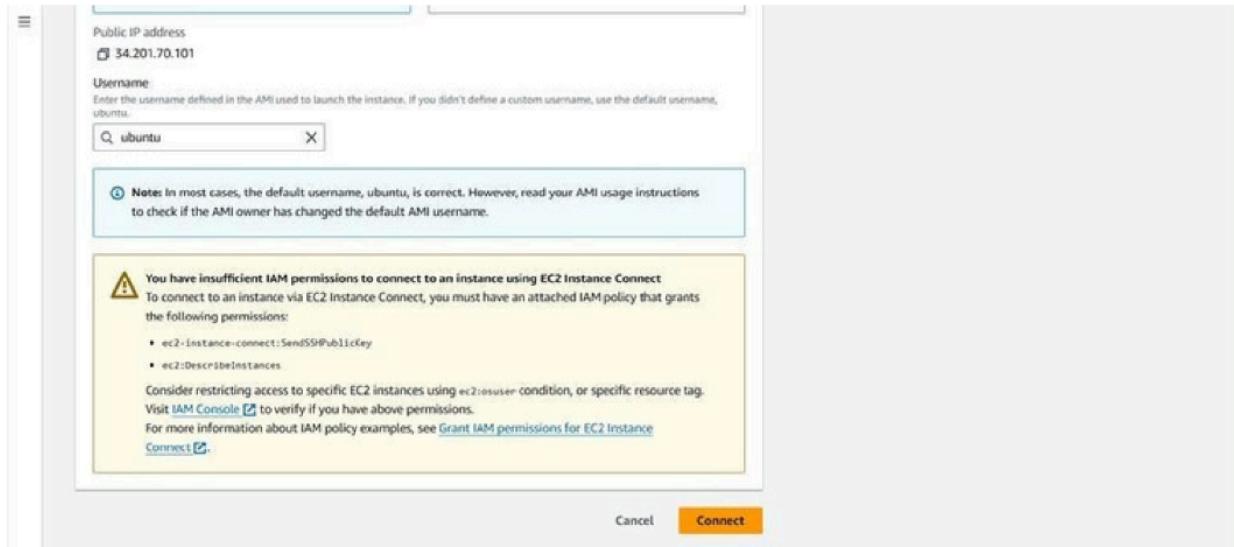
**Index document**  
Specify the home or default page of the website.

index.html

## Using EC2

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with links like AWS Console Home, EC2 Global View, Events, Console-to-Code, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images, AMIs, AMI Catalog, and Elastic Block Store. The Instances link is currently selected. The main content area has a header 'Instances (1/1) info'. Below it is a table with one row, showing details for an instance named 'dynamic-server'. The table columns include Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Put. The instance is listed as 'Running' with an 'ip-10ecbd8d07a55bd2e3' ID, t2.micro type, and 2/2 checks passed. It's located in the us-east-1c zone. Below the table, there's a detailed view for the 'dynamic-server' instance, showing its instance ID (i-0ecbd8d07a55bd2e3), public IPv4 address (34.201.70.101), private IP4 address (172.31.85.104), public IPv4 DNS (ec2-54-201-70-101.compute-1.amazonaws.com), and private IP4 DNS (ip-172-31-85-104.ec2.internal). It also shows its hostname type (IP name: ip-172-31-85-104.ec2.internal), answer private resource DNS name (IPv4 [A]), instance type (t2.micro), and elastic IP addresses (none).

# Shreya Sawant D15A 54



See "man sudo\_root" for details.

```
ubuntu@ip-172-31-41-61:~$ sudo su
root@ip-172-31-41-61:/home/ubuntu# sudo apt install
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@ip-172-31-41-61:/home/ubuntu# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [294 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [68.1 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [3768 B]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [250 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [108 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [8632 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [9412 B]
```

EC2 > Security Groups > sg-0e7811c687e701e30 - launch-wizard-7

### sg-0e7811c687e701e30 - launch-wizard-7

Actions ▾

Details			
Security group name <input type="checkbox"/> launch-wizard-7	Security group ID <input type="checkbox"/> sg-0e7811c687e701e30	Description <input type="checkbox"/> launch-wizard-7 created 2024-08-18T11:25:33.225Z	VPC ID <input type="checkbox"/> vpc-08963bc0f8afcd789 <input checked="" type="checkbox"/>
Owner <input type="checkbox"/> 608111999703	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules    Outbound rules    Tags

**Inbound rules (1)**

Manage tags

< 1 >

Security group name <input type="checkbox"/> launch-wizard-9	Security group ID <input type="checkbox"/> sg-0896d82a58154b33d	Description <input type="checkbox"/> launch-wizard-9 created 2024-08-18T12:21:13.480Z	VPC ID <input type="checkbox"/> vpc-08963bc0f8afcd789 <input checked="" type="checkbox"/>
Owner <input type="checkbox"/> 608111999703	Inbound rules count 3 Permission entries	Outbound rules count 1 Permission entry	

Inbound rules    **Outbound rules**    Tags

**Outbound rules (1)**

Manage tags

< 1 >

<input type="checkbox"/>	Name	Security group rule...	IP version	Type	Protocol
<input type="checkbox"/>	-	sgr-06dd7ee61f83e4e88	IPv4	All traffic	All



## 👕 Order Your Customized T-Shirt 🤪

### T-Shirt Details

Tagline on the Shirt:

Color:

Size:

Quantity:

Delivery Date:

### Delivery Details 🎁

Recipient's name:

Address:

## **EXPERIMENT. 3**

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

## Steps:

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

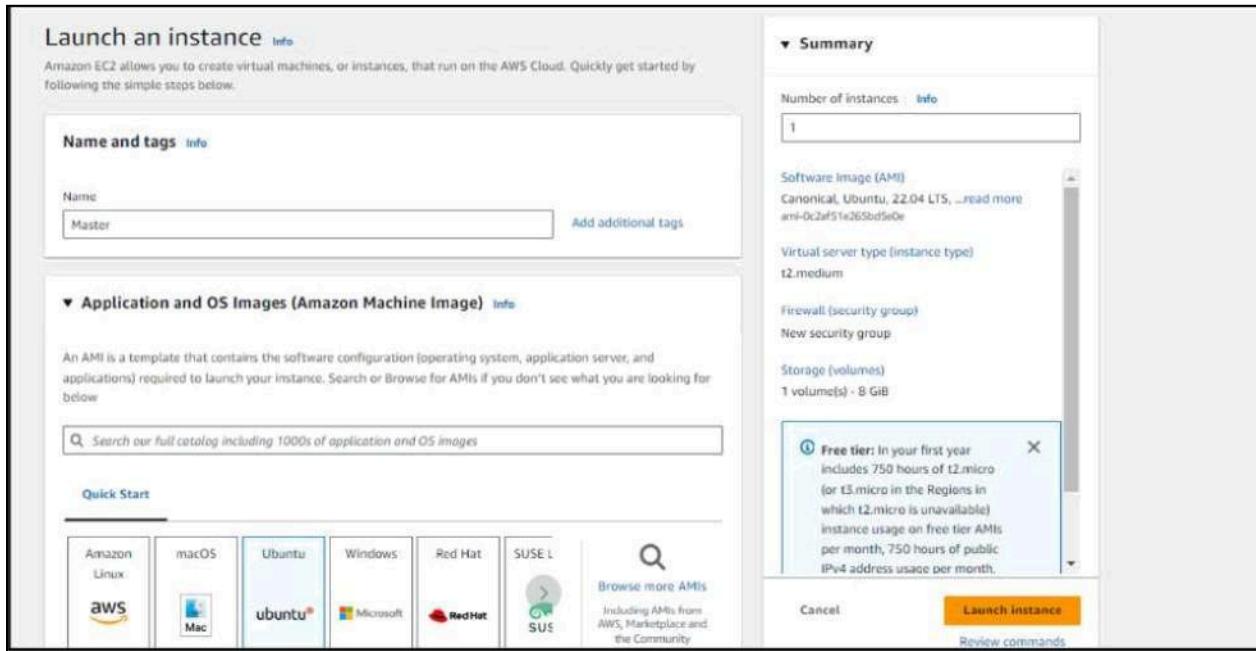
For Master-

Inbound rules						
Security group rule ID	Type	Protocol	Port range	Source	Description - optional	Info
sgr-014fb5b29b92aaab4	Custom TCP	TCP	10251	Custom	Q	0.0.0.0/0 X
sgr-085b5c3f14ccc25ac	Custom TCP	TCP	10250	Custom	Q	0.0.0.0/0 X
sgr-011b629de27fb1c2e	All traffic	All	All	Custom	Q	0.0.0.0/0 X
sgr-001148179bc96ae8e	HTTP	TCP	80	Custom	Q	0.0.0.0/0 X
sgr-014654979999b9348	Custom TCP	TCP	6443	Custom	Q	0.0.0.0/0 X
sgr-0c7eed48d9b9b7a42	All TCP	TCP	0 - 65535	Custom	Q	0.0.0.0/0 X
sgr-0c852ef6f959edebc4	Custom TCP	TCP	10252	Custom	Q	0.0.0.0/0 X
sgr-0c96f380dfa691778	SSH	TCP	22	Custom	Q	0.0.0.0/0 X

For Node-

Security group rule ID	Type	Protocol	Port range	Source	Description - optional	
	Info	Info	Info	Info	Info	
sgr-0be6b7289168883a8	Custom TCP	TCP	30000 - 32767	Custom	Q. 0.0.0.0/0 X	Delete
sgr-035e8c1dae522fa85	SSH	TCP	22	Custom	Q. 0.0.0.0/0 X	Delete
sgr-0b011ea3327732231	All TCP	TCP	0 - 65535	Custom	Q. 0.0.0.0/0 X	Delete
sgr-0087387292cceaa9d	All traffic	All	All	Custom	Q. 0.0.0.0/0 X	Delete
sgr-0a2a26d63b63c3bb1	Custom TCP	TCP	10250	Custom	Q. 0.0.0.0/0 X	Delete
sgr-0dc9223a90b1037d1	HTTP	TCP	80	Custom	Q. 0.0.0.0/0 X	Delete

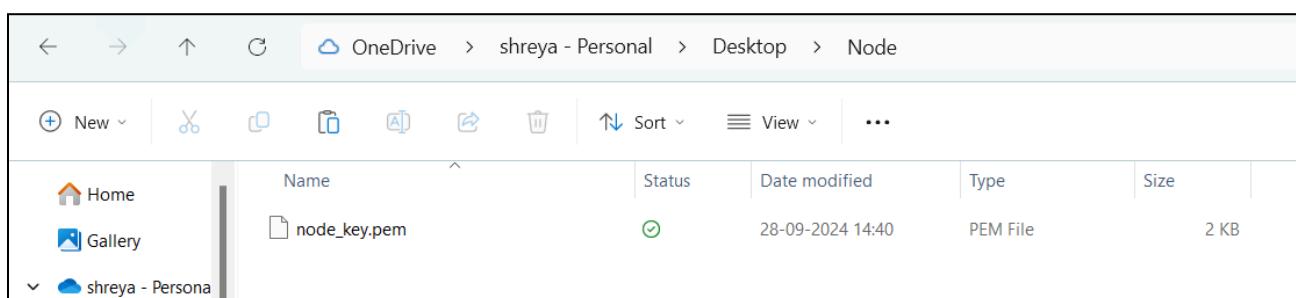
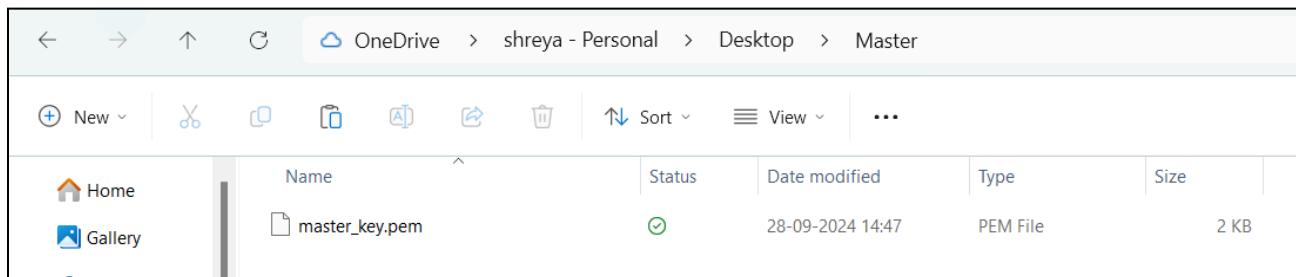
Step 2: Log in to your AWS Academy/personal account and launch 3 new Ec2 Instances(1 for Master and 2 for Node).Select Ubuntu as AMI and t2.medium as Instance Type and create a key of type RSA with .pem extension and move the downloaded key to the new folder.We can use 2 Different keys, 1 for Master and 1 for Node. Also Select Security Groups from the existing.



Instances (1/3)										
Last updated less than a minute ago   <a href="#">C</a>   Connect   Instance state ▾   Actions ▾   <a href="#">Launch instances</a>   ▾										
Find Instance by attribute or tag (case-sensitive)   All states ▾										
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP	
<input checked="" type="checkbox"/> Master	i-0ec7dd230f50ab0a	Shutting-d...	t2.medium	2/2 checks passed	<a href="#">View alarms</a> +	us-east-1d	ec2-54-208-43-77.com...	54.208.43.77	-	
<input type="checkbox"/> Node 1	i-075798e63572ba568	Running	t2.medium	2/2 checks passed	<a href="#">View alarms</a> +	us-east-1d	ec2-3-83-68-98.comput...	3.83.68.98	-	
<input type="checkbox"/> Node 2	i-0aa46c5d7a5a5eb6	Running	t2.medium	2/2 checks passed	<a href="#">View alarms</a> +	us-east-1d	ec2-3-87-184-248.com...	3.87.184.248	-	

Shreya Sawant D15A -54

Step 3: Connect the instance and navigate to SSH client and copy the example command. Now open the folder in the terminal 3 times for Master, Node1 where our .pem key is stored and paste the Example command from ssh client (starting with ssh -i ..... ) in the terminal.



[EC2](#) > [Instances](#) > [i-02d0bd51d43449e29](#) > [Connect to instance](#)

## Connect to instance Info

Connect to your instance i-02d0bd51d43449e29 (Master) using any of these options

[EC2 Instance Connect](#) | [Session Manager](#) | [SSH client](#) (selected) | [EC2 serial console](#)

Instance ID  
 [i-02d0bd51d43449e29 \(Master\)](#)

1. Open an SSH client.  
2. Locate your private key file. The key used to launch this instance is [kubernetes.pem](#)  
3. Run this command, if necessary, to ensure your key is not publicly viewable.  
 `chmod 400 "kubernetes.pem"`  
4. Connect to your instance using its Public DNS:  
 [ec2-54-164-13-87.compute-1.amazonaws.com](#)

Example:  
 `ssh -i "kubernetes.pem" ubuntu@ec2-54-164-13-87.compute-1.amazonaws.com`

Shreya Sawant D15A -54

```
C:\New volume\OneDrive\Desktop\Master>ssh -i "master_key.pem" ubuntu@ec2-3-8-174-4.compute-1.amazonaws.com
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1012-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Sat Sep 28 09:49:45 UTC 2024

System load: 0.0          Processes:           118
Usage of /:   25.9% of 6.71GB  Users logged in:    1
Memory usage: 6%          IPv4 address for enX0: 172.31.81.140
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

145 updates can be applied immediately.
41 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Sat Sep 28 09:42:41 2024 from 110.224.118.66
```

```
ubuntu@ip-172-31-81-140:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo tee /etc/apt/trusted.gpg.d/docker.gpg > /dev/null
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
Repository: 'deb [arch=amd64] https://download.docker.com/linux/ubuntu noble
stable'
Description:
Archive for codename: noble components: stable
More info: https://download.docker.com/linux/ubuntu
Adding repository.
Press [ENTER] to continue or Ctrl-c to cancel.
Adding deb entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-noble.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-noble.list
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
[126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
[126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 https://download.docker.com/linux/ubuntu noble InRelease [48.8 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Pa
ckages [15.0 MB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translat
ion-en [5982 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Co
mponents [3871 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-
n-f Metadata [301 kB]
```

## Shreya Sawant D15A -54

```
Get:38 https://download.docker.com/linux/ubuntu noble/stable amd64 Packages [15.3 kB]
Get:39 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [380 kB]
Get:40 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [82.9 kB]
Get:41 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Met
adata [4560 B]
Get:42 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packa
ges [272 kB]
Get:43 http://security.ubuntu.com/ubuntu noble-security/universe Translation
-en [115 kB]
Get:44 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Compo
nents [8632 B]
Get:45 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f
Metadata [10.3 kB]
Get:46 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Pac
kages [353 kB]
Get:47 http://security.ubuntu.com/ubuntu noble-security/restricted Translati
on-en [68.1 kB]
Get:48 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n
-f Metadata [428 B]
Get:49 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Pac
kages [10.9 kB]
Get:50 http://security.ubuntu.com/ubuntu noble-security/multiverse Translati
on-en [2808 B]
Get:51 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Com
ponents [208 B]
Get:52 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n
-f Metadata [344 B]
Fetched 29.1 MB in 4s (7408 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: The key(s)
) in the keyring /etc/apt/trusted.gpg.d/docker.gpg are ignored as the file h
as an unsupported filetype.
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is st
ored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATI
ON section in apt-key(8) for details.
```

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get update
sudo apt-get install -y docker-ce
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease

Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelea
se
Hit:4 https://download.docker.com/linux/ubuntu noble InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: The key(s)
) in the keyring /etc/apt/trusted.gpg.d/docker.gpg are ignored as the file h
as an unsupported filetype.
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is st
ored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATI
ON section in apt-key(8) for details.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  containerd.io docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0
  pigz slirp4netns
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite
The following NEW packages will be installed:
  containerd.io docker-buildx-plugin docker-ce docker-ce-cli docker-ce-rootl
ess-extras docker-compose-plugin libltdl7
  libslirp0 pigz slirp4netns
0 upgraded, 10 newly installed, 0 to remove and 143 not upgraded.
Need to get 123 MB of archives.
After this operation, 442 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 pi
gz amd64 2.8-1 [65.6 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libltd
l7 amd64 2.4.7-7build1 [40.3 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libsli
```

```
Preparing to unpack .../7-libltdl7_2.4.7-7build1_amd64.deb ...
Unpacking libltdl7:amd64 (2.4.7-7build1) ...
Selecting previously unselected package libslirp0:amd64.
Preparing to unpack .../8-libslirp0_4.7.0-1ubuntu3_amd64.deb ...
Unpacking libslirp0:amd64 (4.7.0-1ubuntu3) ...
Selecting previously unselected package slirp4netns.
Preparing to unpack .../9-slirp4netns_1.2.1-1build2_amd64.deb ...
Unpacking slirp4netns (1.2.1-1build2) ...
Setting up docker-buildx-plugin (0.17.1-1~ubuntu.24.04~noble) ...
Setting up containerd.io (1.7.22-1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /usr/lib/systemd/system/containerd.service.
Setting up docker-compose-plugin (2.29.7-1~ubuntu.24.04~noble) ...
Setting up libltdl7:amd64 (2.4.7-7build1) ...
Setting up docker-ce-cli (5:27.3.1-1~ubuntu.24.04~noble) ...
Setting up libslirp0:amd64 (4.7.0-1ubuntu3) ...
Setting up pigz (2.8-1) ...
Setting up docker-ce-rootless-extras (5:27.3.1-1~ubuntu.24.04~noble) ...
Setting up slirp4netns (1.2.1-1build2) ...
Setting up docker-ce (5:27.3.1-1~ubuntu.24.04~noble) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /usr/lib/systemd/system/docker.socket.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

```
ubuntu@ip-172-31-81-140:~$ sudo mkdir -p /etc/docker
cat <<EOF | sudo tee /etc/docker/daemon.json
{
  "exec-opts": ["native.cgroupdriver=systemd"]
}
EOF
{
  "exec-opts": ["native.cgroupdriver=systemd"]
}
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo systemctl enable docker
sudo systemctl daemon-reload
sudo systemctl restart docker
Synchronizing state of docker.service with SysV service script with /usr/lib
/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable docker
```

```
ubuntu@ip-172-31-81-140:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.3
1/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-k
eyring.gpg
echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg https://pk
gs.k8s.io/core:/stable:/v1.31/deb/ /' | sudo tee /etc/apt/sources.list.d/kub
ernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg https://pkgs.k8s
.io/core:/stable:/v1.31/deb/ /
```

## ERROR-

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get update
sudo apt-get install -y kubelet kubeadm kubectl
sudo apt-mark hold kubelet kubeadm kubectl
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list ([option] not assignment)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list ([option] not assignment)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list ([option] not assignment)
E: The list of sources could not be read.
```

To solve the error: Added sudo mkdir -p /etc/apt/keyrings in the previous command

```
ubuntu@ip-172-31-81-140:~$ sudo mkdir -p /etc/apt/keyrings
ubuntu@ip-172-31-81-140:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.3
1/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-k
eyring.gpg
File '/etc/apt/keyrings/kubernetes-apt-keyring.gpg' exists. Overwrite? (y/N)
y
ubuntu@ip-172-31-81-140:~$ echo 'deb [signed-by=/etc/apt/keyrings/kubernetes
-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.31/deb/ /' | sudo tee
/etc/apt/sources.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s
.io/core:/stable:/v1.31/deb/ /
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
[126 kB]
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu noble InRelease
Hit:6 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb InRelease [1186 B]
Get:7 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb Packages [4865 B]
Fetched 132 kB in 1s (240 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: The key(s)
) in the keyring /etc/apt/trusted.gpg.d/docker.gpg are ignored as the file h
as an unsupported filetype.
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is st
ored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATI
ON section in apt-key(8) for details.
```

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get install -y kubelet kubeadm kubectl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubectl kubelet kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 143 not upgraded.
Need to get 87.4 MB of archives.
After this operation, 314 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 conntr
ack amd64 1:1.4.8-1ubuntu1 [37.9 kB]
Get:2 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/s
table:/v1.31/deb cri-tools 1.31.1-1.1 [15.7 MB]
Get:3 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/s
table:/v1.31/deb kubeadm 1.31.1-1.1 [11.4 MB]
Get:4 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/s
table:/v1.31/deb kubectl 1.31.1-1.1 [11.2 MB]
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/s
table:/v1.31/deb kubernetes-cni 1.5.1-1.1 [33.9 MB]
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/s
table:/v1.31/deb kubelet 1.31.1-1.1 [15.2 MB]
Fetched 87.4 MB in 1s (90.5 MB/s)
Selecting previously unselected package conntrack.
(Reading database ... 68007 files and directories currently installed.)
Preparing to unpack .../0-conntrack_1%3a1.4.8-1ubuntu1_amd64.deb ...
Unpacking conntrack (1:1.4.8-1ubuntu1) ...
Selecting previously unselected package cri-tools.
Preparing to unpack .../1-cri-tools_1.31.1-1.1_amd64.deb ...
Unpacking cri-tools (1.31.1-1.1) ...
Selecting previously unselected package kubeadm.
Preparing to unpack .../2-kubeadm_1.31.1-1.1_amd64.deb ...
Unpacking kubeadm (1.31.1-1.1) ...
Selecting previously unselected package kubectl.
Preparing to unpack .../3-kubectl_1.31.1-1.1_amd64.deb ...
Unpacking kubectl (1.31.1-1.1) ...
Selecting previously unselected package kubernetes-cni.
```

Shreya Sawant D15A -54

```
Unpacking kubernetes-cni (1.5.1-1.1) ...
Selecting previously unselected package kubelet.
Preparing to unpack .../5-kubelet_1.31.1-1.1_amd64.deb ...
Unpacking kubelet (1.31.1-1.1) ...
Setting up conntrack (1:1.4.8-1ubuntu1) ...
Setting up kubectl (1.31.1-1.1) ...
Setting up cri-tools (1.31.1-1.1) ...
Setting up kubernetes-cni (1.5.1-1.1) ...
Setting up kubeadm (1.31.1-1.1) ...
Setting up kubelet (1.31.1-1.1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...
```

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

```
ubuntu@ip-172-31-81-140:~$ sudo apt-mark hold kubelet kubeadm kubectl
```

kubelet set on hold.

kubeadm set on hold.

kubectl set on hold.

```
ubuntu@ip-172-31-81-140:~$ sudo apt-mark hold kubelet kubeadm kubectl
```

kubelet was already set on hold.

kubeadm was already set on hold.

kubectl was already set on hold.

```
ubuntu@ip-172-31-81-140:~$ sudo systemctl enable --now kubelet
```

sudo apt-get install -y containerd

Reading package lists... Done

Building dependency tree... Done

Reading state information... Done

The following packages were automatically installed and are no longer required:  
ed:

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo mkdir -p /etc/containerd
sudo containerd config default | sudo tee /etc/containerd/config.toml
disabled_plugins = []
imports = []
oom_score = 0
plugin_dir = ""
required_plugins = []
root = "/var/lib/containerd"
state = "/run/containerd"
temp = ""
version = 2

[cgroup]
  path = ""

[debug]
  address = ""
  format = ""
  gid = 0
  level = ""
  uid = 0

[grpc]
  address = "/run/containerd/containerd.sock"
  gid = 0
  max_recv_message_size = 16777216
  max_send_message_size = 16777216
  tcp_address = ""
  tcp_tls_ca = ""
  tcp_tls_cert = ""
  tcp_tls_key = ""
  uid = 0

[metrics]
  address = ""
  grpc_histogram = false
```

```
ubuntu@ip-172-31-81-140:~$ sudo systemctl restart containerd
sudo systemctl enable containerd
sudo systemctl status containerd
● containerd.service - containerd container runtime
   Loaded: loaded (/usr/lib/systemd/system/containerd.service; enabled; pres
   Active: active (running) since Sat 2024-09-28 10:07:50 UTC; 258ms ago
     Docs: https://containerd.io
      Main PID: 4844 (containerd)
        Tasks: 8
       Memory: 13.8M (peak: 14.5M)
         CPU: 54ms
        CGroup: /system.slice/containerd.service
                  └─4844 /usr/bin/containerd

Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Starting containerd"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 containerd[4844]: time="2024-09-28T10:07:50+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 28 10:07:50 ip-172-31-81-140 systemd[1]: Started containerd.service - container runtime
lines 1-21/21 (END)... skipping...
● containerd.service - containerd container runtime
   Loaded: loaded (/usr/lib/systemd/system/containerd.service; enabled; pres
   Active: active (running) since Sat 2024-09-28 10:07:50 UTC; 258ms ago
     Docs: https://containerd.io
      Main PID: 4844 (containerd)
        Tasks: 8
       Memory: 13.8M (peak: 14.5M)
         CPU: 54ms
        CGroup: /system.slice/containerd.service
                  └─4844 /usr/bin/containerd
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get install -y socat
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0 pigz slirp4netns
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  socat
0 upgraded, 1 newly installed, 0 to remove and 143 not upgraded.
Need to get 374 kB of archives.
After this operation, 1649 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 socat
  amd64 1.8.0.0-4build3 [374 kB]
Fetched 374 kB in 0s (16.7 MB/s)
Selecting previously unselected package socat.
(Reading database ... 68108 files and directories currently installed.)
Preparing to unpack .../socat_1.8.0.0-4build3_amd64.deb ...
Unpacking socat (1.8.0.0-4build3) ...
Setting up socat (1.8.0.0-4build3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo kubeadm init --pod-network-cidr=10.244.0.0/16
[init] Using Kubernetes version: v1.31.0
[preflight] Running pre-flight checks
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your
internet connection
[preflight] You can also perform this action beforehand using 'kubeadm config images pull'
W0928 10:09:26.018351      5076 checks.go:846] detected that the sandbox image
"registry.k8s.io/pause:3.8" of the container runtime is inconsistent with t
hat used by kubeadm. It is recommended to use "registry.k8s.io/pause:3.10" as
the 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 [ip-172-31-81-140 kub
ernetes kubernetes.default kubernetes.default.svc kubernetes.default.svc.clu
ster.local] and IPs [10.96.0.1 172.31.81.140]
[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 [ip-172-31-81-140 l
ocalhost] and IPs [172.31.81.140 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [ip-172-31-81-140 loc
alhost] and IPs [172.31.81.140 127.0.0.1 ::1]
[certs] Generating "etcd/healthcheck-client" certificate and key
[certs] Generating "apiserver-etcd-client" certificate and key
[certs] Generating "sa" key and public key
[kubeconfig] Using kubeconfig folder "/etc/kubernetes"
[kubeconfig] Writing "admin.conf" kubeconfig file
[kubeconfig] Writing "super-admin.conf" kubeconfig file
[kubeconfig] Writing "kubelet.conf" kubeconfig file
[kubeconfig] Writing "controller-manager.conf" kubeconfig file
```

```
ubuntu@ip-172-31-81-140:~$ mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
cp: overwrite '/home/ubuntu/.kube/config'? y
ubuntu@ip-172-31-81-140:~$ kubectl get nodes
NAME           STATUS    ROLES     AGE   VERSION
ip-172-31-81-140  NotReady control-plane  32m   v1.31.1
ubuntu@ip-172-31-81-140:~$ kubectl get nodes
NAME           STATUS    ROLES     AGE   VERSION
ip-172-31-81-140  NotReady control-plane  33m   v1.31.1
ip-172-31-85-214  NotReady <none>       18s   v1.31.1
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo apt-get install -y kubelet kubeadm kubectl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubectl kubelet kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 143 not upgraded.
Need to get 87.4 MB of archives.
After this operation, 314 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 conntrack amd64 1:1.4.8-1ubuntu1 [37.9 kB]
Get:2 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb cri-tools 1.31.1-1.1 [15.7 MB]
Get:3 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubeadm 1.31.1-1.1 [11.4 MB]
Get:4 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubectl 1.31.1-1.1 [11.2 MB]
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubernetes-cni 1.5.1-1.1 [33.9 MB]
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubelet 1.31.1-1.1 [15.2 MB]
Fetched 87.4 MB in 1s (90.5 MB/s)
Selecting previously unselected package conntrack.
(Reading database ... 68007 files and directories currently installed.)
Preparing to unpack .../0-conntrack_1%3a1.4.8-1ubuntu1_amd64.deb ...
Unpacking conntrack (1:1.4.8-1ubuntu1) ...
Selecting previously unselected package cri-tools.
Preparing to unpack .../1-cri-tools_1.31.1-1.1_amd64.deb ...
Unpacking cri-tools (1.31.1-1.1) ...
Selecting previously unselected package kubeadm.
Preparing to unpack .../2-kubeadm_1.31.1-1.1_amd64.deb ...
Unpacking kubeadm (1.31.1-1.1) ...
Selecting previously unselected package kubectl.
Preparing to unpack .../3-kubectl_1.31.1-1.1_amd64.deb ...
```

```
ubuntu@ip-172-31-81-140:~$ sudo apt-mark hold kubelet kubeadm kubectl
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo systemctl enable --now kubelet
sudo apt-get install -y containerd
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0 pigz slirp4netns
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  runc
The following packages will be REMOVED:
  containerd.io docker-ce
The following NEW packages will be installed:
  containerd runc
0 upgraded, 2 newly installed, 2 to remove and 143 not upgraded.
Need to get 47.2 MB of archives.
After this operation, 53.1 MB disk space will be freed.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64
4 runc amd64 1.1.12-0ubuntu3.1 [8599 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64
4 containerd amd64 1.7.12-0ubuntu4.1 [38.6 MB]
Fetched 47.2 MB in 1s (81.9 MB/s)
(Reading database ... 68064 files and directories currently installed.)
Removing docker-ce (5:27.3.1-1~ubuntu.24.04~noble) ...
Removing containerd.io (1.7.22-1) ...
Selecting previously unselected package runc.
(Reading database ... 68044 files and directories currently installed.)
Preparing to unpack .../runc_1.1.12-0ubuntu3.1_amd64.deb ...
Unpacking runc (1.1.12-0ubuntu3.1) ...
Selecting previously unselected package containerd.
Preparing to unpack .../containerd_1.7.12-0ubuntu4.1_amd64.deb ...
Unpacking containerd (1.7.12-0ubuntu4.1) ...
Setting up runc (1.1.12-0ubuntu3.1) ...
Setting up containerd (1.7.12-0ubuntu4.1) ...
```

```
Selecting previously unselected package runc.
(Reading database ... 68044 files and directories currently installed.)
Preparing to unpack .../runc_1.1.12-0ubuntu3.1_amd64.deb ...
Unpacking runc (1.1.12-0ubuntu3.1) ...
Selecting previously unselected package containerd.
Preparing to unpack .../containerd_1.7.12-0ubuntu4.1_amd64.deb ...
Unpacking containerd (1.7.12-0ubuntu4.1) ...
Setting up runc (1.1.12-0ubuntu3.1) ...
Setting up containerd (1.7.12-0ubuntu4.1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ sudo mkdir -p /etc/containerd
sudo containerd config default | sudo tee /etc/containerd/config.toml
disabled_plugins = []
imports = []
oom_score = 0
plugin_dir = ""
required_plugins = []
root = "/var/lib/containerd"
state = "/run/containerd"
temp = ""
version = 2

[cgroup]
    path = ""

[debug]
    address = ""
    format = ""
    gid = 0
    level = ""
    uid = 0

[grpc]
    address = "/run/containerd/containerd.sock"
    gid = 0
    max_recv_message_size = 16777216
    max_send_message_size = 16777216
    tcp_address = ""
    tcp_tls_ca = ""
    tcp_tls_cert = ""
    tcp_tls_key = ""
    uid = 0

[metrics]
    address = ""
    grpc_histogram = false
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-81-140:~$ kubectl apply -f https://docs.projectcalico.org/m
anifests/calico.yaml
poddisruptionbudget.policy/calico-kube-controllers created
serviceaccount/calico-kube-controllers created
serviceaccount/calico-node created
configmap/calico-config created
customresourcedefinition.apiextensions.k8s.io/bgpconfigurations.crd.projectc
alico.org created
customresourcedefinition.apiextensions.k8s.io/bgppeers.crd.projectcalico.org
created
customresourcedefinition.apiextensions.k8s.io/blockaffinities.crd.projectcal
ico.org created
customresourcedefinition.apiextensions.k8s.io/caliconodestatuses.crd.project
calico.org created
customresourcedefinition.apiextensions.k8s.io/clusterinformations.crd.projec
tcalico.org created
customresourcedefinition.apiextensions.k8s.io/felixconfigurations.crd.projec
tcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworkpolicies.crd.proj
ectcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworksets.crd.projectc
alico.org created
customresourcedefinition.apiextensions.k8s.io/hostendpoints.crd.projectcalic
o.org created
customresourcedefinition.apiextensions.k8s.io/ipamblocks.crd.projectcalico.o
rg created
customresourcedefinition.apiextensions.k8s.io/ipamconfigs.crd.projectcalico.
org created
customresourcedefinition.apiextensions.k8s.io/ipamhandles.crd.projectcalico.
org created
customresourcedefinition.apiextensions.k8s.io/ippools.crd.projectcalico.org
```

```
ubuntu@ip-172-31-81-140:~$ kubectl get nodes -o wide
NAME           STATUS   ROLES      AGE    VERSION   INTERNAL-IP
EXTERNAL-IP   OS-IMAGE          KERNEL-VERSION   CONTAINER-RUNTIME
ip-172-31-81-140   Ready   control-plane   35m    v1.31.1   172.31.81.140
<none>        Ubuntu 24.04 LTS  6.8.0-1012-aws  containerd://1.7.12
ubuntu@ip-172-31-81-140:~$ kubectl get nodes -o wide
NAME           STATUS   ROLES      AGE    VERSION   INTERNAL-IP
EXTERNAL-IP   OS-IMAGE          KERNEL-VERSION   CONTAINER-RUNTIME
ip-172-31-81-140   Ready   control-plane   36m    v1.31.1   172.31.81.140
<none>        Ubuntu 24.04 LTS  6.8.0-1012-aws  containerd://1.7.12
ip-172-31-85-214   Ready   <none>     3m15s   v1.31.1   172.31.85.214
<none>        Ubuntu 24.04 LTS  6.8.0-1012-aws  containerd://1.7.12
ubuntu@ip-172-31-81-140:~$ 1:kubectl label node ip-172-31-28-117 kubernetes.
io/role=Node1
1:kubectl: command not found
ubuntu@ip-172-31-81-140:~$ kubectl label node ip-172-31-85-214 kubernetes.io
/role=Node1
node/ip-172-31-85-214 labeled
ubuntu@ip-172-31-81-140:~$ kubectl get nodes
NAME           STATUS   ROLES      AGE    VERSION
ip-172-31-81-140   Ready   control-plane   38m    v1.31.1
ip-172-31-85-214   Ready   Node1      5m9s   v1.31.1
```

Shreya Sawant D15A -54

Shreya Sawant D15A -54

## EXPERIMENT.4

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

Step.1 Create new instance .

The screenshot shows the 'Launch an instance' wizard in the AWS Management Console. The top navigation bar shows 'EC2 > Instances > Launch an instance'. The main title is 'Launch an instance' with an 'Info' link. A descriptive text below says: 'Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.' The first step, 'Name and tags', is selected. It contains a 'Name' field with the value 'Ex.4' and a link 'Add additional tags'. The second step, 'Application and OS Images (Amazon Machine Image)', is collapsed, showing a search bar with placeholder text 'Search our full catalog including 1000s of application and OS images'.

▼ Application and OS Images (Amazon Machine Image) [Info](#)

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    Wind

aws    Mac    ubuntu®    Mic

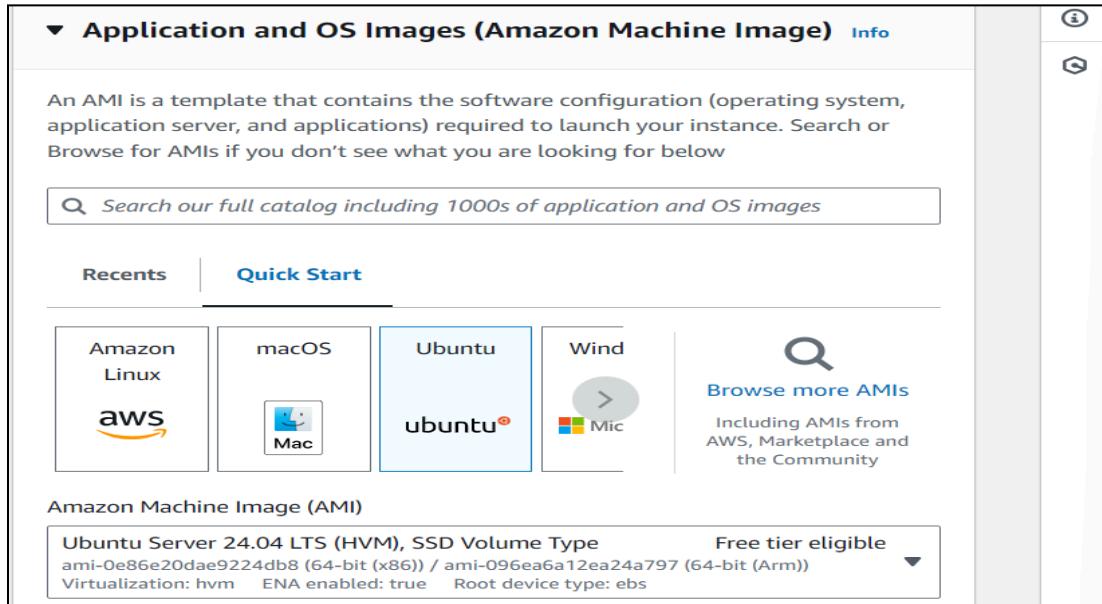
Browse more AMIs  
Including AMIs from AWS, Marketplace and the Community

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



Create a key pair.

▼ 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*

ex.4\_key [Create new key pair](#)

▼ Network settings [Info](#)

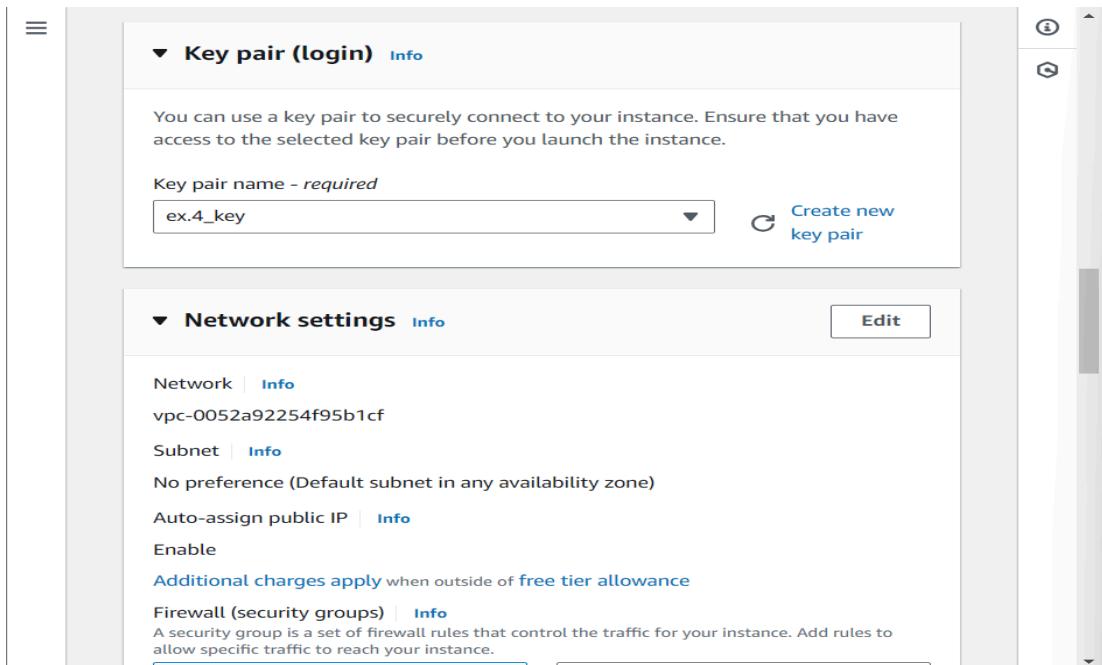
Network | [Info](#)  
vpc-0052a92254f95b1cf

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.



Click on connect and check ssh link.

**Instance summary for i-0b055a4b6971f650f (Ex.4) [Info](#)**

Updated less than a minute ago

Instance ID <a href="#">i-0b055a4b6971f650f (Ex.4)</a>	Public IPv4 address <a href="#">3.88.203.119   open address</a>	Private IPv4 addresses <a href="#">172.31.91.201</a>
IPv6 address -	Instance state <span style="color: green;">Running</span>	Public IPv4 DNS <a href="#">ec2-3-88-203-119.compute-1.amazonaws.com   open address</a>
Hostname type IP name: ip-172-31-91-201.ec2.internal	Private IP DNS name (IPv4 only) <a href="#">ip-172-31-91-201.ec2.internal</a>	Elastic IP addresses -
Answer private resource DNS name IPv4 (A)	Instance type t2.medium	AWS Compute Optimizer finding <a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a> <a href="#">Learn more</a>
Auto-assigned IP address <a href="#">3.88.203.119 [Public IP]</a>	VPC ID <a href="#">vpc-0052a92254f95b1cf</a>	Auto Scaling Group name -
IAM Role -	Subnet ID <a href="#">subnet-0c3aa1e8d31879c70</a>	
IMDSv2 Required	Instance ARN <a href="#">arn:aws:ec2:us-east-1:010928179348:instance/i-0b055a4b6971f650f</a>	

**EC2 > Instances > i-0b055a4b6971f650f > Connect to instance**

**Connect to instance [Info](#)**

Connect to your instance i-0b055a4b6971f650f (Ex.4) using any of these options

**EC2 Instance Connect**   **Session Manager**   **SSH client**   **EC2 serial console**

Instance ID  
[i-0b055a4b6971f650f \(Ex.4\)](#)

1. Open an SSH client.  
 2. Locate your private key file. The key used to launch this instance is ex.4\_key.pem  
 3. Run this command, if necessary, to ensure your key is not publicly viewable.  
`chmod 400 "ex.4\_key.pem"`  
 4. Connect to your instance using its Public DNS:  
`ec2-3-88-203-119.compute-1.amazonaws.com`

**Command copied**

`ssh -i "ex.4\_key.pem" ubuntu@ec2-3-88-203-119.compute-1.amazonaws.com`

**Note:** In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

Shreya Sawant D15A -54

```
C:\New volume\OneDrive\Desktop\Experiment.4>ssh -i "ex.4_key.pem" ubuntu@ec2-3-88-203-119.compute-1.amazonaws.com
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1012-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Sat Sep 28 11:11:29 UTC 2024

System load: 0.0          Processes:           114
Usage of /:   22.8% of 6.71GB  Users logged in:    0
Memory usage: 5%          IPv4 address for enX0: 172.31.91.201
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sat Sep 28 11:11:30 2024 from 110.224.118.66
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

```
ubuntu@ip-172-31-91-201:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo tee
/etc/apt/trusted.gpg.d/docker.gpg > /dev/null
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/
ubuntu
$(lsb_release -cs) stable"
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
-----BEGIN PGP PUBLIC KEY BLOCK-----
```

```
Get:46 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [353 kB]
Get:47 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [68.1 kB]
Get:48 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Meta
data [428 B]
Get:49 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [10.9 kB]
Get:50 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2808 B]
Get:51 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components
[208 B]
Get:52 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Meta
data [344 B]
Fetched 29.1 MB in 4s (7762 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is stored in
 legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in
 apt-key(8) for details.
```

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get update
sudo apt-get install -y docker-ce
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu noble InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is stored in
 legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in
 apt-key(8) for details.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  containerd.io docker-buildx-plugin docker-ce-cli
  docker-ce-rootless-extras docker-compose-plugin libltdl7 libslirp0 pigz
  slirp4netns
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite
The following NEW packages will be installed:
  containerd.io docker-buildx-plugin docker-ce docker-ce-cli
  docker-ce-rootless-extras docker-compose-plugin libltdl7 libslirp0 pigz
  slirp4netns
0 upgraded, 10 newly installed, 0 to remove and 143 not upgraded.
Need to get 123 MB of archives.
After this operation, 442 MB of additional disk space will be used.
```

Shreya Sawant D15A -54

```
Setting up docker-compose-plugin (2.29.7-1~ubuntu.24.04~noble) ...
Setting up libltdl7:amd64 (2.4.7-7build1) ...
Setting up docker-ce-cli (5:27.3.1-1~ubuntu.24.04~noble) ...
Setting up libslirp0:amd64 (4.7.0-1ubuntu3) ...
Setting up pigz (2.8-1) ...
Setting up docker-ce-rootless-extras (5:27.3.1-1~ubuntu.24.04~noble) ...
Setting up slirp4netns (1.2.1-1build2) ...
Setting up docker-ce (5:27.3.1-1~ubuntu.24.04~noble) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /usr/lib/systemd/system/docker.socket.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

```
ubuntu@ip-172-31-91-201:~$ sudo mkdir -p /etc/docker
cat <<EOF | sudo tee /etc/docker/daemon.json
{
  "exec-opts": ["native.cgroupdriver=systemd"]
}
EOF
{
  "exec-opts": ["native.cgroupdriver=systemd"]
}
```

```
ubuntu@ip-172-31-91-201:~$ sudo systemctl enable docker
sudo systemctl daemon-reload
sudo systemctl restart docker
Synchronizing state of docker.service with SysV service script with /usr/lib/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable docker
```

### Error-

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get update
sudo apt-get install -y kubelet kubeadm kubectl
sudo apt-mark hold kubelet kubeadm kubectl
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (URI)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (URI)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (URI)
E: The list of sources could not be read.
```

```
ubuntu@ip-172-31-91-201:~$ sudo mkdir -p /etc/apt/keyrings
ubuntu@ip-172-31-91-201:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.31/deb/R
elease.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
File '/etc/apt/keyrings/kubernetes-apt-keyring.gpg' exists. Overwrite? (y/N) y
ubuntu@ip-172-31-91-201:~$ echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-ke
yring.gpg] https://pkgs.k8s.io/core:/stable:/v1.31/deb/' | sudo tee /etc/apt/sour
ces.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/co
re:/stable:/v1.31/deb/ /
```

### Error solved-

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InReleaseHit:3 h
ttp://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu noble InRelease
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb InRelease [1186 B]
Hit:6 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:7 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb Packages [4865 B]
Fetched 6051 B in 1s (10.8 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/noble/InRelease: Key is stored in
 legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in
 apt-key(8) for details.
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get install -y kubelet kubeadm kubectl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubelet kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 143 not upgraded.
Need to get 87.4 MB of archives.
After this operation, 314 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 conntrack amd64 1:1.4.8-1ubuntu1 [37.9 kB]
Get:2 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb cri-tools 1.31.1-1.1 [15.7 MB]
Get:3 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubeadm 1.31.1-1.1 [11.4 MB]
Get:4 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubectl 1.31.1-1.1 [11.2 MB]
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubernetes-cni 1.5.1-1.1 [33.9 MB]
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.31/deb kubelet 1.31.1-1.1 [15.2 MB]
Fetched 87.4 MB in 1s (67.9 MB/s)
Selecting previously unselected package conntrack.
(Reading database ... 68007 files and directories currently installed.)
Preparing to unpack .../0-conntrack_1%3a1.4.8-1ubuntu1_amd64.deb ...
Unpacking conntrack (1:1.4.8-1ubuntu1) ...
Selecting previously unselected package cri-tools.
Preparing to unpack .../1-cri-tools_1.31.1-1.1_amd64.deb ...
Unpacking cri-tools (1.31.1-1.1) ...
Selecting previously unselected package kubeadm.
Preparing to unpack .../2-kubeadm_1.31.1-1.1_amd64.deb ...
Unpacking kubeadm (1.31.1-1.1) ...
Selecting previously unselected package kubectl.
Preparing to unpack .../3-kubectl_1.31.1-1.1_amd64.deb ...
Unpacking kubectl (1.31.1-1.1) ...
Selecting previously unselected package kubernetes-cni.
Preparing to unpack .../4-kubernetes-cni_1.5.1-1.1_amd64.deb ...
```

```
ubuntu@ip-172-31-91-201:~$ sudo apt-mark hold kubelet kubeadm kubectl
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
```

```
ubuntu@ip-172-31-91-201:~$ sudo systemctl enable --now kubelet
sudo kubeadm init --pod-network-cidr=10.244.0.0/16
[init] Using Kubernetes version: v1.31.0
[preflight] Running pre-flight checks
W0928 11:20:30.419305    4275 checks.go:1080] [preflight] WARNING: Couldn't create
the interface used for talking to the container runtime: failed to create new CRI r
untime service: validate service connection: validate CRI v1 runtime API for endpoint "unix:///var/run/containerd/containerd.sock": rpc error: code = Unimplemented de
sc = unknown service runtime.v1.RuntimeService
    [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 interne
t connection
[preflight] You can also perform this action beforehand using 'kubeadm config image
s pull'
error execution phase preflight: [preflight] Some fatal errors occurred:
failed to create new CRI runtime service: validate service connection: validate CRI
v1 runtime API for endpoint "unix:///var/run/containerd/containerd.sock": rpc erro
r: code = Unimplemented desc = unknown service runtime.v1.RuntimeService[preflight]
If you know what you are doing, you can make a check non-fatal with '--ignore-pref
light-errors='...
To see the stack trace of this error execute with --v=5 or higher
```

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get install -y containerd
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0 pigz slirp4netns
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  runc
The following packages will be REMOVED:
  containerd.io docker-ce
The following NEW packages will be installed:
  containerd runc
0 upgraded, 2 newly installed, 2 to remove and 143 not upgraded.
Need to get 47.2 MB of archives.
After this operation, 53.1 MB disk space will be freed.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 runc
amd64 1.1.12-0ubuntu3.1 [8599 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 conta
inerd amd64 1.7.12-0ubuntu4.1 [38.6 MB]
Fetched 47.2 MB in 1s (52.3 MB/s)
(Reading database ... 68064 files and directories currently installed.)
Removing docker-ce (5:27.3.1-1~ubuntu.24.04~noble) ...
Removing containerd.io (1.7.22-1) ...
Selecting previously unselected package runc.
(Reading database ... 68044 files and directories currently installed.)
Preparing to unpack .../runc_1.1.12-0ubuntu3.1_amd64.deb ...
Unpacking runc (1.1.12-0ubuntu3.1) ...
Selecting previously unselected package containerd.
Preparing to unpack .../containerd_1.7.12-0ubuntu4.1_amd64.deb ...
```

```
ubuntu@ip-172-31-91-201:~$ sudo mkdir -p /etc/containerd
sudo containerd config default | sudo tee /etc/containerd/config.toml
disabled_plugins = []
imports = []
oom_score = 0
plugin_dir = ""
required_plugins = []
root = "/var/lib/containerd"
state = "/run/containerd"
temp = ""
version = 2

[cgroup]
  path = ""

[debug]
  address = ""
  format = ""
  gid = 0
  level = ""
  uid = 0

[grpc]
  address = "/run/containerd/containerd.sock"
  gid = 0
  max_recv_message_size = 16777216
  max_send_message_size = 16777216
  tcp_address = ""
  tcp_tls_ca = ""
  tcp_tls_cert = ""
  tcp_tls_key = ""
  uid = 0

[metrics]
  address = ""
  grpc_histogram = false

[plugins]
  [plugins."io.containerd.gc.v1.scheduler"]
    deletion_threshold = 0
```

```
[proxy_plugins]

[stream_processors]

[stream_processors."io.containerd.ocicrypt.decoder.v1.tar"]
    accepts = ["application/vnd.oci.image.layer.v1.tar+encrypted"]
    args = ["--decryption-keys-path", "/etc/containerd/ocicrypt/keys"]
    env = ["OCICRYPT_KEYPROVIDER_CONFIG=/etc/containerd/ocicrypt/ocicrypt_keyprovider.conf"]
    path = "ctd-decoder"
    returns = "application/vnd.oci.image.layer.v1.tar"

[stream_processors."io.containerd.ocicrypt.decoder.v1.tar.gzip"]
    accepts = ["application/vnd.oci.image.layer.v1.tar+gzip+encrypted"]
    args = ["--decryption-keys-path", "/etc/containerd/ocicrypt/keys"]
    env = ["OCICRYPT_KEYPROVIDER_CONFIG=/etc/containerd/ocicrypt/ocicrypt_keyprovider.conf"]
    path = "ctd-decoder"
    returns = "application/vnd.oci.image.layer.v1.tar+gzip"

[timeouts]
    "io.containerd.timeout.bolt.open" = "0s"
    "io.containerd.timeout.metrics.shimstats" = "2s"
    "io.containerd.timeout.shim.cleanup" = "5s"
    "io.containerd.timeout.shim.load" = "5s"
    "io.containerd.timeout.shim.shutdown" = "3s"
    "io.containerd.timeout.task.state" = "2s"

[ttrpc]
    address = ""
    gid = 0
    uid = 0
```

```
ubuntu@ip-172-31-91-201:~$ sudo systemctl restart containerd
sudo systemctl enable containerd
sudo systemctl status containerd
● containerd.service - containerd container runtime
   Loaded: loaded (/usr/lib/systemd/system/containerd.service; enabled; pre>
   Active: active (running) since Sat 2024-09-28 11:21:39 UTC; 212ms ago
     Docs: https://containerd.io
   Main PID: 4648 (containerd)
      Tasks: 7
     Memory: 13.5M (peak: 14.0M)
        CPU: 52ms
      CGroup: /system.slice/containerd.service
              └─4648 /usr/bin/containerd
```

```
ubuntu@ip-172-31-91-201:~$ sudo apt-get install -y socat
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0 pigz slirp4netns
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  socat
0 upgraded, 1 newly installed, 0 to remove and 143 not upgraded.
Need to get 374 kB of archives.
After this operation, 1649 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 socat amd64 1
.8.0.0-4build3 [374 kB]
Fetched 374 kB in 0s (15.8 MB/s)
Selecting previously unselected package socat.
(Reading database ... 68108 files and directories currently installed.)
Preparing to unpack .../socat_1.8.0.0-4build3_amd64.deb ...
Unpacking socat (1.8.0.0-4build3) ...
Setting up socat (1.8.0.0-4build3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

```
ubuntu@ip-172-31-91-201:~$ sudo kubeadm init --pod-network-cidr=10.244.0.0/1
[init] Using Kubernetes version: v1.31.0
[preflight] Running pre-flight checks
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your
t connection
[preflight] You can also perform this action beforehand using 'kubeadm config
s pull'
W0928 11:23:04.952425      4870 checks.go:846] detected that the sandbox image
try.k8s.io/pause:3.8" of the container runtime is inconsistent with that used
by kubeadm. It is recommended to use "registry.k8s.io/pause:3.10" as the CRI sandb
e.
[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 [ip-172-31-91-201 kube
kubernetes.default kubernetes.default.svc kubernetes.default.svc.cluster.lo
d IPs [10.96.0.1 172.31.91.201]]
[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 [ip-172-31-91-201 l
t] and IPs [172.31.91.201 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [ip-172-31-91-201 loc
and IPs [172.31.91.201 127.0.0.1 ::1]
[certs] Generating "etcd/healthcheck-client" certificate and key
[certs] Generating "apiserver-etcd-client" certificate and key
[certs] Generating "sa" key and public key
[kubeconfig] Using kubeconfig folder "/etc/kubernetes"
[kubeconfig] Writing "admin.conf" kubeconfig file
[kubeconfig] Writing "super-admin.conf" kubeconfig file
[kubeconfig] Writing "kubelet.conf" kubeconfig file
[kubeconfig] Writing "controller-manager.conf" kubeconfig file
[kubeconfig] Writing "scheduler.conf" kubeconfig file
[etcd] Creating static Pod manifest for local etcd in "/etc/kubernetes/manif
[control-plane] Using manifest folder "/etc/kubernetes/manifests"
```

Your Kubernetes control-plane has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

Alternatively, if you are the root user, you can run:

```
export KUBECONFIG=/etc/kubernetes/admin.conf
```

You should now deploy a pod network to the cluster.

Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:  
<https://kubernetes.io/docs/concepts/cluster-administration/addons/>

Then you can join any number of worker nodes by running the following on each as root:

```
kubeadm join 172.31.91.201:6443 --token q3om2a.eyg0y6uqtn8u8ewg \
--discovery-token-ca-cert-hash sha256:ae556afaf3b327562e2bcd9b397d521fc452d
a0e26fa1655cf037bad462973e7
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-91-201:~$ mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

```
ubuntu@ip-172-31-91-201:~$ kubectl apply -f "https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml"
namespace/kube-flannel created
clusterrole.rbac.authorization.k8s.io/flannel created
clusterrolebinding.rbac.authorization.k8s.io/flannel created
serviceaccount/flannel created
configmap/kube-flannel-cfg created
daemonset.apps/kube-flannel-ds created
```

```
ubuntu@ip-172-31-91-201:~$ kubectl apply -f https://k8s.io/examples/application/deployment.yaml
deployment.apps/nginx-deployment created
ubuntu@ip-172-31-91-201:~$ kubectl get pods
NAME                  READY   STATUS    RESTARTS   AGE
nginx-deployment-d556bf558-q8gt7   0/1     Pending   0          9s
nginx-deployment-d556bf558-z9f8d   0/1     Pending   0          9s
ubuntu@ip-172-31-91-201:~$ POD_NAME=$(kubectl get pods -l app=nginx -o jsonpath=".items[0].metadata.name")
kubectl port-forward $POD_NAME 8080:80
error: unable to forward port because pod is not running. Current status=Pending
```

Shreya Sawant D15A -54

```
ubuntu@ip-172-31-91-201:~$ kubectl describe pod nginx-deployment-d556bf558-q8gt7
Name:           nginx-deployment-d556bf558-q8gt7
Namespace:      default
Priority:       0
Service Account: default
Node:           <none>
Labels:          app=nginx
                  pod-template-hash=d556bf558
Annotations:    <none>
Status:         Pending
IP:
IPs:
Controlled By: ReplicaSet/nginx-deployment-d556bf558
Containers:
  nginx:
    Image:      nginx:1.14.2
    Port:        80/TCP
    Host Port:   0/TCP
    Environment: <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-px64b (ro)

Conditions:
  Type        Status
  PodScheduled  False
Volumes:
  kube-api-access-px64b:
    Type:             Projected (a volume that contains injected data from m
                      ultiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:      kube-root-ca.crt
    ConfigMapOptional:  <nil>
    DownwardAPI:        true
    QoS Class:          BestEffort
```

```
ubuntu@ip-172-31-91-201:~$ kubectl taint nodes ip-172-31-91-201 node-role.kubernetes.io/control-plane:NoSchedule-
node/ip-172-31-91-201 untainted
ubuntu@ip-172-31-91-201:~$ kubectl get nodes
NAME           STATUS   ROLES      AGE   VERSION
ip-172-31-91-201   Ready    control-plane   40m   v1.31.1
ubuntu@ip-172-31-91-201:~$ kubectl get pods
NAME                 READY   STATUS    RESTARTS   AGE
nginx-deployment-d556bf558-q8gt7   1/1     Running   0          35m
nginx-deployment-d556bf558-z9f8d   1/1     Running   0          35m
```

```
ubuntu@ip-172-31-91-201:~$ POD_NAME=$(kubectl get pods -l app=nginx -o jsonpath=".items[0].metadata.name")
kubectl port-forward $POD_NAME 8081:80
Forwarding from 127.0.0.1:8081 -> 80
Forwarding from [::1]:8081 -> 80
Handling connection for 8081
```

Shreya Sawant D15A -54

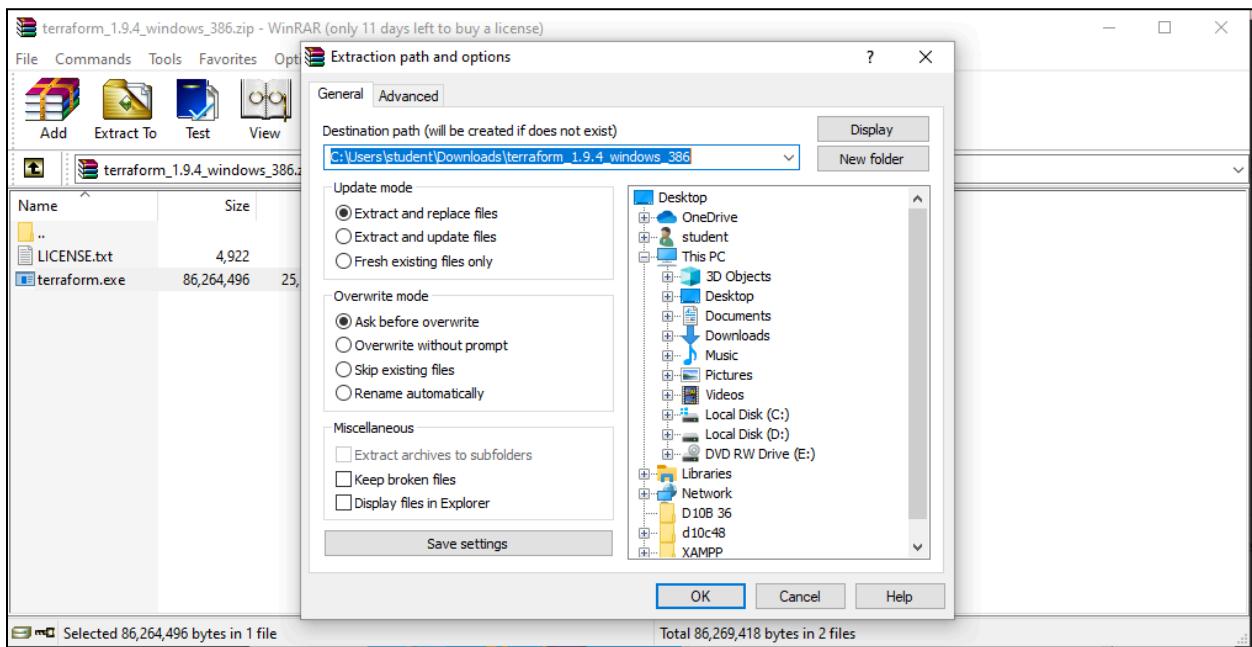
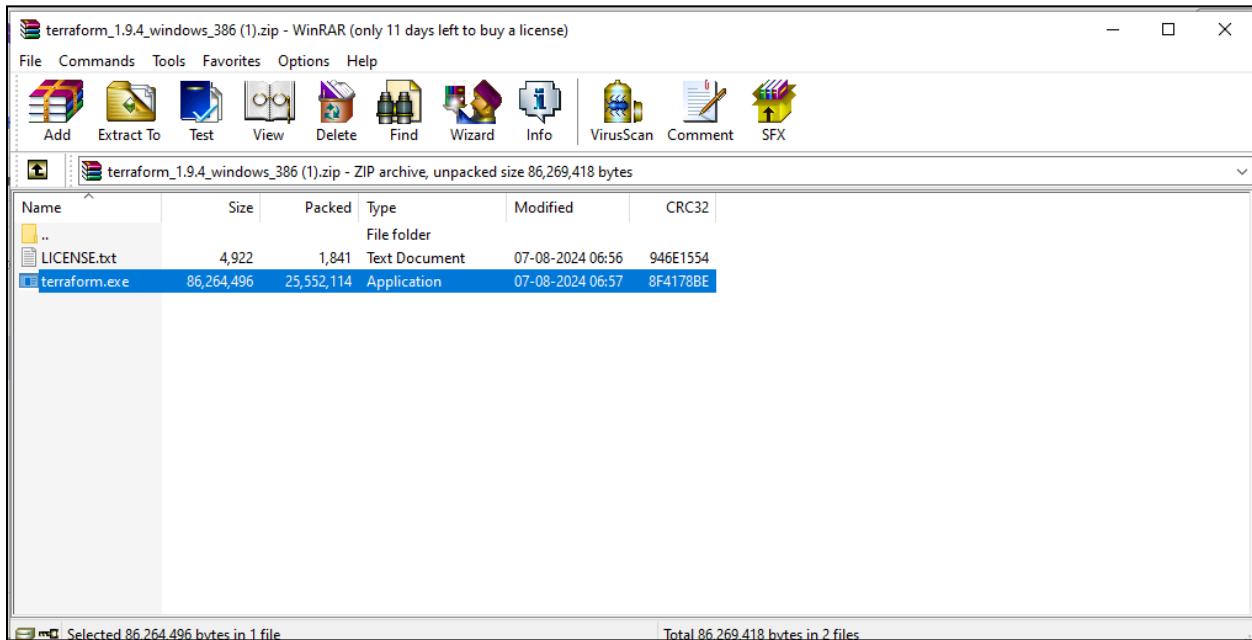
```
ubuntu@ip-172-31-91-201:~$ curl --head http://127.0.0.1:8081
HTTP/1.1 200 OK
Server: nginx/1.14.2
Date: Sat, 28 Sep 2024 12:06:03 GMT
Content-Type: text/html
Content-Length: 612
Last-Modified: Tue, 04 Dec 2018 14:44:49 GMT
Connection: keep-alive
ETag: "5c0692e1-264"
Accept-Ranges: bytes
```

Shreya Sawant

D15A -54

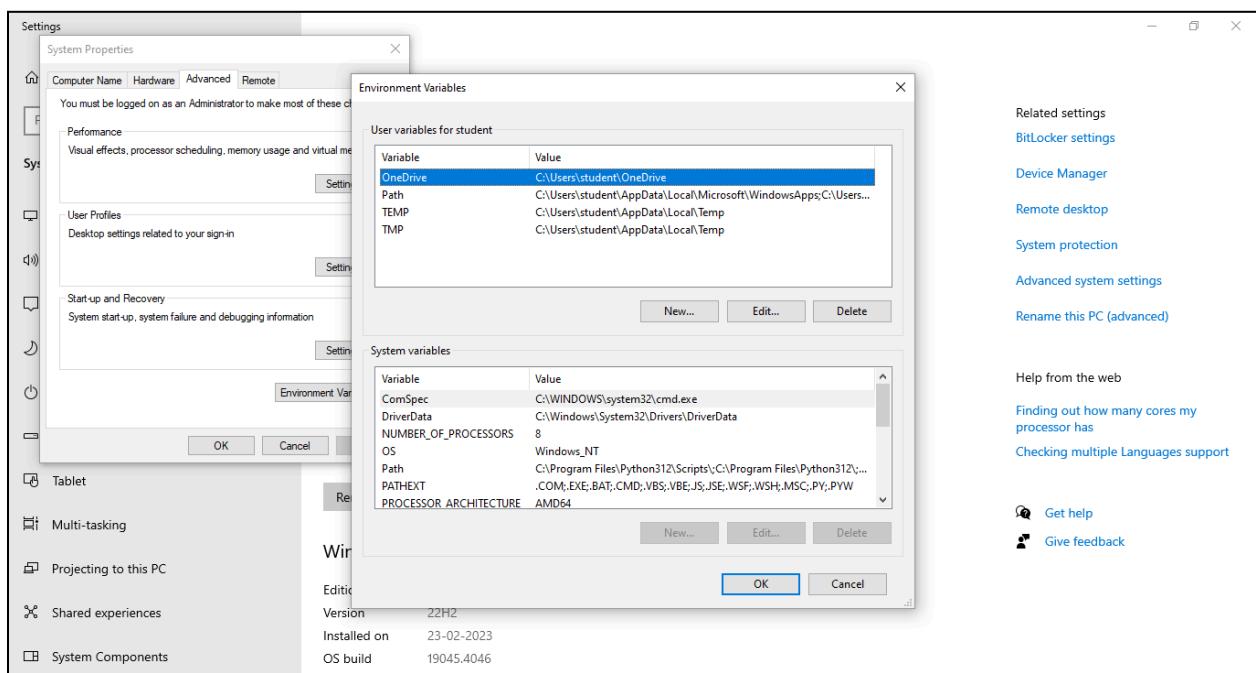
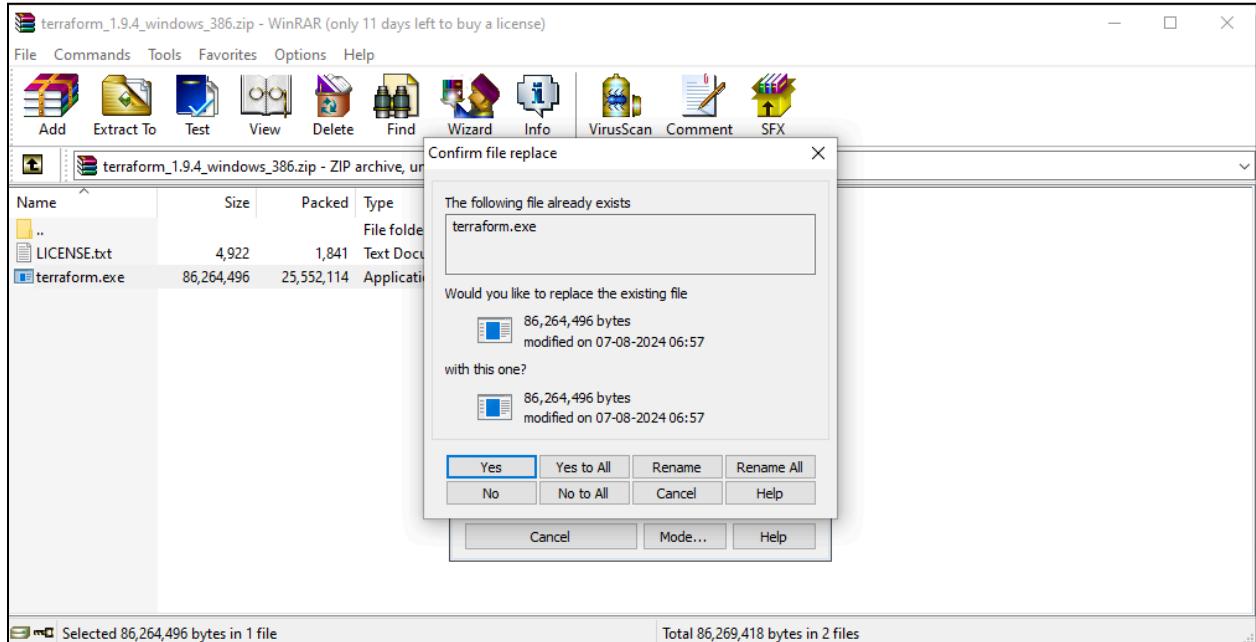
## Experiment.5

Aim - To understand the Terraform lifecycle, core concepts and installation on windows.



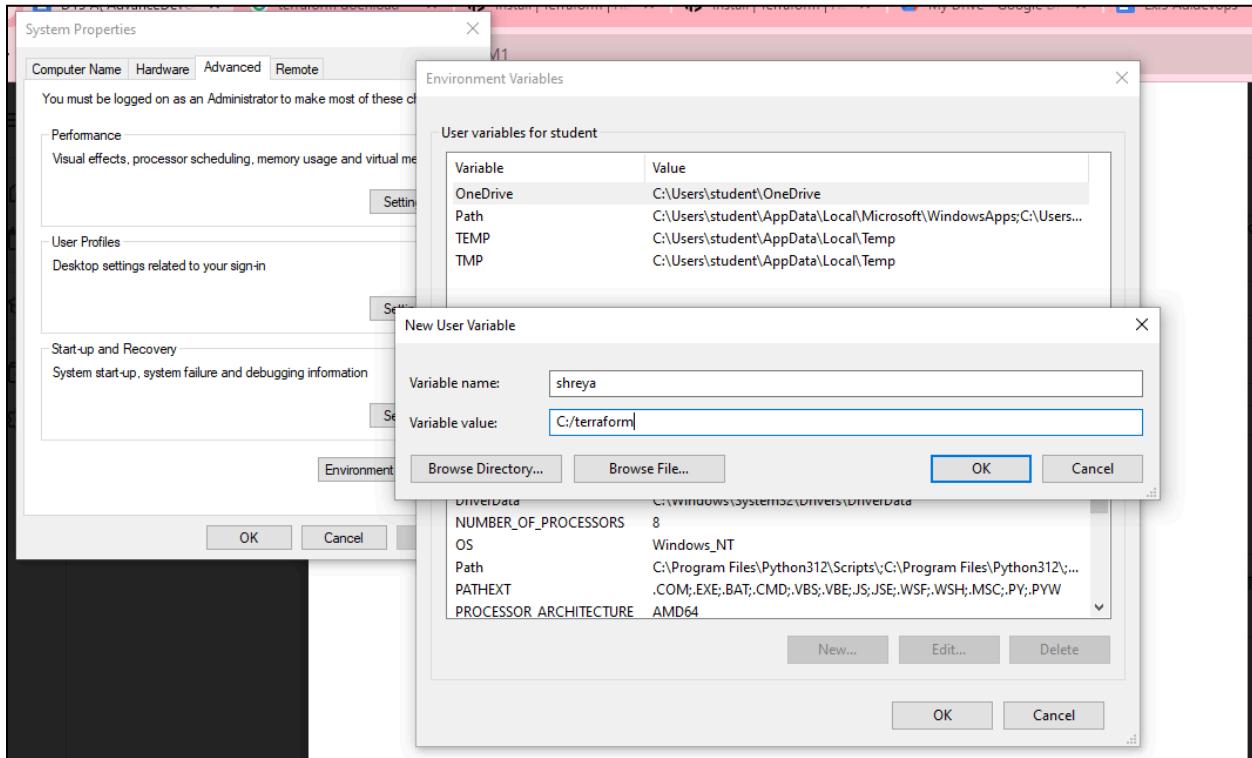
Shreya Sawant

D15A -54



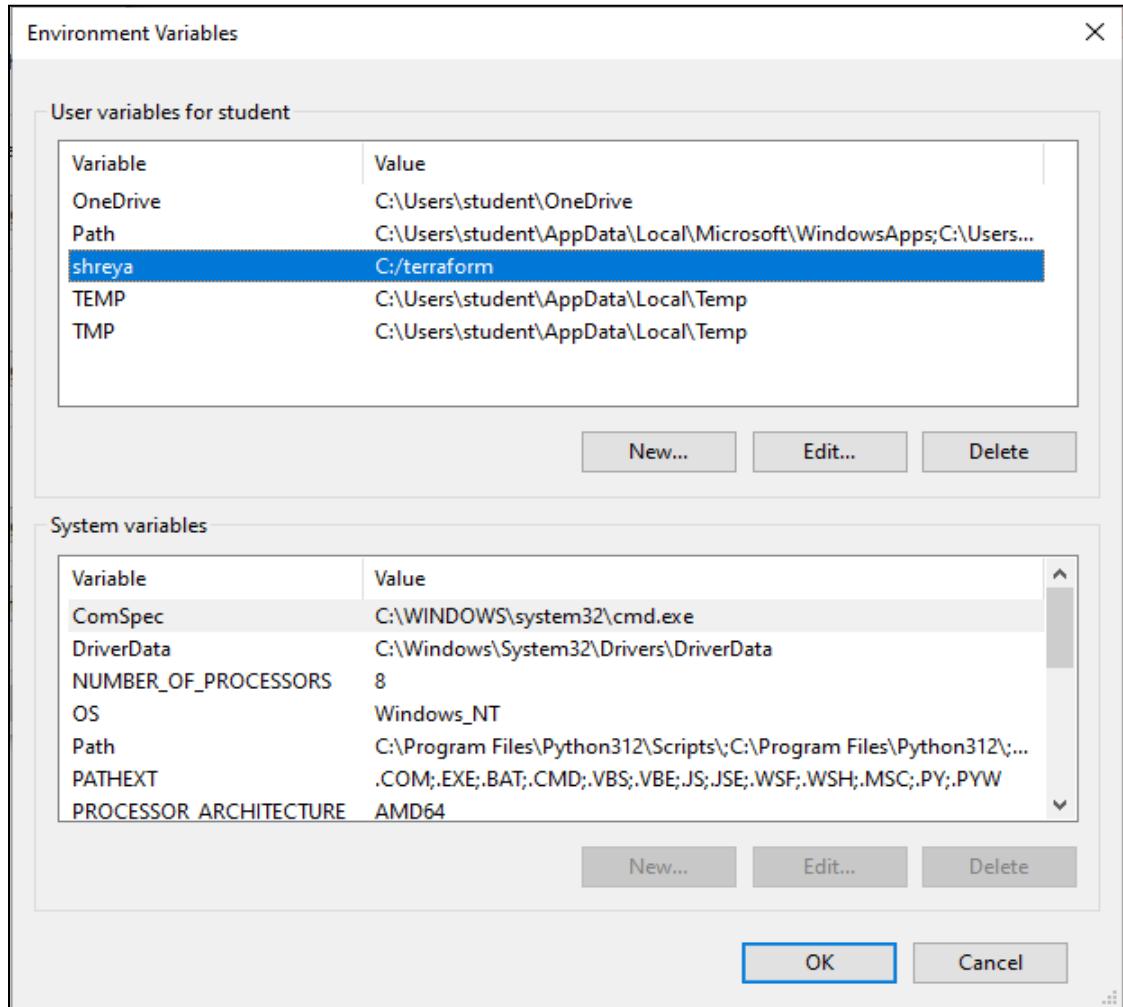
Shreya Sawant

D15A -54



Shreya Sawant

D15A -54



Shreya Sawant

D15A -54

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

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\student> terraform
Usage: terraform [global options] <subcommand> [args]

The available commands for execution are listed below.
The primary workflow commands are given first, followed by
less common or more advanced commands.

Main commands:
  init            Prepare your working directory for other commands
  validate        Check whether the configuration is valid
  plan            Show changes required by the current configuration
  apply           Create or update infrastructure
  destroy         Destroy previously-created infrastructure

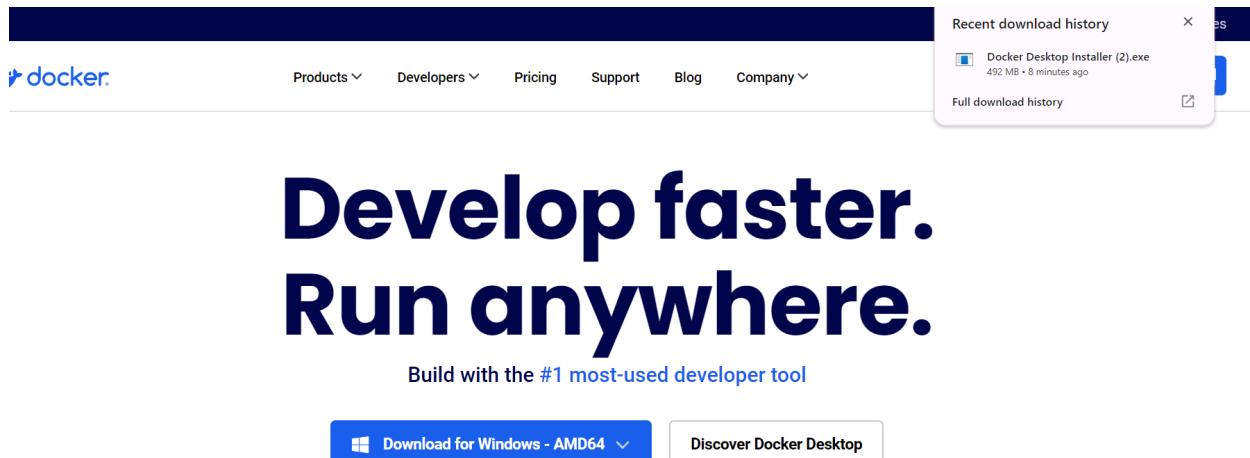
All other commands:
  console         Try Terraform expressions at an interactive command prompt
  fmt             Reformat your configuration in the standard style
  force-unlock   Release a stuck lock on the current workspace
  get             Install or upgrade remote Terraform modules
  graph           Generate a Graphviz graph of the steps in an operation
  import          Associate existing infrastructure with a Terraform resource
  login           Obtain and save credentials for a remote host
  logout          Remove locally-stored credentials for a remote host
  metadata        Metadata related commands
  output          Show output values from your root module
  providers       Show the providers required for this configuration
  refresh         Update the state to match remote systems
  show            Show the current state or a saved plan
  state           Advanced state management
  taint           Mark a resource instance as not fully functional
  test            Execute integration tests for Terraform modules
  untaint         Remove the 'tainted' state from a resource instance
  version         Show the current Terraform version
  workspace       Workspace management

Global options (use these before the subcommand, if any):
  -chdir=DIR      Switch to a different working directory before executing the
                  given subcommand.
  -help           Show this help output, or the help for a specified subcommand.
  -version        An alias for the "version" subcommand.
PS C:\Users\student>
```

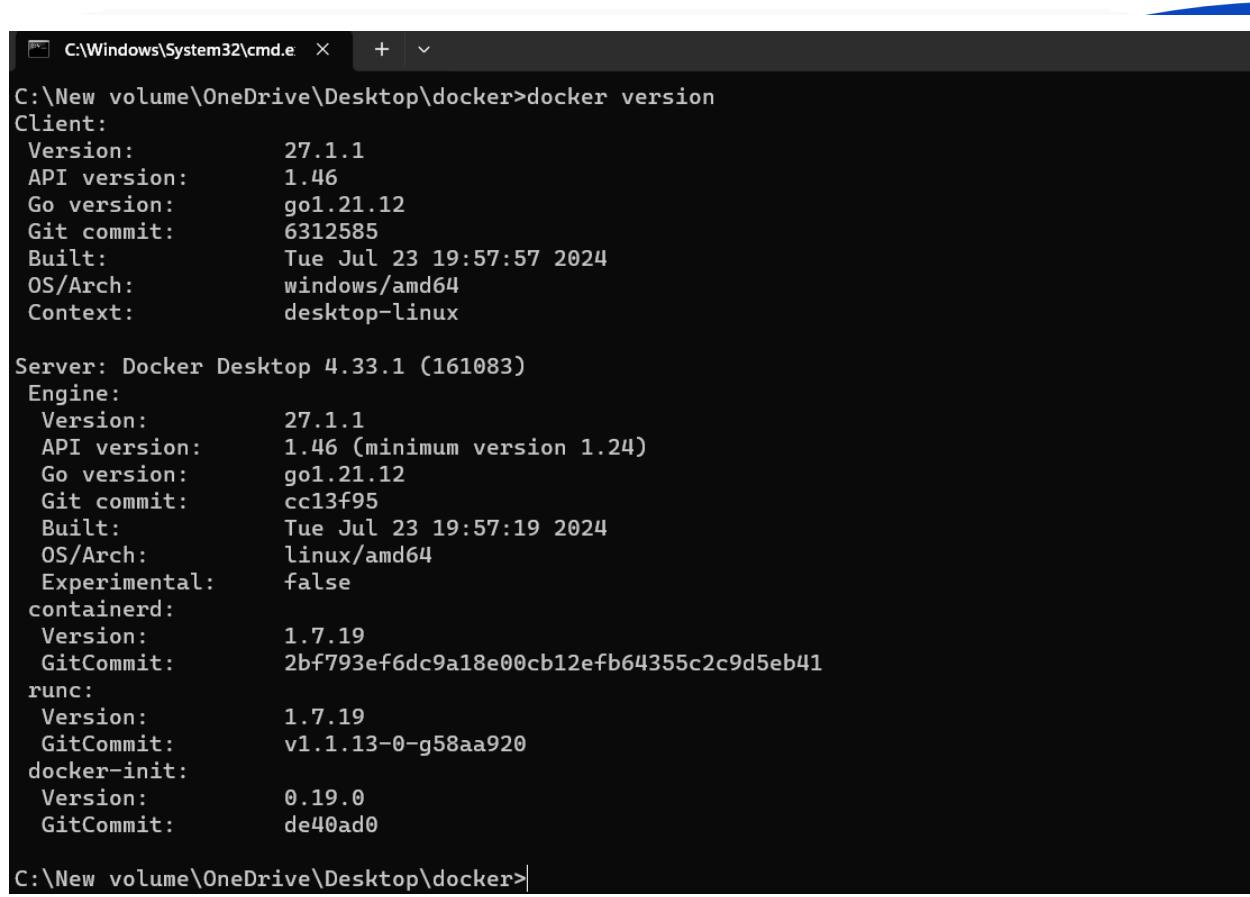
## Experiment.6

**Aim-** To create docker image using terraform

Step 1: Check the docker functionality



The screenshot shows the official Docker website. At the top, there's a navigation bar with links for Products, Developers, Pricing, Support, Blog, and Company. A sidebar on the right displays 'Recent download history' with an entry for 'Docker Desktop Installer (2).exe' from 8 minutes ago. Below the navigation, a large blue banner with white text reads 'Develop faster. Run anywhere.' followed by the subtext 'Build with the #1 most-used developer tool'. At the bottom of the banner are two buttons: a blue one labeled 'Download for Windows - AMD64' and a white one labeled 'Discover Docker Desktop'.

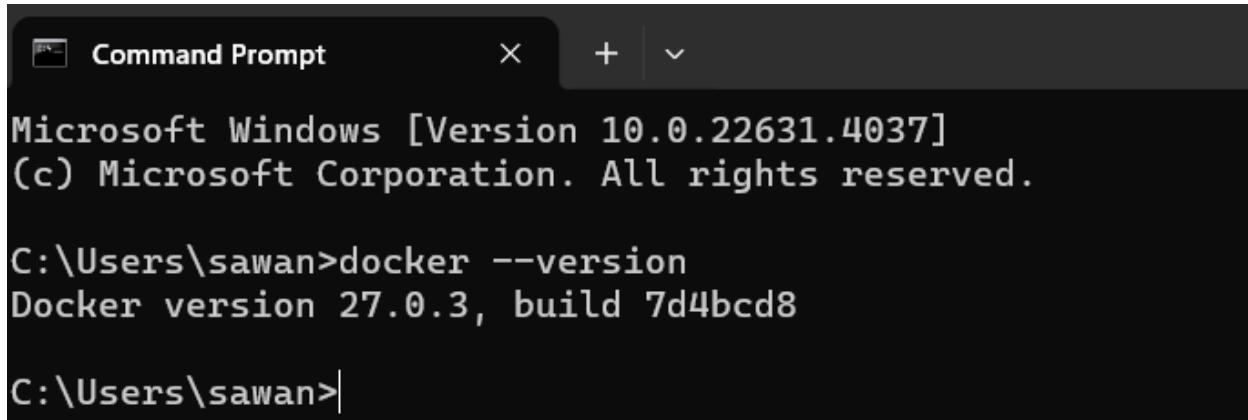
  


The screenshot shows a Windows command prompt window titled 'C:\Windows\System32\cmd.exe'. The command 'docker version' is run, displaying detailed information about both the client and the Docker Desktop server. The client version is 27.1.1, and the server version is 4.33.1 (161083). Various components like Engine, containerd, runc, and docker-init are listed with their respective versions and git commits.

```
C:\New volume\OneDrive\Desktop\docker>docker version
Client:
  Version:          27.1.1
  API version:     1.46
  Go version:      go1.21.12
  Git commit:      6312585
  Built:           Tue Jul 23 19:57:57 2024
  OS/Arch:         windows/amd64
  Context:         desktop-linux

Server: Docker Desktop 4.33.1 (161083)
Engine:
  Version:          27.1.1
  API version:     1.46 (minimum version 1.24)
  Go version:      go1.21.12
  Git commit:      cc13f95
  Built:           Tue Jul 23 19:57:19 2024
  OS/Arch:         linux/amd64
  Experimental:   false
containerd:
  Version:          1.7.19
  GitCommit:        2bf793ef6dc9a18e00cb12efb64355c2c9d5eb41
runc:
  Version:          1.7.19
  GitCommit:        v1.1.13-0-g58aa920
docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0

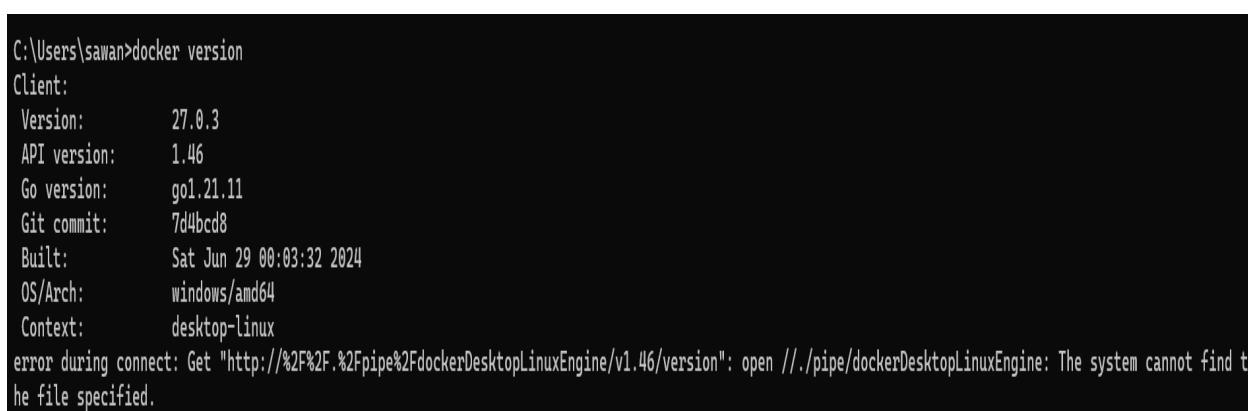
C:\New volume\OneDrive\Desktop\docker>
```



```
Microsoft Windows [Version 10.0.22631.4037]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sawan>docker --version
Docker version 27.0.3, build 7d4bcd8

C:\Users\sawan>
```

```
C:\Users\sawan>docker version
Client:
  Version: 27.0.3
  API version: 1.46
  Go version: go1.21.11
  Git commit: 7d4bcd8
  Built: Sat Jun 29 00:03:32 2024
  OS/Arch: windows/amd64
  Context: desktop-linux
error during connect: Get "http://%2F%2F.%2Fpipe%2FdockerDesktopLinuxEngine/v1.46/version": open //./pipe/dockerDesktopLinuxEngine: The system cannot find t he file specified.
```

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.

```
terraform {
  required_providers {
    docker = {
      source = "kreuzwerker/docker"
      version = "2.21.0"
    }
  }
}

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

# Pull the Ubuntu image
resource "docker_image" "ubuntu" {
```

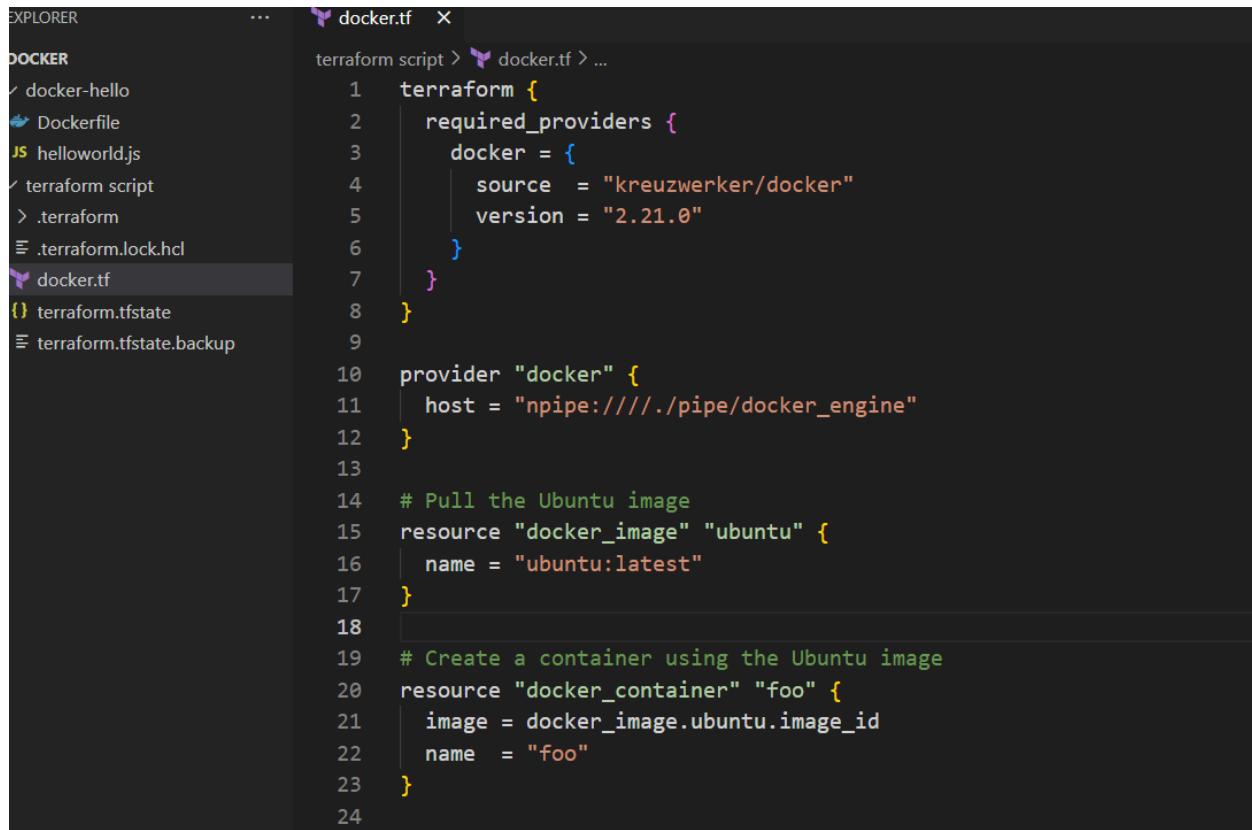
Shreya Sawant

D15A 54

```
name = "ubuntu:latest"
}
```

# Create a container using the Ubuntu image

```
resource "docker_container" "foo" {
  image = docker_image.ubuntu.image_id
  name  = "foo"
}
```



```
EXPLORER      ...  docker.tf  X
DOCKER
✓ docker-hello
  Dockerfile
JS helloworld.js
✓ terraform script
  .terraform
  .terraform.lock.hcl
/docker.tf
  terraform.tfstate
  terraform.tfstate.backup

terrible script > docker.tf > ...
1  terraform {
2    required_providers {
3      docker = {
4        source  = "kreuzwerker/docker"
5        version = "2.21.0"
6      }
7    }
8  }
9
10 provider "docker" {
11   host = "npipe://./pipe/docker_engine"
12 }
13
14 # Pull the Ubuntu image
15 resource "docker_image" "ubuntu" {
16   name = "ubuntu:latest"
17 }
18
19 # Create a container using the Ubuntu image
20 resource "docker_container" "foo" {
21   image = docker_image.ubuntu.image_id
22   name  = "foo"
23 }
24
```

Shreya Sawant

D15A 54

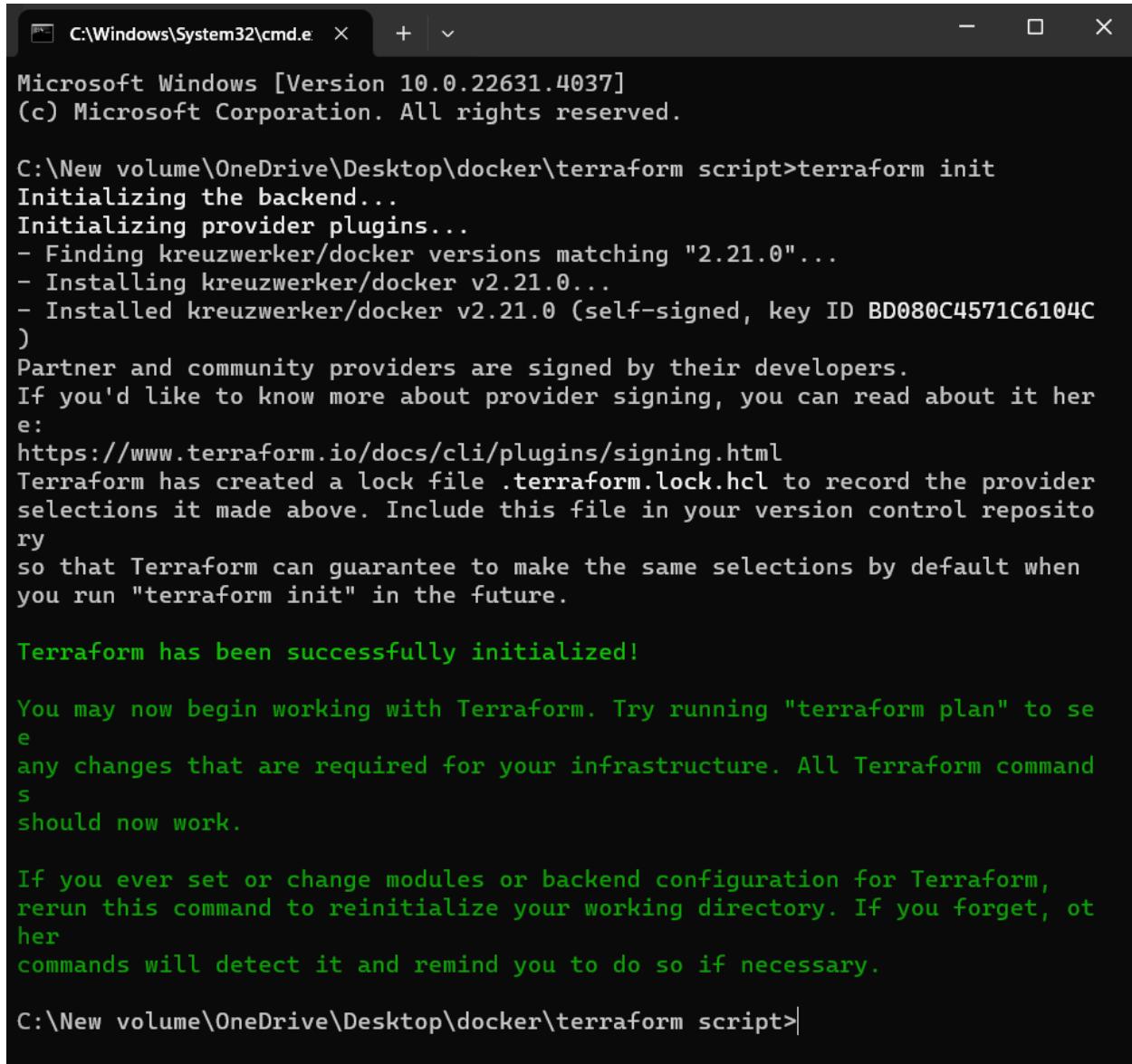
```
C:\Users\sawan>docker -H
flag needs an argument: 'H' in -H
See 'docker --help'.

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
```

Step 3: Execute Terraform Init command to initialize the resources



```
C:\Windows\System32\cmd.e x + v Microsoft Windows [Version 10.0.22631.4037]
(c) Microsoft Corporation. All rights reserved.

C:\New volume\OneDrive\Desktop\docker\terraform script>terraform init
Initializing the backend...
Initializing provider plugins...
- Finding kreuzwerker/docker versions matching "2.21.0"...
- Installing kreuzwerker/docker v2.21.0...
- Installed kreuzwerker/docker v2.21.0 (self-signed, key ID BD080C4571C6104C
)
Partner and community providers are signed by their developers.
If you'd like to know more about provider signing, you can read about it here:
https://www.terraform.io/docs/cli/plugins/signing.html
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

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 command
s
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.

C:\New volume\OneDrive\Desktop\docker\terraform script>
```

## Step 4: Execute Terraform plan to see the available resources

```
C:\New volume\OneDrive\Desktop\docker\terraform script>terraform plan

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         = (known after apply)
    + container_logs = (known after apply)
    + 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)
    + ip_prefix_length= (known after apply)
    + ipc_mode        = (known after apply)
    + log_driver      = (known after apply)
    + logs            = false
    + must_run        = true
    + name            = "foo"
```

```
+ network_data      = (known after apply)
+ read_only          = false
+ remove_volumes    = true
+ restart           = "no"
+ rm                = false
+ runtime           = (known after apply)
+ security_opts     = (known after apply)
+ shm_size          = (known after apply)
+ start             = true
+ stdin_open        = false
+ stop_signal       = (known after apply)
+ stop_timeout      = (known after apply)
+ tty               = false

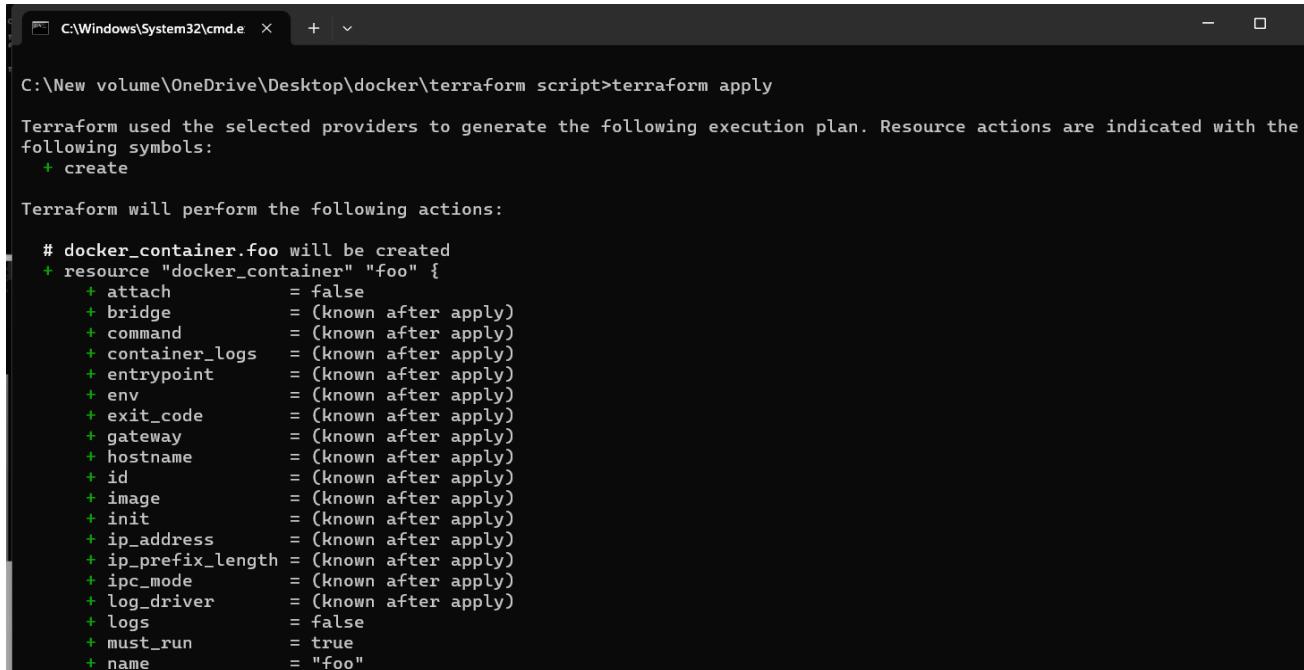
+ healthcheck (known after apply)

+ labels (known after apply)
}

# docker_image.ubuntu will be created
+ resource "docker_image" "ubuntu" {
    + id              = (known after apply)
    + image_id        = (known after apply)
    + latest          = (known after apply)
    + name            = "ubuntu:latest"
    + output          = (known after apply)
    + repo_digest     = (known after apply)
}

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

Step 5: Execute Terraform apply to apply the configuration, which will automatically create and run the Ubuntu Linux container based on our configuration. Using command : “terraform apply”

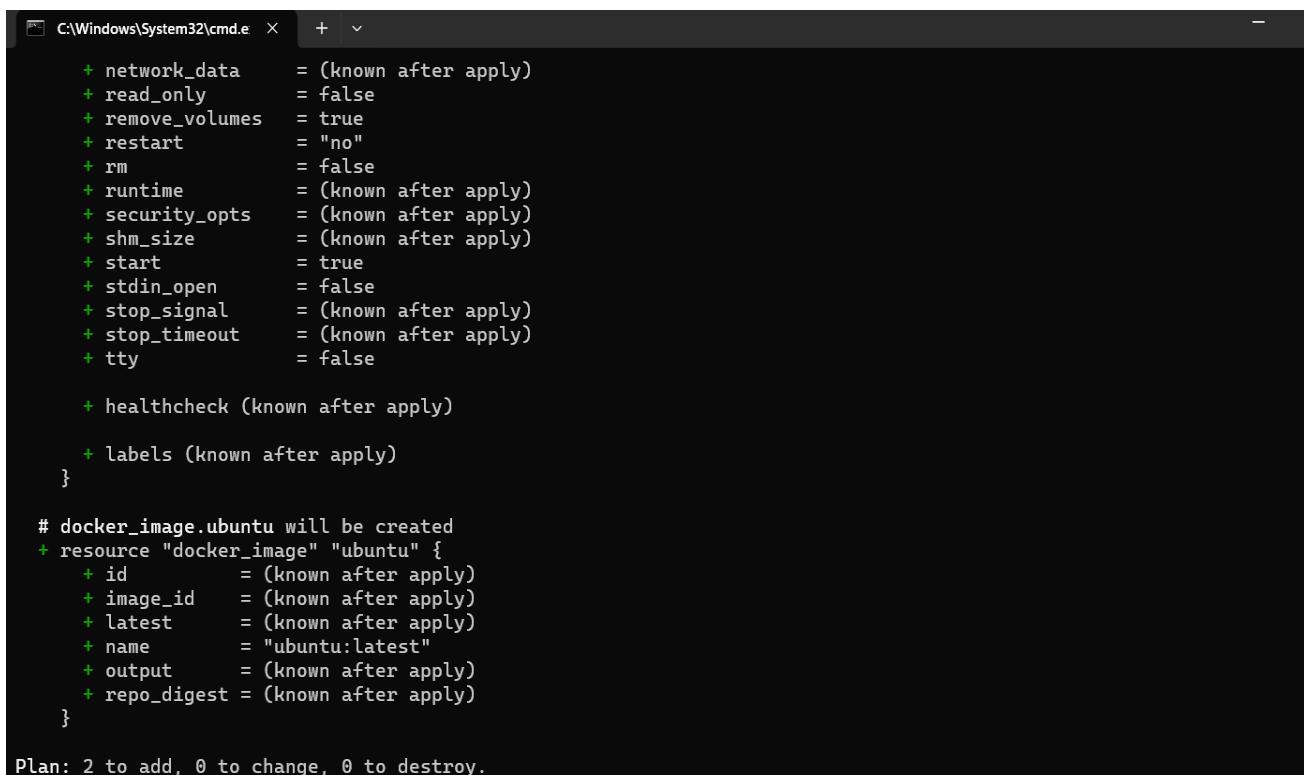


```
C:\New volume\OneDrive\Desktop\docker>terraform apply

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         = (known after apply)
    + container_logs = (known after apply)
    + 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)
    + ip_prefix_length= (known after apply)
    + ipc_mode        = (known after apply)
    + log_driver      = (known after apply)
    + logs            = false
    + must_run        = true
    + name            = "foo"
}
```



```
+ network_data      = (known after apply)
+ read_only          = false
+ remove_volumes    = true
+ restart            = "no"
+ rm                 = false
+ runtime            = (known after apply)
+ security_opts     = (known after apply)
+ shm_size           = (known after apply)
+ start              = true
+ stdin_open         = false
+ stop_signal        = (known after apply)
+ stop_timeout       = (known after apply)
+ tty                = false

+ healthcheck (known after apply)

+ labels (known after apply)
}

# docker_image.ubuntu will be created
+ resource "docker_image" "ubuntu" {
    + id              = (known after apply)
    + image_id        = (known after apply)
    + latest          = (known after apply)
    + name            = "ubuntu:latest"
    + output           = (known after apply)
    + repo_digest     = (known after apply)
}

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

Docker images, Before Executing Apply step and Execute Terraform destroy to delete the configuration, which will automatically delete the Ubuntu Container.

```
C:\Windows\System32\cmd.e x + v - □ ×
C:\New volume\OneDrive\Desktop\docker\terraform script>docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
ubuntu          latest   edbfe74c41f8  3 weeks ago  78.1MB

C:\New volume\OneDrive\Desktop\docker\terraform script>terraform destroy
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:latest]

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_image.ubuntu will be destroyed
- resource "docker_image" "ubuntu" {
    - id          = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:latest" -> null
    - image_id    = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598a" -> null
    - latest      = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598a" -> null
    - name        = "ubuntu:latest" -> null
    - repo_digest = "ubuntu@sha256:8a37d68f4f73ebf3d4efafbcf66379bf3728902a8038616808f04e34a9ab63ee" -> null
}

Plan: 0 to add, 0 to change, 1 to destroy.

Do you really want to destroy all resources?
Terraform will destroy all your managed infrastructure, as shown above.
There is no undo. Only 'yes' will be accepted to confirm.


```

```
Plan: 0 to add, 0 to change, 1 to destroy.

Do you really want to destroy all resources?
Terraform will destroy all your managed infrastructure, as shown above.
There is no undo. Only 'yes' will be accepted to confirm.

Enter a value: yes

docker_image.ubuntu: Destroying... [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:latest]
docker_image.ubuntu: Destruction complete after 0s

Destroy complete! Resources: 1 destroyed.

C:\New volume\OneDrive\Desktop\docker\terraform script>docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE

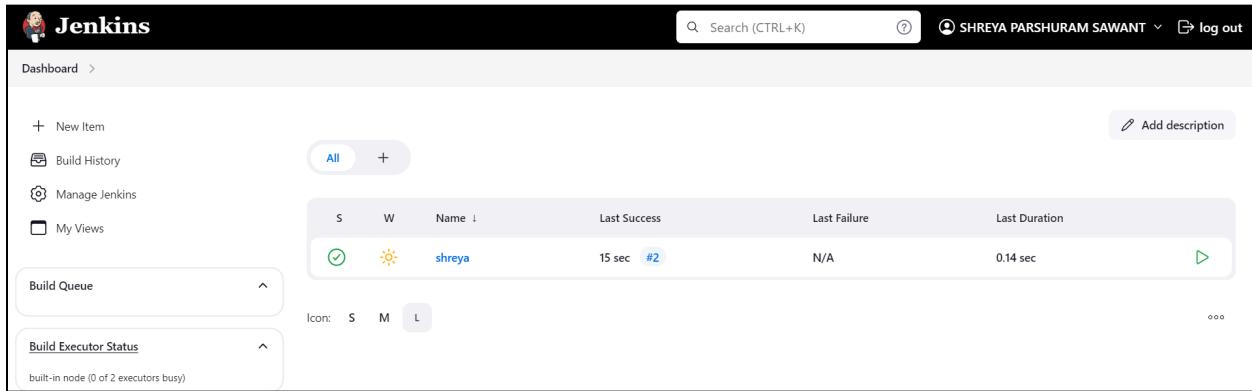
C:\New volume\OneDrive\Desktop\docker\terraform script>
```

Shreya Sawant  
D15A 54

## Experiment.7

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

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



The screenshot shows the Jenkins dashboard with a single build entry for 'shreya'. The build was successful ('S') 15 seconds ago ('#2'). The last failure was 'N/A' and the duration was '0.14 sec'. The dashboard also includes links for 'New Item', 'Build History', 'Manage Jenkins', and 'My Views'. It features sections for 'Build Queue' and 'Build Executor Status'.

Step.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
```

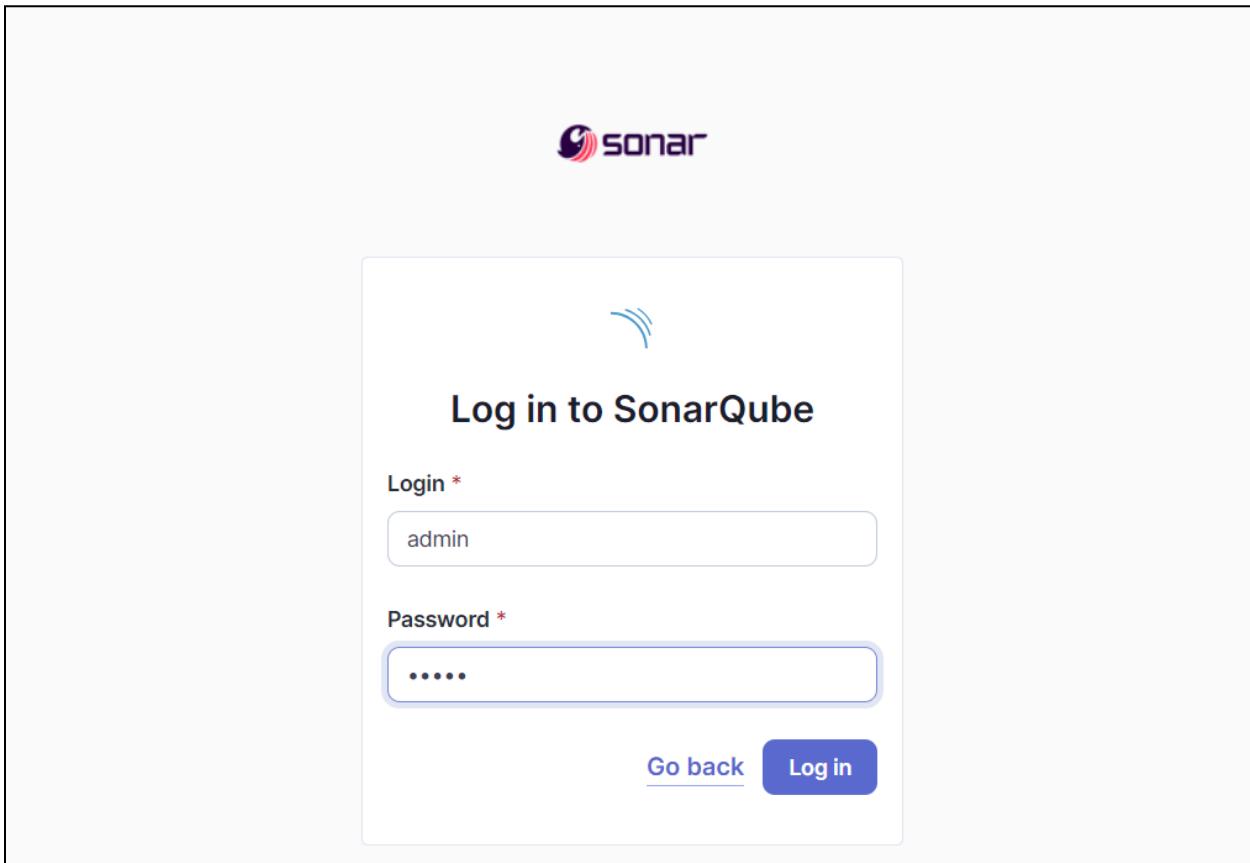
```
PS C:\Users\sawan> docker -v
Docker version 27.1.1, build 6312585
```

```
PS C:\Users\sawan> 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: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31ae
cde
Status: Downloaded newer image for sonarqube:latest
23c4905f5f439b89ce26341b6f016db921c6d4546f70a2450366e258833428e7
PS C:\Users\sawan> |
```

Shreya Sawant  
D15A - 54

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

Login to SonarQube using username admin and password admin.



The screenshot shows the SonarQube interface for creating a new project. At the top, there is a navigation bar with links for Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, More, and a search bar. Below the navigation, a section titled "How do you want to create your project?" is displayed. It asks if the user wants to benefit from SonarQube's features like repository import and Pull Request decoration, and suggests creating a project from a favorite DevOps platform. It then asks the user to set up a DevOps platform configuration. Below this, there are five "Import" buttons with "Setup" sub-buttons: "Import from Azure DevOps", "Import from Bitbucket Cloud", "Import from Bitbucket Server", "Import from GitHub", and "Import from GitLab". At the bottom, there is a note about testing or advanced use-cases, followed by a "Create a local project" button.

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

1 of 2

## Create a local project

**Project display name \***

**Project key \***

**Main branch name \***

The name of your project's default branch [Learn More ↗](#)

**Cancel** **Next**

2 of 2

### Set up project for Clean as You Code

The new code definition sets which part of your code will be considered new code. This helps you focus attention on the most recent changes to your project, enabling you to follow the Clean as You Code methodology. Learn more: [Defining New Code ↗](#)

Choose the baseline for new code for this project

Use the global setting

Previous version

Any code that has changed since the previous version is considered new code.  
Recommended for projects following regular versions or releases.

Define a specific setting for this project

Previous version

Any code that has changed since the previous version is considered new code.  
Recommended for projects following regular versions or releases.

Number of days

Any code that has changed in the last x days is considered new code. If no action is taken on a new issue after x days, this issue will become part of the overall code.  
Recommended for projects following continuous delivery.

Shreya Sawant  
D15A - 54

Step.5 Setup the project and come back to Jenkins Dashboard.  
Go to Manage Jenkins and search for SonarQube Scanner for Jenkins and install it.

The screenshot shows the Jenkins Plugins page. The search bar at the top contains the text "sonar". A list of plugins is displayed, with "SonarQube Scanner for Jenkins 2.17.2" being the first item. This plugin is marked as "Enabled" with a green checkmark and has a red "Uninstall" button next to it. Other options like "Updates", "Available plugins", and "Advanced settings" are also visible.

Step.6 Under Jenkins 'Configure System', look for SonarQube Servers and enter the details.  
Enter the Server Authentication token if needed.

The screenshot shows the Jenkins System configuration page under "SonarQube installations". It includes fields for "Name" (set to "sonarqube"), "Server URL" (set to "http://localhost:9000"), and "Server authentication token" (set to "- none -"). There is also an "Advanced" dropdown menu.

Shreya Sawant  
D15A - 54

Step.7 After the configuration, create a New Item in Jenkins, choose a freestyle project.

**New Item**

Enter an item name  
sonarqube

Select an item type

- Freestyle project**  
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
- Pipeline**  
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
- Multi-configuration project**  
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
- Folder**  
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

**OK**

**Configure**

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

Repository URL ?  
https://github.com/shazforiot/MSBuild\_firstproject.git

Credentials ?  
none

+ Add ▾

Advanced ▾

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?  
\*/master

Add Branch

**Save** **Apply**

Shreya Sawant

D15A - 54

Step.8 Under Build-> Execute SonarQube Scanner, enter these Analysis properties. Mention the SonarQube Project Key, Login, Password, Source path and Host URL.

Configure

Build Steps

Execute SonarQube Scanner

JDK ?  
JDK to be used for this SonarQube analysis  
(Inherit From Job)

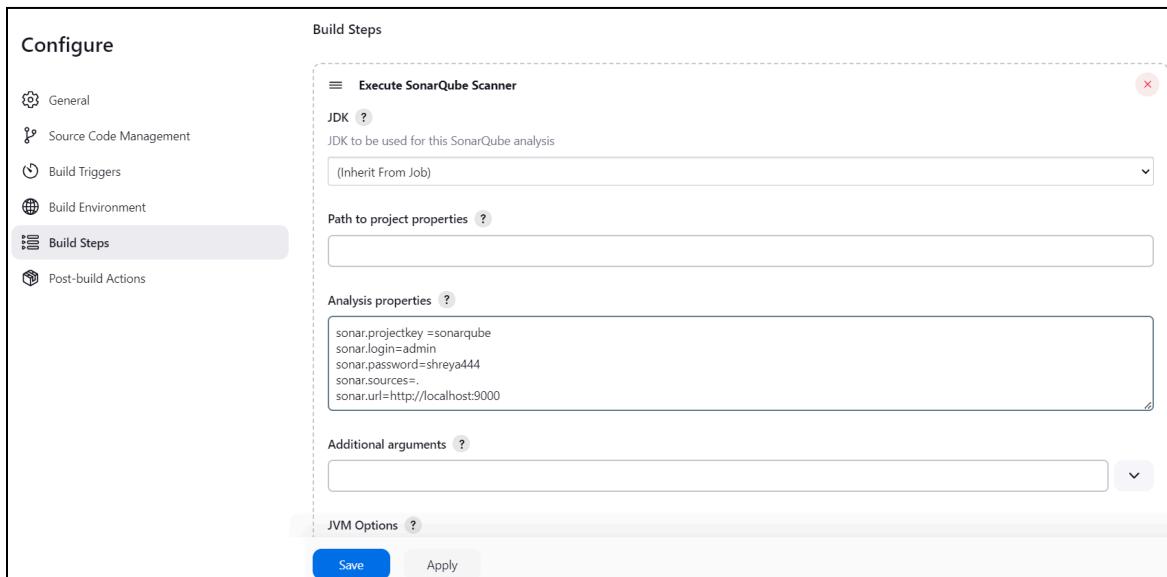
Path to project properties ?  
sonar.projectkey=sonarqube  
sonar.login=admin  
sonar.password=shreya@444  
sonar.sources=.  
sonar.url=http://localhost:9000

Analysis properties ?

Additional arguments ?

JVM Options ?

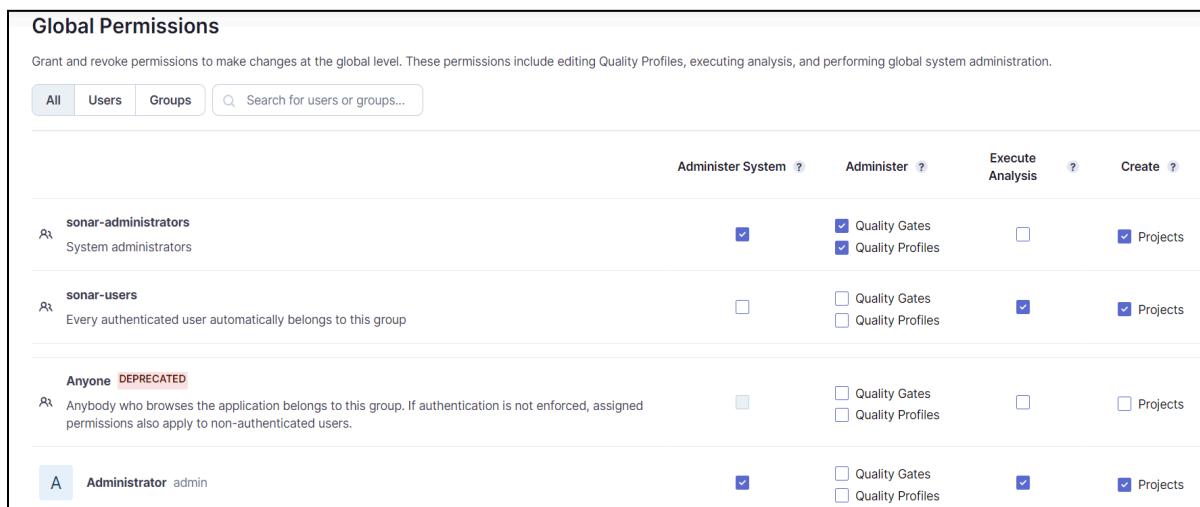
Save Apply



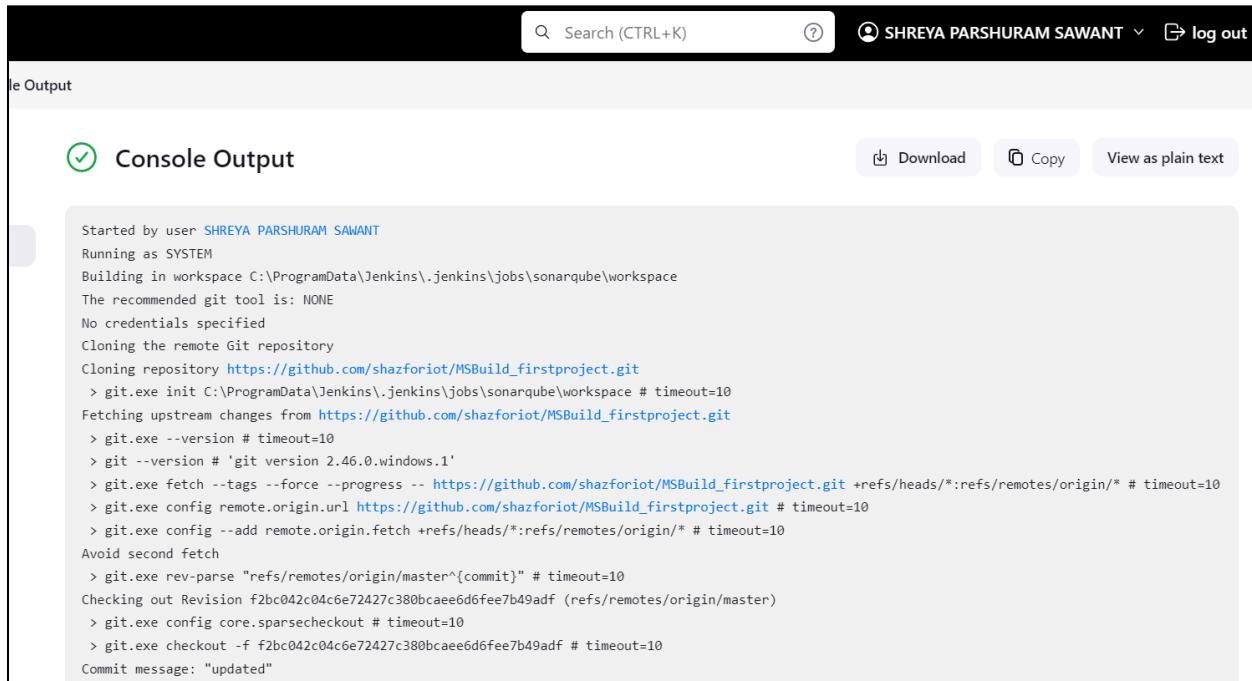
Global Permissions

Grant and revoke permissions to make changes at the global level. These permissions include editing Quality Profiles, executing analysis, and performing global system administration.

	Administer System ?	Administer ?	Execute Analysis ?	Create ?
sonar-administrators System administrators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Quality Gates <input checked="" type="checkbox"/> Quality Profiles	<input type="checkbox"/>	<input checked="" type="checkbox"/> Projects
sonar-users Every authenticated user automatically belongs to this group	<input type="checkbox"/>	<input type="checkbox"/> Quality Gates <input type="checkbox"/> Quality Profiles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Projects
Anyone DEPRECATED Anybody who browses the application belongs to this group. If authentication is not enforced, assigned permissions also apply to non-authenticated users.	<input type="checkbox"/>	<input type="checkbox"/> Quality Gates <input type="checkbox"/> Quality Profiles	<input type="checkbox"/>	<input type="checkbox"/> Projects
A Administrator admin	<input checked="" type="checkbox"/>	<input type="checkbox"/> Quality Gates <input type="checkbox"/> Quality Profiles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Projects

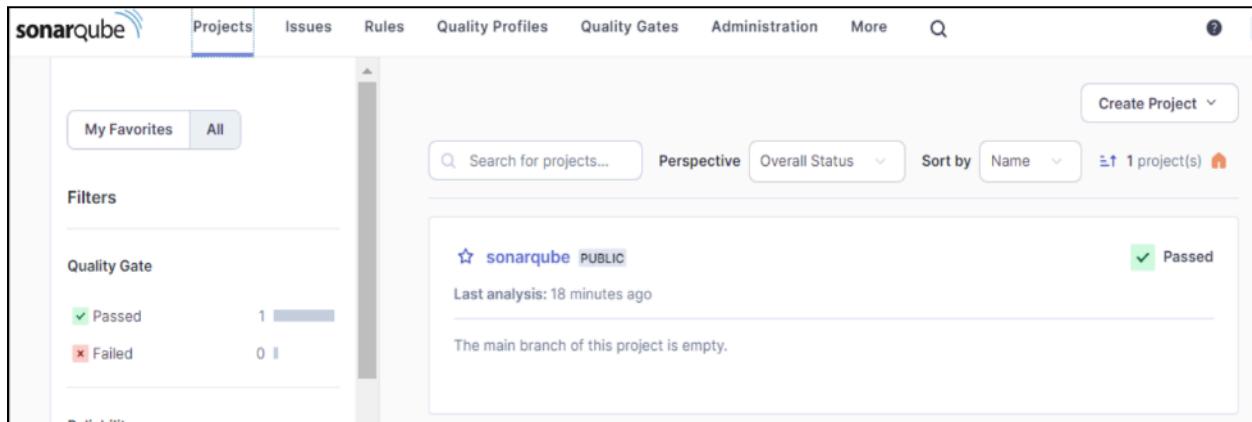


Step.9 Run The Build.  
Check the console output.



The screenshot shows the Jenkins 'Console Output' page. At the top, there is a search bar, a user profile for 'SHREYA PARSHURAM SAWANT', and a 'log out' button. Below the header, the title 'Console Output' is displayed with a green checkmark icon. To the right of the title are three buttons: 'Download', 'Copy', and 'View as plain text'. The main content area contains the build logs:

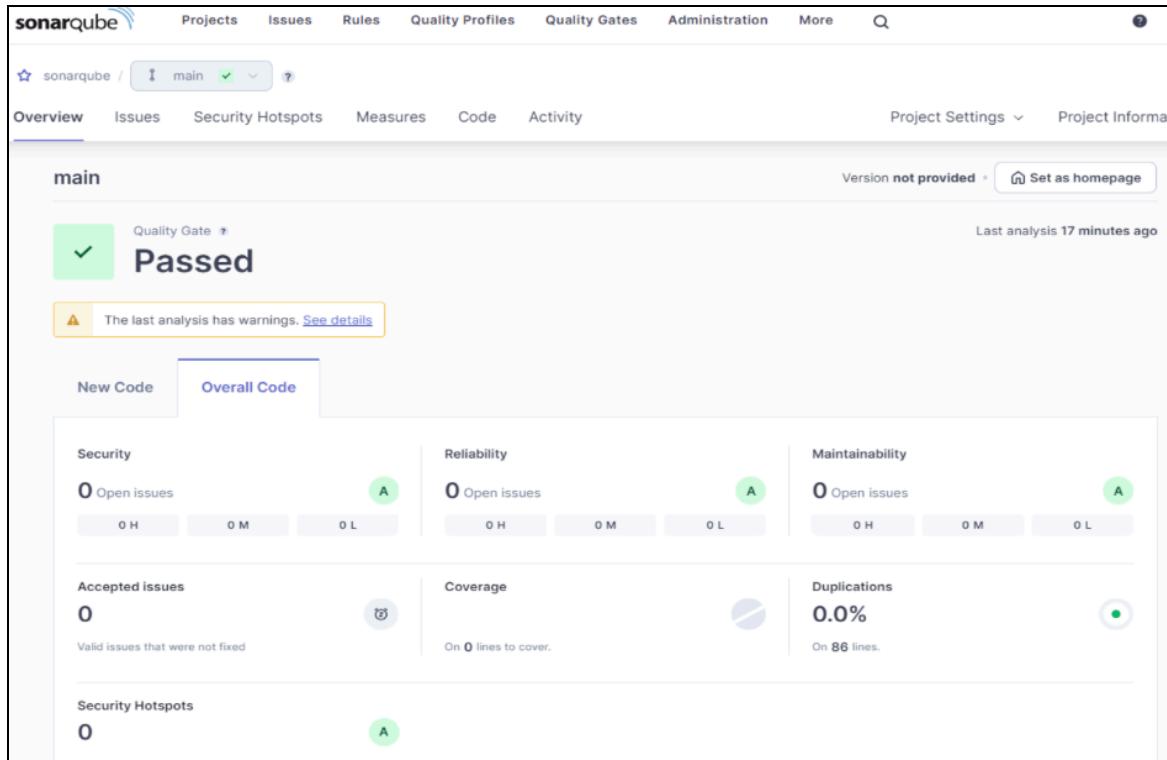
```
Started by user SHREYA PARSHURAM SAWANT
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\jobs\sonarqube\workspace
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/shazforiot/MSBuild_firstproject.git
> git.exe init C:\ProgramData\Jenkins\jobs\sonarqube\workspace # timeout=10
Fetching upstream changes from https://github.com/shazforiot/MSBuild_firstproject.git
> git.exe --version # timeout=10
> git --version # 'git' version 2.46.0.windows.1'
> git.exe fetch --tags --force --progress -- https://github.com/shazforiot/MSBuild_firstproject.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git.exe config remote.origin.url https://github.com/shazforiot/MSBuild_firstproject.git # timeout=10
> git.exe config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
> git.exe rev-parse "refs/remotes/origin/master^{commit}" # timeout=10
Checking out Revision f2bc042c04c6e72427c380bcaee6d6fee7b49adf (refs/remotes/origin/master)
> git.exe config core.sparsecheckout # timeout=10
> git.exe checkout -f f2bc042c04c6e72427c380bcaee6d6fee7b49adf # timeout=10
Commit message: "updated"
```



The screenshot shows the SonarQube 'Projects' page. The top navigation bar includes links for 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', 'Administration', 'More', and a search bar. On the left, there are buttons for 'My Favorites' and 'All'. Below these are 'Filters' and a 'Quality Gate' section. The 'Quality Gate' section shows two items: 'Passed' (checked) and 'Failed' (unchecked). The main content area displays a project card for 'sonarqube' (PUBLIC). The card indicates a 'Last analysis: 18 minutes ago' and a 'Passed' status with a green checkmark. A note states: 'The main branch of this project is empty.'

Shreya Sawant

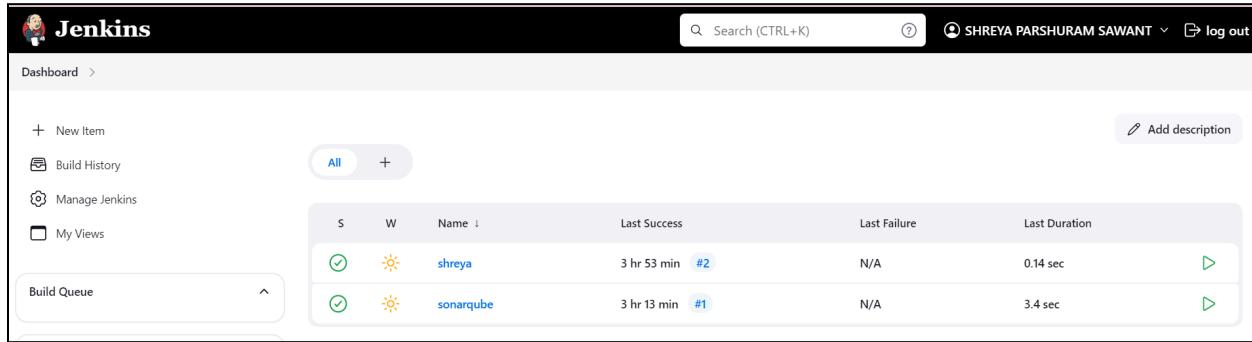
D15A - 54



## Experiment.8

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



S	W	Name ↓	Last Success	Last Failure	Last Duration
✓	☀️	shreya	3 hr 53 min #2	N/A	0.14 sec
✓	☀️	sonarqube	3 hr 13 min #1	N/A	3.4 sec

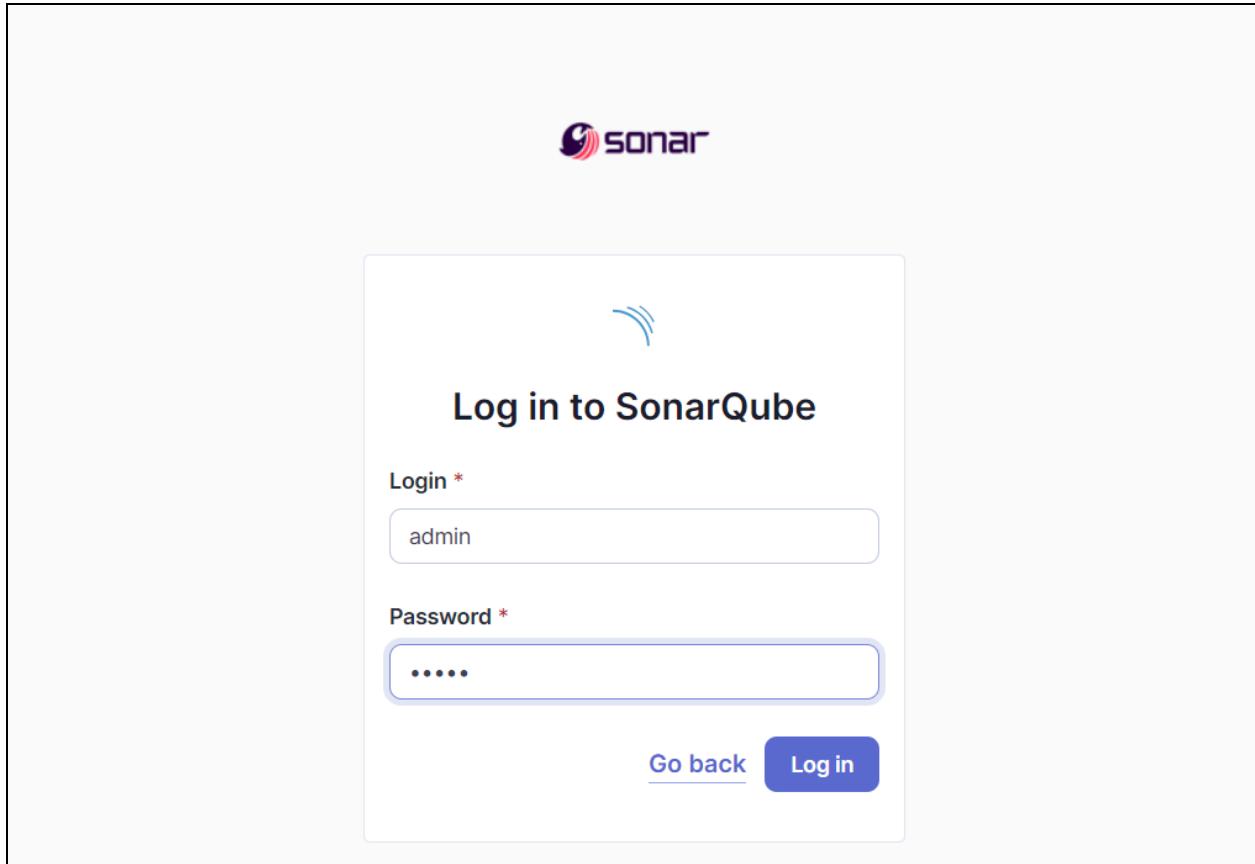
Step.2 Run SonarQube in a Docker container using this command

```
PS C:\Users\sawan> docker -v
Docker version 27.1.1, build 6312585
```

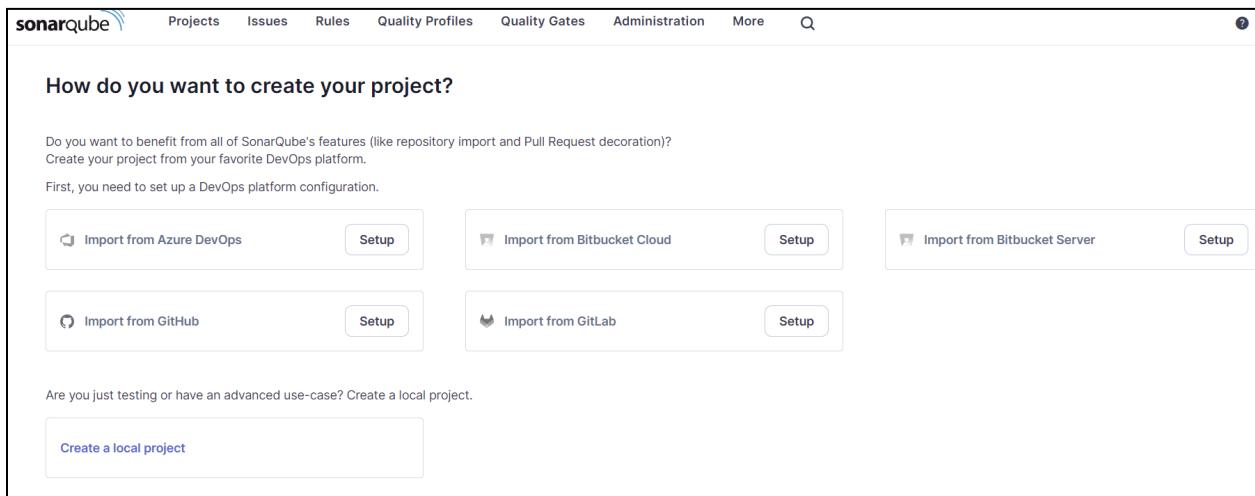
```
PS C:\Users\sawan> docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest
Unable to find image 'sonarqube:latest' locally
Latest: Pulling from library/sonarqube
7478e0ac0f23: Pull complete
90a925ab929a: Pull complete
7d9a34308537: Pull complete
80338217a4ab: Pull complete
1a5fd5c7e184: Pull complete
7b87d6fa783d: Pull complete
bd819c9b5ead: Pull complete
4f4fb700ef54: Pull complete
Digest: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31ae
cde
Status: Downloaded newer image for sonarqube:latest
23c4905f5f439b89ce26341b6f016db921c6d4546f70a2450366e258833428e7
PS C:\Users\sawan> |
```

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

Shreya Sawant  
D15A \_54



The image shows the SonarQube login interface. At the top center is the Sonar logo. Below it is a light gray rectangular form containing a blue loading icon. The text "Log in to SonarQube" is centered above two input fields. The first field is labeled "Login \*" and contains the value "admin". The second field is labeled "Password \*" and contains five redacted dots. At the bottom of the form are two buttons: "Go back" in blue and "Log in" in white.



The image shows the SonarQube "How do you want to create your project?" page. The header includes the SonarQube logo and navigation links: Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, More, and a search bar. Below the header, a section titled "How do you want to create your project?" provides instructions for benefiting from SonarQube's features by creating a project from a DevOps platform. It lists five import options: "Import from Azure DevOps", "Import from Bitbucket Cloud", "Import from Bitbucket Server", "Import from GitHub", and "Import from GitLab", each with a "Setup" button. At the bottom, there is a link for creating a local project: "Create a local project".

Shreya Sawant  
D15A \_54

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

1 of 2

## Create a local project

**Project display name \***

✓

**Project key \***

✓

**Main branch name \***

The name of your project's default branch [Learn More ↗](#)

Cancel Next

2 of 2

### Set up project for Clean as You Code

The new code definition sets which part of your code will be considered new code. This helps you focus attention on the most recent changes to your project, enabling you to follow the Clean as You Code methodology. Learn more: [Defining New Code ↗](#)

Choose the baseline for new code for this project

Use the global setting

**Previous version**  
Any code that has changed since the previous version is considered new code.  
Recommended for projects following regular versions or releases.

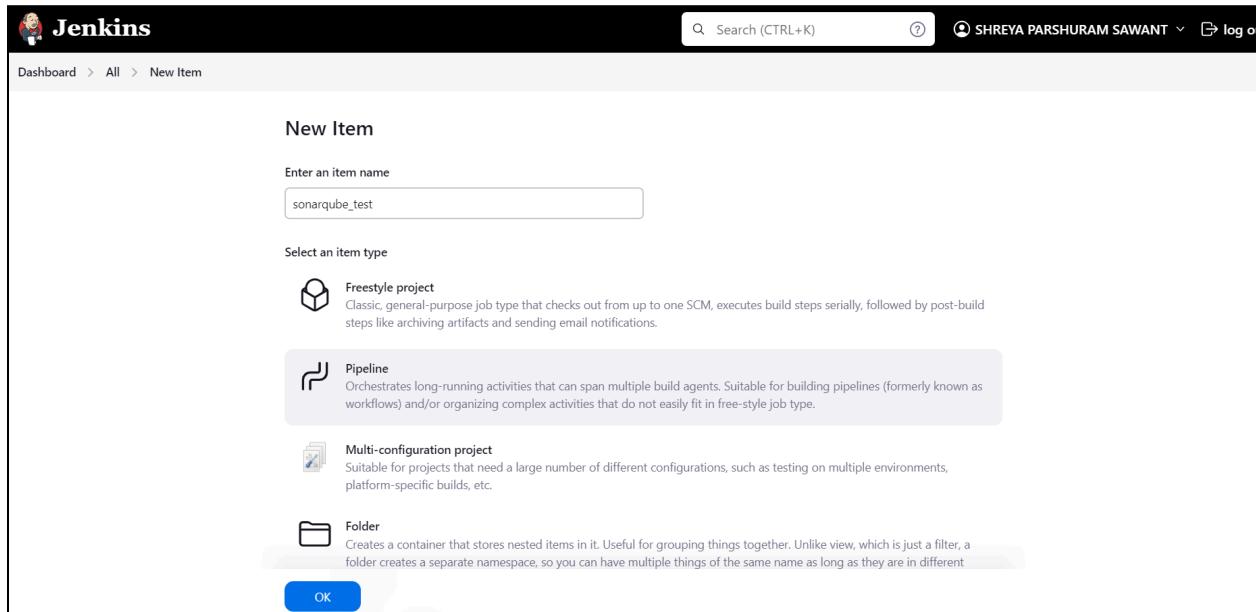
Define a specific setting for this project

Previous version  
Any code that has changed since the previous version is considered new code.  
Recommended for projects following regular versions or releases.

Number of days  
Any code that has changed in the last x days is considered new code. If no action is taken on a new issue after x days, this issue will become part of the overall code.  
Recommended for projects following continuous delivery.

Shreya Sawant  
D15A \_54

Step.5 Create a New Item in Jenkins, choose Pipeline.



Under Pipeline Script, enter the following -

```
node {  
    stage('Cloning the GitHub Repo') {  
        git 'https://github.com/shazforiot/GOL.git'  
    }  
    stage('SonarQube analysis') {  
        withSonarQubeEnv('sonarqube') {  
            sh "<PATH_TO SONARQUBE 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=http://127.0.0.1:9000/"  
        }  
    }  
}
```

The screenshot shows the Jenkins Pipeline configuration page for the 'sonarqube\_test' job. The pipeline script is defined as follows:

```

1 node {
2   stage('Cloning the GitHub Repo') {
3     git 'https://github.com/shazforiot/GOL.git'
4   }
5   step('SonarQube analysis') {
6     withSonarQubeEnv('sonarqube') {
7       sh "cd ${PATH_TO SONARQUBE FOLDER}/bin/ & sonar-scanner \
8         -D sonar.login=${SonarQube.USERNAME} \
9         -D sonar.password=${SonarQube.PASSWORD} \
10        -D sonar.projectKey=<Project KEY> \
11        -D sonar.exclusions=vendor/**,resources/**,*/**/*.java \
12        -D sonar.host.url=http://127.0.0.1:9000"
13     }
14   }
15 }

```

Below the script, there is a checked checkbox labeled 'Use Groovy Sandbox'. At the bottom are 'Save' and 'Apply' buttons.

## Step.6 Run The Build.

The screenshot shows the Jenkins console output for the 'sonarqube\_test' job. The log starts with the build being started by user 'SHREYA PARSHURAM SAWANT' and shows the execution of a Jenkins pipeline script. The script performs a git clone of the 'GOL' repository from GitHub and runs a SonarQube analysis step. The log ends with a commit message: "Update Jenkinsfile".

```

Started by user SHREYA PARSHURAM SAWANT
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in C:\ProgramData\Jenkins\jobs\sonarqube_test\workspace
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Cloning the GitHub Repo)
[Pipeline] git
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/shazforiot/GOL.git
> git.exe init C:\ProgramData\Jenkins\jobs\sonarqube_test\workspace # timeout=10
Fetching upstream changes from https://github.com/shazforiot/GOL.git
> git.exe --version # timeout=10
> git --version # 'git version 2.46.0.windows.1'
> git.exe fetch --tags --force --progress -- https://github.com/shazforiot/GOL.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git.exe config remote.origin.url https://github.com/shazforiot/GOL.git # timeout=10
> git.exe config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
> git.exe rev-parse "refs/remotes/origin/master^{commit}" # timeout=10
Checking out Revision ba799ba7e1b576f04a461232b0412c5e6e1e5e4 (refs/remotes/origin/master)
> git.exe config core.sparsecheckout # timeout=10
> git.exe checkout -f ba799ba7e1b576f04a461232b0412c5e6e1e5e4 # timeout=10
> git.exe branch -a -v --no-abbrev # timeout=10
> git.exe checkout -b master ba799ba7e1b576f04a461232b0412c5e6e1e5e4 # timeout=10
Commit message: "Update Jenkinsfile"

```

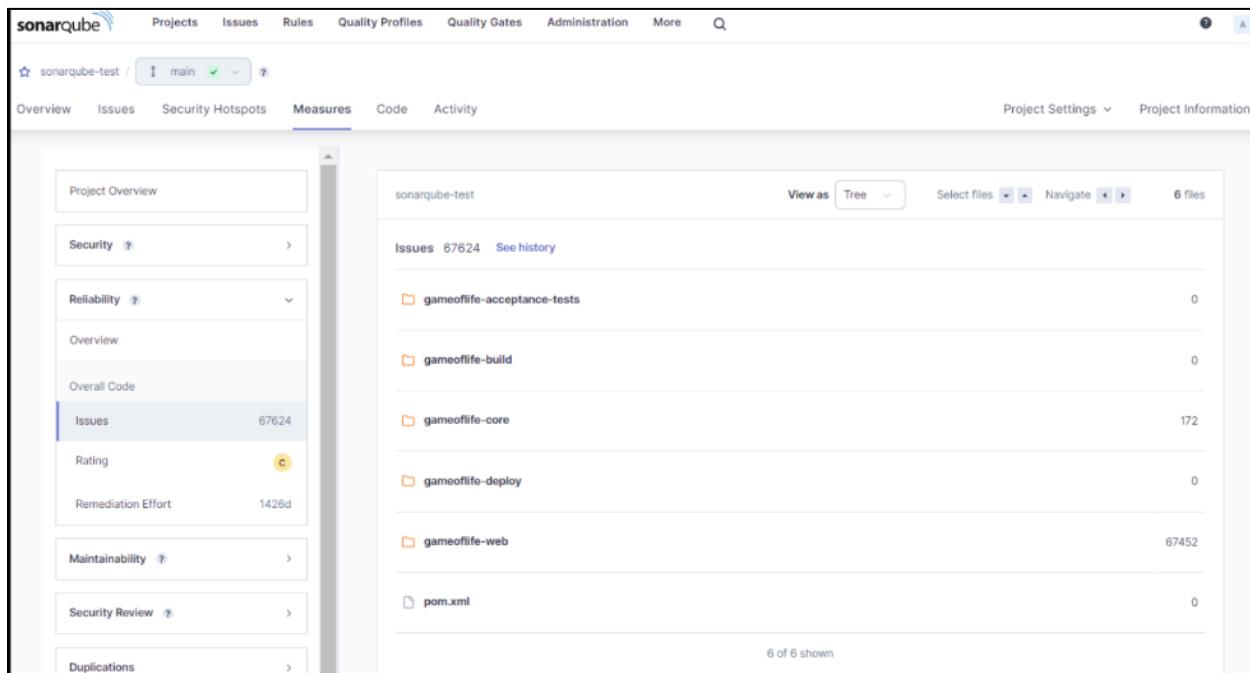
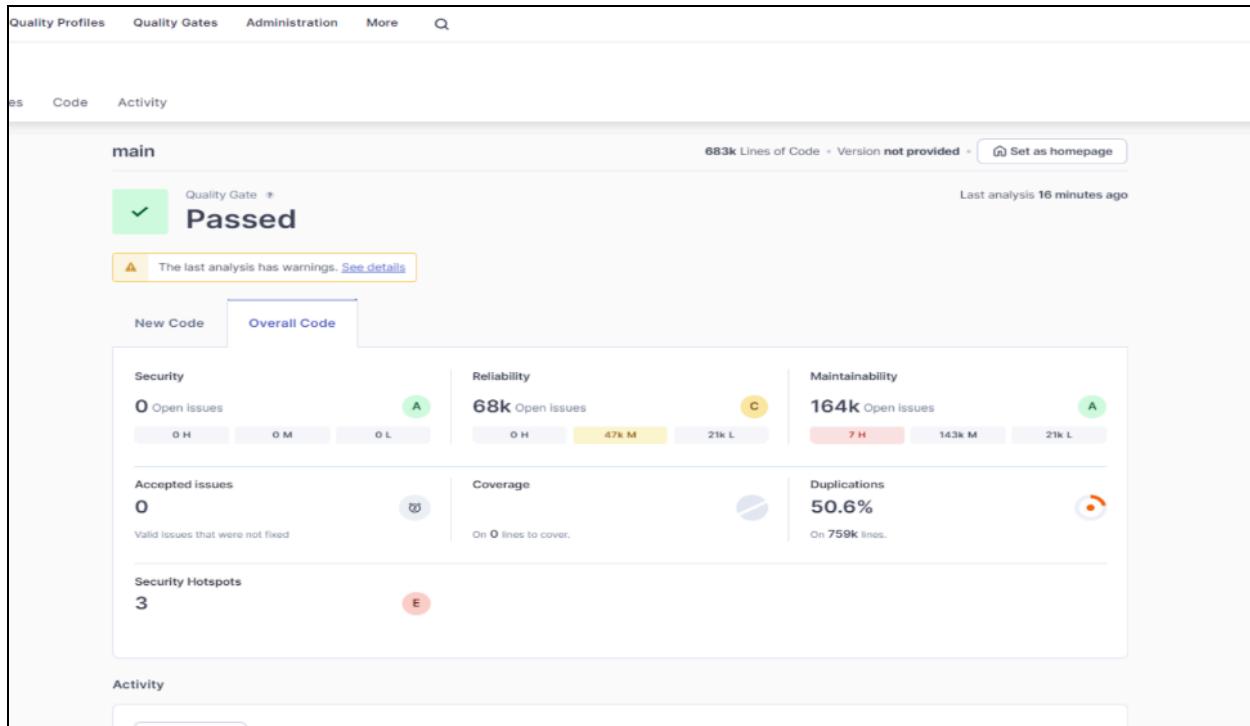
Shreya Sawant  
D15A \_54

```
00:49:56.322 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 32. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 177. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 188. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 65. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 349. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 40. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 75. Keep only the first 100 references
00:49:56.323 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 41. Keep only the first 100 references
00:49:56.324 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 17. Keep only the first 100 references
00:49:56.324 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/util/TextAreaCellRenderer.html for block at line 296. Keep only the first 100 references
00:49:56.324 INFO CPD Executor CPD calculation finished (done) | time=94621ms
00:49:56.350 INFO SCM revision ID '0a799ba7eb576f04a4612322b0412c5e61e5e4'
00:51:30.482 INFO Analysis report generated in 2893ms, dir size=117.2 MB
00:51:40.652 INFO Analysis report compressed in 10210ms, zip size=29.6 MB
00:51:44.098 INFO Analysis report uploaded in 3444ms
00:51:44.101 INFO ANALYSIS SUCCESSFUL, you can find the results at: http://127.0.0.1:9001/dashboard?id=sonarqube-test
00:51:44.101 INFO Note that you will be able to access the updated dashboard once the server has processed the submitted analysis report
00:51:44.101 INFO More about the report processing at http://127.0.0.1:9001/api/ce/task?id=22b0b5c1-635d-4c1b-8d62-99d4ce4567b9
00:51:53.341 INFO Analysis total time: 8:44.093 s
00:51:53.349 INFO SonarScanner Engine completed successfully
00:51:54.059 INFO EXECUTION SUCCESS
00:51:54.071 INFO Total time: 8:51.363s
[Pipeline]
[Pipeline] // withSonarQubeEnv
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Step.7 After that, check the project in SonarQube.

The screenshot shows the SonarQube web interface. At the top, there's a navigation bar with 'Create Project' and a search bar. Below it, a 'Filters' section includes dropdowns for 'My Favorites' and 'All'. The main area displays the 'sonarqube-test' project, which is marked as 'PUBLIC' and 'Passed'. It shows the last analysis was 15 minutes ago, involving 683k Lines of Code in HTML, XML, etc. Below this, there are three sections: 'Quality Gate' (Passed), 'Reliability' (0 issues), and 'Security' (0 issues). On the right, there are detailed metrics: 0 security issues (green), 68k reliability (yellow), 164k maintainability (green), 0.0% hotspots reviewed (red), Coverage (50.6%, orange), and Duplications (grey).

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D15A \_54



# Shreya Sawant

## D15A \_54

SonarQube Issues Project Settings Project Information

sonarqube-test / main

Overview Issues Security Hotspots Measures Code Activity

My Issues All

Bulk Change Select issues Navigate to issue 196,662 issues 3075d effort

Filters Clear All Filters

Issues in new code

Clean Code Attribute 1

- Consistency 197k
- Intentionality 14k
- Adaptability 0
- Responsibility 0

Add to selection Ctrl + click

Software Quality

- Security 0
- Reliability 54k
- Maintainability 164k

Severity

Type

gameoflife-core/build/reports/tests/all-tests.html

Insert a <!DOCTYPE> declaration to before this <html> tag. Reliability Consistency user-experience

Open  Not assigned L1 × 5min effort × 4 years ago × Bug Major

Remove this deprecated "width" attribute. Maintainability Consistency html5 obsolete

Open  Not assigned L9 × 5min effort × 4 years ago × Code Smell Major

Remove this deprecated "align" attribute. Maintainability Consistency html5 obsolete

Open  Not assigned L11 × 5min effort × 4 years ago × Code Smell Major

Remove this deprecated "size" attribute. Consistency

SonarQube Issues Project Settings Project Information

sonarqube-test / main

Overview Issues Security Hotspots Measures Code Activity

My Issues All

Bulk Change Select issues Navigate to issue 13,887 issues 59d effort

Filters Clear All Filters

Issues in new code

Clean Code Attribute 1

- Consistency 197k
- Intentionality 14k
- Adaptability 0
- Responsibility 0

Add to selection Ctrl + click

Software Quality

- Security 0
- Reliability 14k
- Maintainability 15

Severity

Type

gameoflife-acceptance-tests/Dockerfile

Use a specific version tag for the image. Maintainability Intentionality No tags

Open  Not assigned L1 × 5min effort × 4 years ago × Code Smell Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Maintainability Intentionality No tags

Open  Not assigned L12 × 5min effort × 4 years ago × Code Smell Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Maintainability Intentionality No tags

Open  Not assigned L12 × 5min effort × 4 years ago × Code Smell Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Maintainability Intentionality No tags

Open  Not assigned L13 × 5min effort × 4 years ago × Code Smell Major

Shreya Sawant  
D15A \_54

sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration More Q

sonarqube-test / main

Overview Issues Security Hotspots Measures Code Activity Project Settings Project Information

Filters Clear All Filters

Issues in new code

> Clean Code Attribute 1 1x

- Consistency 54k
- Intentionality 14k
- Adaptability 0
- Responsibility 0

Add to selection Ctrl + click

> Software Quality 1 1x

- Security 0
- Reliability 14k
- Maintainability 15

Add to selection Ctrl + click

> Severity ?

> Type

Bulk Change Select issues Navigate to issue 13,872 issues 59d effort

gameoflife-core/build/reports/tests/all-tests.html

Add "lang" and/or "xml:lang" attributes to this "<html>" element Intentionality Reliability accessibility wcag2-a

Open  Not assigned L1 = 2min effort 4 years ago ⚙ Bug ⚙ Major

Add "<th>" headers to this "<table>". Intentionality Reliability accessibility wcag2-a

Open  Not assigned L9 = 2min effort 4 years ago ⚙ Bug ⚙ Major

gameoflife-core/build/reports/tests/allclasses-frame.html

Add "lang" and/or "xml:lang" attributes to this "<html>" element Intentionality Reliability accessibility wcag2-a

Open  Not assigned L1 = 2min effort 4 years ago ⚙ Bug ⚙ Major

Add "<th>" headers to this "<table>". Intentionality Reliability accessibility wcag2-a

Open  Not assigned L9 = 2min effort 4 years ago ⚙ Bug ⚙ Major

sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration More Q

sonarqube-test / main

Overview Issues Security Hotspots Measures Code Activity Project Settings Project Information

Filters Clear All Filters

Issues in new code

> Clean Code Attribute 1 1x

> Software Quality 1 1x

> Severity ?

> Type 1 1x

- Bug 0
- Vulnerability 0
- Code Smell 15

> Scope

> Status

> Security Category

> Creation Date

Bulk Change Select issues Navigate to issue 15 issues 44min effort

gameoflife-acceptance-tests/Dockerfile

Use a specific version tag for the image. Intentionality Reliability No tags

Open  Not assigned L1 = 5min effort 4 years ago ⚙ Code Smell ⚙ Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Intentionality Reliability No tags

Open  Not assigned L12 = 5min effort 4 years ago ⚙ Code Smell ⚙ Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Intentionality Reliability No tags

Open  Not assigned L12 = 5min effort 4 years ago ⚙ Code Smell ⚙ Major

Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. Intentionality Reliability No tags

Open  Not assigned L13 = 5min effort 4 years ago ⚙ Code Smell ⚙ Major

gameoflife-core/.../com/wakaleo/gameoflife/domain/0\_WhenYouCreateACell.html

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D15A \_54

The tomcat image runs with root as the default user. Make sure it is safe here. ⚠️  
Running containers as a privileged user is security-sensitive docker:56471

Status: To review  
This security hotspot needs to be reviewed to assess whether the code poses a risk.

Review priority: ⚠️ Medium  
Category: Permission  
Assignee: Not assigned

gameoflife-web/Dockerfile ↗  
Open in IDE

```
1 FROM tomcat:8.0-jre8
2
3 RUN rm -rf /usr/local/tomcat/webapps/*
4
5 COPY target/gameoflife.war /usr/local/tomcat/webapps/ROOT.war
6
7 EXPOSE 8080
8 CMD ["catalina.sh", "run"]
```

Rating  
Effort to Reach A 0.0%

Security Review  
Overall Code  
Security Hotspots 3  
Rating ⚠️  
Security Hotspots Reviewed 0.0%

Duplications  
Overview  
Overall Code  
Density 50.6%  
Duplicated Lines 384,007  
Duplicated Blocks 42,818  
Duplicated Files 979

sonarqube-test  
View as Tree Select files Navigate 6 files  
Duplicated Lines (%) 50.6% See history

	Duplicated Lines (%)	Duplicated Lines
gameoflife-acceptance-tests	0.0%	0
gameoflife-build	0.0%	0
gameoflife-core	9.6%	374
gameoflife-deploy	0.0%	0
gameoflife-web	50.9%	383,633
pom.xml	0.0%	0

6 of 6 shown

Shreya Sawant  
D15A \_54

The screenshot shows the SonarQube interface for the project 'sonarqube-test'. The left sidebar has tabs for Overview, Issues, Security Hotspots, Measures, Code, and Activity. The 'Measures' tab is selected. The main panel displays a summary of code metrics: Effort to Reach A (0), Security Review (3 hotspots), Overall Code (Security Hotspots: 3), Rating (E), and Duplications. Under 'Size', it shows Lines of Code: 682,883, Lines: 759,093, Files: 1,147, Comment Lines: 31,958, and Comments (%): 4.5%. The right panel shows a detailed tree view of the codebase under 'sonarqube-test'. The tree includes 'gameoflife-acceptance-tests' (164 files), 'gameoflife-build' (368 files), 'gameoflife-core' (3,675 files), 'gameoflife-deploy' (69 files), 'gameoflife-web' (678,148 files), and 'pom.xml' (459 files). The total number of files is 6.

The screenshot shows the SonarQube interface for the project 'sonarqube-test'. The left sidebar has tabs for Overview, Issues, Security Hotspots, Measures, Code, and Activity. The 'Measures' tab is selected. The main panel displays a summary of code metrics: Security Review (3 hotspots), Overall Code (Security Hotspots: 3), Rating (E), and Duplications. Under 'Size', it shows Lines of Code: 682,883, Lines: 759,093, Files: 1,147, Comment Lines: 31,958, and Comments (%): 4.5%. The right panel shows a detailed tree view of the codebase under 'sonarqube-test'. The tree includes 'gameoflife-acceptance-tests', 'gameoflife-build', 'gameoflife-core' (18 files), 'gameoflife-deploy', 'gameoflife-web' (1,094 files), and 'pom.xml'. The total number of files is 6. At the bottom of the right panel, it says '6 of 6 shown'.

## Experiment.9

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

Step.1 Create an Amazon Linux EC2 Instance in AWS and name it - nagios-host

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with navigation links like EC2 Dashboard, EC2 Global View, Events, Console-to-Code Preview, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity, Reservations, Images, AMIs, AMI Catalog, and Elastic Block Store. The main area displays a table of instances. A single row is selected for 'nagios-host' (Instance ID: i-0392d5d7d0864f1dd). The instance details are shown in a modal window below the table. The modal has tabs for Details, Status and alarms, Monitoring, Security, Networking, Storage, and Tags. Under the Details tab, the 'Instance summary' section shows the Instance ID (i-0392d5d7d0864f1dd), Public IPv4 address (54.147.245.126), Instance state (Running), and Private IP4 address (172.31.80.22). Other fields include IPv6 address (empty), Hostname type (IP name: in-172-31-80-22.ec2.internal), and Private IP DNS name (IP name: in-172-31-80-22.ec2.internal).

The screenshot shows the 'Launch an instance' success page. The URL in the browser is 'EC2 > Instances > Launch an instance'. A green success message box says 'Success' and 'Successfully initiated launch of instance (i-094481053ee570f32)'. Below the message is a link '▶ Launch log'. At the bottom, there's a 'Next Steps' section with a text input field asking 'What would you like to do next with this instance, for example "create alarm"?' and a navigation bar with page numbers 1 through 12.

Step.2 Under Security Group, make sure HTTP, HTTPS, SSH, ICMP are open from everywhere.

Inbound rules <small>Info</small>								
Security group rule ID	Type <small>Info</small>	Protocol <small>Info</small>	Port range	Source <small>Info</small>	Description - optional <small>Info</small>			
sgr-0dd3db4ec3e713a9f	HTTPS	TCP	443	Custom ▾	<input type="text" value="0.0.0.0/0"/> X	<input type="text"/>	<input type="text"/>	<button>Delete</button>
sgr-096c285fa9ec0a889	All ICMP - IPv4	ICMP	All	Custom ▾	<input type="text" value="0.0.0.0/0"/> X	<input type="text"/>	<input type="text"/>	<button>Delete</button>
sgr-03f2302a42808e10a	SSH	TCP	22	Custom ▾	<input type="text" value="0.0.0.0/0"/> X	<input type="text"/>	<input type="text"/>	<button>Delete</button>
sgr-092a303d8441e3ce4	All ICMP - IPv6	IPv6 ICMP	All	Custom ▾	<input type="text" value="0.0.0.0/0"/> X	<input type="text"/>	<input type="text"/>	<button>Delete</button>
sgr-0aad7f8e3c2bda6d1	HTTP	TCP	80	Custom ▾	<input type="text" value="0.0.0.0/0"/> X	<input type="text"/>	<input type="text"/>	<button>Delete</button>
sgr-0feb657cefb8d08cc	All traffic	All	All	Custom ▾	<input type="text"/>	<input type="text"/>	<input type="text"/>	<button>Delete</button>

**⚠ All ports are open to all IPv4 addresses in your security group**  
 All ports are currently open to all IPv4 addresses, indicated by All and 0.0.0.0/0 in the inbound rule in [your security group](#). For increased security, consider restricting access to only the EC2 Instance Connect service IP addresses for your Region: 18.206.107.24/29. [Learn more](#).

Instance ID  
i-094481053ee570f32 (nagios-host)

Connection Type

Connect using EC2 Instance Connect  
Connect using the EC2 Instance Connect browser-based client, with a public IPv4 or IPv6 address.

Connect using EC2 Instance Connect Endpoint  
Connect using the EC2 Instance Connect browser-based client, with a private IPv4 address and a VPC endpoint.

Public IPv4 address  
44.203.145.24

IPv6 address  
—

Username  
Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username, ec2-user.

(i) Note: In most cases, the default username, ec2-user, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

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

ⓘ Keyboard shortcut

To tab out of the terminal window and select the next button element, press the left and right Shift keys together.

```
'          #
~\_\_###_      Amazon Linux 2023
~~ \_\#\#\#\`\
~~   \#\#\|_
~~     \#/      https://aws.amazon.com/linux/amazon-linux-2023
~~     V~'__->
~~~           /
~~.._./_
~/m/`_/
Last login: Tue Oct  1 08:38:37 2024 from 18.206.107.27
[ec2-user@ip-172-31-87-21 ~]$
```

Step.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

sudo yum install gd gd-devel

```
[ec2-user@ip-172-31-87-21 ~]$ sudo yum update
Last metadata expiration check: 0:10:07 ago on Tue Oct  1 08:30:38 2024.
Dependencies resolved.
Nothing to do.
Complete!
```

## Shreya Sawant D15A-54

```
[ec2-user@ip-172-31-87-21 ~]$ sudo yum install httpd php
Last metadata expiration check: 0:10:31 ago on Tue Oct 1 08:30:38 2024.
Dependencies resolved.
=====
== Package                                     Architecture      Version       Repository
e
=====
== Installing:
  httpd           x86_64          2.4.62-1.amzn2023   amazonlinux
  php8.3          x86_64          8.3.10-1.amzn2023.0.1  amazonlinux
  apr             x86_64          1.7.2-2.amzn2023.0.2  amazonlinux
  apr-util         x86_64          1.6.3-1.amzn2023.0.1  amazonlinux
  generic-logos-htpd    noarch        18.0.0-12.amzn2023.0.3  amazonlinux
  httpd-core       x86_64          2.4.62-1.amzn2023   amazonlinux
  httpd-filesystem noarch        2.4.62-1.amzn2023   amazonlinux
=====
i-094481053ee570f32 (nagios-host)
PublicIPs: 44.203.145.24 PrivateIPs: 172.31.87.21
```

```
-- Total                                         19 MB/s | 1

Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing : [=====
g : [=====
[=====                                          P
=====                                          Preparing
=====                                          Preparing : [=====
g : [=====
[=====                                          P
=====                                          Preparing
=====
i-094481053ee570f32 (nagios-host)
PublicIPs: 44.203.145.24 PrivateIPs: 172.31.87.21
```

## Shreya Sawant D15A-54

```
Installed:
  apr-1.7.2-2.amzn2023.0.2.x86_64           apr-util-1.6.3-1.amzn2023.0.1.x86_64           apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64
  generic-logos-httd-18.0.0-12.amzn2023.0.3.noarch   httpd-2.4.62-1.amzn2023.x86_64           httpd-core-2.4.62-1.amzn2023.x86_64
  httpd-filesystem-2.4.62-1.amzn2023.noarch       httpd-tools-2.4.62-1.amzn2023.x86_64           libbrotli-1.0.9-4.amzn2023.0.2.x86_64
  libsodium-1.0.19-4.amzn2023.x86_64           libxslt-1.1.34-5.amzn2023.0.2.x86_64           mailcap-2.1.49-3.amzn2023.0.3.noarch
  mod_http2-2.0.27-1.amzn2023.0.3.x86_64       mod_lua-2.4.62-1.amzn2023.x86_64           nginx-filesystem-1:1.24.0-1.amzn2023.0.4.noarch
  php8.3-8.3.10-1.amzn2023.0.1.x86_64         php8.3-cli-8.3.10-1.amzn2023.0.1.x86_64           php8.3-common-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64       php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64           php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-pdo-8.3.10-1.amzn2023.0.1.x86_64       php8.3-process-8.3.10-1.amzn2023.0.1.x86_64           php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64

Complete!
[ec2-user@ip-172-31-87-21 ~]$
```

```
Verifying : libxcb-devel-1.13.1-7.amzn2023.0.2.x86_64
Verifying : libxml2-devel-2.10.4-1.amzn2023.0.6.x86_64
Verifying : pcre2-devel-10.40-1.amzn2023.0.3.x86_64
Verifying : pcre2-utf16-10.40-1.amzn2023.0.3.x86_64
Verifying : pcre2-utf32-10.40-1.amzn2023.0.3.x86_64
Verifying : pixman-0.40.0-3.amzn2023.0.3.x86_64
Verifying : sysprof-capture-devel-3.40.1-2.amzn2023.0.2.x86_64
Verifying : xml-common-0.6.3-56.amzn2023.0.2.noarch
Verifying : xorg-x11proto-devel-2021.4-1.amzn2023.0.2.noarch
Verifying : xz-devel-5.2.5-9.amzn2023.0.2.x86_64
Verifying : zlib-devel-1.2.11-33.amzn2023.0.5.x86_64

Installed:
  brotli-1.0.9-4.amzn2023.0.2.x86_64           brotli-devel-1.0.9-4.amzn2023.0.2.x86_64
  bzip2-devel-1.0.8-6.amzn2023.0.2.x86_64           cairo-1.17.6-2.amzn2023.0.1.x86_64
```

```
libicu-devel-67.1-7.amzn2023.0.3.x86_64           libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64
libjpeg-turbo-devel-2.1.4-2.amzn2023.0.5.x86_64           libmount-devel-2.37.4-1.amzn2023.0.4.x86_64
libpng-2:1.6.37-10.amzn2023.0.6.x86_64           libpng-devel-2:1.6.37-10.amzn2023.0.6.x86_64
libselinux-devel-3.4-5.amzn2023.0.2.x86_64           libsepol-devel-3.4-3.amzn2023.0.3.x86_64
libtiff-4.4.0-4.amzn2023.0.18.x86_64           libtiff-devel-4.4.0-4.amzn2023.0.18.x86_64
libwebp-1.2.4-1.amzn2023.0.6.x86_64           libwebp-devel-1.2.4-1.amzn2023.0.6.x86_64
libxcb-1.13.1-7.amzn2023.0.2.x86_64           libxcb-devel-1.13.1-7.amzn2023.0.2.x86_64
libxml2-devel-2.10.4-1.amzn2023.0.6.x86_64           pcre2-devel-10.40-1.amzn2023.0.3.x86_64
pcre2-utf16-10.40-1.amzn2023.0.3.x86_64           pcre2-utf32-10.40-1.amzn2023.0.3.x86_64
pixman-0.40.0-3.amzn2023.0.3.x86_64           sysprof-capture-devel-3.40.1-2.amzn2023.0.2.x86_64
xml-common-0.6.3-56.amzn2023.0.2.noarch
xz-devel-5.2.5-9.amzn2023.0.2.x86_64           xorg-x11proto-devel-2021.4-1.amzn2023.0.2.noarch

Complete!
[ec2-user@ip-172-31-87-21 ~]$
```

Step.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-172-31-87-21 ~]$ sudo useradd nagios
sudo passwd nagios
Changing password for user nagios.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-87-21 ~]$ █
```

Step.6 Create a new user group

```
sudo groupadd nagcmd
```

```
[ec2-user@ip-172-31-87-21 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-87-21 ~]$ sudo usermod -aG nagcmd nagios
sudo usermod -aG nagcmd apache
[ec2-user@ip-172-31-87-21 ~]$ mkdir ~/downloads
cd ~/downloads
[ec2-user@ip-172-31-87-21 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
--2024-10-01 08:50:36-- 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          6%[====>]  751.62K  3.56MB/s
nagios-4.4.6.tar.gz          31%[=====>]  3.45M  8.18MB/s
nagios-4.4.6.tar.gz          56%[=====>]  6.09M  9.73MB/s
nagios-4.4.6.tar.gz          79%[=====>]  8.63M 10.4MB/s
nagios-4.4.6.tar.gz         100%[=====] 10.81M 10.9MB/s

2024-10-01 08:50:37 (10.9 MB/s) - 'nagios-4.4.6.tar.gz' saved [11333414/11333414]
--2024-10-01 08:50:37-- https://nagios-plugins.org/download/nagios-plugins-2.3.3.tar.gz
```

Step.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
```

```
2024-10-01 08:50:37 (10.9 MB/s) - 'nagios-4.4.6.tar.gz' saved [11333414/11333414]

--2024-10-01 08:50:37-- 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%[
nagios-plugins-2.3.3.tar.gz          12%[======>
nagios-plugins-2.3.3.tar.gz          100%[=====

2024-10-01 08:50:38 (7.06 MB/s) - 'nagios-plugins-2.3.3.tar.gz' saved [2782610/2782610]
[ec2-user@ip-172-31-87-21 downloads]$ █
```

Step.8 Use wget to download the source zip files.

wget http://nagios-plugins.org/download/nagios-plugins-2.0.3.tar.gz

```
2024-10-01 08:50:38 (7.06 MB/s) - 'nagios-plugins-2.3.3.tar.gz' saved [2782610/2782610]

[ec2-user@ip-172-31-87-21 downloads]$ tar zxvf nagios-4.4.6.tar.gz
cd nagios-4.4.6
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/tap/tests/todo/Makefile.in
nagios-4.4.6/tap/tests/todo/test.c
nagios-4.4.6/tap/tests/todo/test.pl
nagios-4.4.6/tap/tests/todo/test.t
nagios-4.4.6/test/
nagios-4.4.6/test/test-downtime.pl
nagios-4.4.6/update-version
nagios-4.4.6/worker/
nagios-4.4.6/worker/Makefile.in
nagios-4.4.6/worker/ping/
nagios-4.4.6/worker/ping/.gitignore
nagios-4.4.6/worker/ping/Makefile.in
nagios-4.4.6/worker/ping/worker-ping.c
nagios-4.4.6/xdata/
nagios-4.4.6/xdata/.gitignore
nagios-4.4.6/xdata/Makefile.in
nagios-4.4.6/xdata/xcddefault.c
nagios-4.4.6/xdata/xcddefault.h
nagios-4.4.6/xdata/xodtemplate.c
nagios-4.4.6/xdata/xodtemplate.h
nagios-4.4.6/xdata/xpddefault.c
nagios-4.4.6/xdata/xpddefault.h
nagios-4.4.6/xdata/xrddefault.c
nagios-4.4.6/xdata/xrddefault.h
nagios-4.4.6/xdata/xsddefault.c
nagios-4.4.6/xdata/xsddefault.h
[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ □
```

Step.9 Run the configuration script with the same group name you previously created.

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

```
[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ ./configure --with-command-group=nagcmd
checking for a BSD-compatible install... /usr/bin/install -c
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
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 whether make sets $(MAKE)... yes
checking whether ln -s works... yes
checking for strip... /usr/bin/strip
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
checking for ANSI C header files... yes
checking whether time.h and sys/time.h may both be included... yes
checking for sys/wait.h that is POSIX.1 compatible... yes
checking for sys/types.h... yes
checking for sys/stat.h... yes
checking for stdlib.h... yes
checking for string.h... yes
```

```
General Options:
-----
    Nagios executable: nagios
    Nagios user/group: nagios,nagios
    Command user/group: nagios,nagcmd
        Event Broker: yes
    Install ${prefix}: /usr/local/nagios
    Install ${includedir}: /usr/local/nagios/include/nagios
        Lock file: /run/nagios.lock
    Check result directory: /usr/local/nagios/var/spool/checkresults
        Init directory: /lib/systemd/system
Apache conf.d directory: /etc/httpd/conf.d
    Mail program: /bin/mail
        Host OS: linux-gnu
    IOBroker Method: epoll

Web Interface Options:
-----
    HTML URL: http://localhost/nagios/
    CGI URL: http://localhost/nagios/cgi-bin/
Traceroute (used by WAP): /usr/bin/traceroute

Review the options above for accuracy. If they look okay,
type 'make all' to compile the main program and CGIs.

[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ 
```

**Step.10 Compile the source code.**

make all

```
[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ make all
cd ./base && make
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.4.6/base'
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o nagios.o nagios.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o broker.o broker.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o nebmods.o nebmods.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o .../common/shared.o .../common/shared.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o query-handler.o query-handler.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o workers.o workers.c
In function 'get_wproc_list',
  inlined from 'get_worker' at workers.c:277:12:
workers.c:253:17: warning: '%s' directive argument is null [-Wformat-overflow=]
  253 |         log_debug_info(DEBUG_CHECKS, 1, "Found specialized worker(s) for \"%s\"", (slash && *slash != '/') ? slash : cmd_name);
  |         ^
  |
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o checks.o checks.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o config.o config.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o commands.o commands.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o events.o events.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o flapping.o flapping.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o logging.o logging.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o macros-base.o .../common/macros.c
gcc -Wall -I... -g -O2 -DHAVE_CONFIG_H -DNSCORE -c -o netutils.o netutils.c
netutils.c: In function 'my_tcp_connect':
netutils.c:50:47: warning: '%d' directive output may be truncated writing between 1 and 11 bytes into a region of size 6 [-Wformat-truncation=]
  50 |     sprintf(port_str, sizeof(port_str), "%d", port);
  |     ^
  |
```

```
*** Support Notes ****
If you have questions about configuring or running Nagios,
please make sure that you:
    - Look at the sample config files
    - Read the documentation on the Nagios Library at:
        https://library.nagios.com

before you post a question to one of the mailing lists.
Also make sure to include pertinent information that could
help others help you. This might include:
    - What version of Nagios you are using
    - What version of the plugins you are using
    - Relevant snippets from your config files
    - Relevant error messages from the Nagios log file

For more information on obtaining support for Nagios, visit:
    https://support.nagios.com
*****
Enjoy.

[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ ]
```

Step.11 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-172-31-87-21 nagios-4.4.6]$ sudo make install
sudo make install-init
sudo make install-config
sudo make install-commandmode
cd ./base && make install
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.4.6/base'
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/bin
/usr/bin/install -c -s -m 774 -o nagios -g nagios nagios /usr/local/nagios/bin
/usr/bin/install -c -s -m 774 -o nagios -g nagios nagiosstats /usr/local/nagios/bin
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-4.4.6/base'
cd ./cgi && make install
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.4.6/cgi'
make install-basic
make[2]: Entering directory '/home/ec2-user/downloads/nagios-4.4.6/cgi'
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/sbin
for file in *.cgi; do \
    /usr/bin/install -c -s -m 775 -o nagios -g nagios $file /usr/local/nagios/sbin; \
done
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-4.4.6/cgi'
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-4.4.6/cgi'
cd ./html && make install
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.4.6/html'
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/share
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/share/media
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/share/stylesheets
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/share/contexthelp
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/share/docs
```

```
/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
/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
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/cgi.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 660 -o nagios -g nagios sample-config/resource.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/template.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/commands.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/contacts.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/timeperiods.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/locations.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/windows.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/printers.cfg /usr/local/nagios/etc
/usr/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/switches.cfg /usr/local/nagios/etc

*** 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 ***

[ec2-user@ip-172-31-87-21 nagios-4.4.6]$
```

Step.12 Edit the config file and change the email address.

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

```
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             sawantshreya647@gmail.com ; <***** CHANGE THIS TO YOUR EMAIL ADDRESS *****>
}
```

Step.13 Configure the web interface.

sudo make install-webconf

```
[ec2-user@ip-172-31-87-21 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-172-31-87-21 nagios-4.4.6]$
```

Step.14 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-172-31-87-21 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-172-31-87-21 nagios-4.4.6]$
```

Step.15 Restart Apache

```
sudo service httpd restart
```

Go back to the downloads folder and unzip the plugins zip file.

```
cd ~/downloads
```

```
tar zxvf nagios-plugins-2.0.3.tar.gz
```

```
[ec2-user@ip-172-31-87-21 nagios-4.4.6]$ sudo systemctl restart httpd
[ec2-user@ip-172-31-87-21 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/plugins-scripts/Makefile.in
nagios-plugins-2.3.3/plugins-scripts/check_ifoperstatus.pl
nagios-plugins-2.3.3/plugins-scripts/Makefile.am
nagios-plugins-2.3.3/plugins-scripts/check_breeze.pl
nagios-plugins-2.3.3/plugins-scripts/check_log.sh
nagios-plugins-2.3.3/plugins-scripts/check_ssl_validity.pl
nagios-plugins-2.3.3/plugins-scripts/check_flexlm.pl
nagios-plugins-2.3.3/plugins-scripts/check_rpc.pl
nagios-plugins-2.3.3/plugins-scripts/check_oracle.sh
nagios-plugins-2.3.3/plugins-scripts/utils.pm.in
nagios-plugins-2.3.3/plugins-scripts/check_disk_smb.pl
nagios-plugins-2.3.3/plugins-scripts/t/
nagios-plugins-2.3.3/plugins-scripts/t/check_ifoperstatus.t
nagios-plugins-2.3.3/plugins-scripts/t/check_rpc.t
nagios-plugins-2.3.3/plugins-scripts/t/check_file_age.t
nagios-plugins-2.3.3/plugins-scripts/t/check_disk_smb.t
nagios-plugins-2.3.3/plugins-scripts/t/check_ifstatus.t
nagios-plugins-2.3.3/plugins-scripts/t/utils.t
nagios-plugins-2.3.3/plugins-scripts/check_mailq.pl
nagios-plugins-2.3.3/plugins-scripts/check_wave.pl
nagios-plugins-2.3.3/plugins-scripts/check_ircd.pl
nagios-plugins-2.3.3/plugins-scripts/utils.sh.in
nagios-plugins-2.3.3/plugins-scripts/check_ifstatus.pl
nagios-plugins-2.3.3/plugins-scripts/check_sensors.sh
nagios-plugins-2.3.3/pkg/
nagios-plugins-2.3.3/pkg/fedora/
nagios-plugins-2.3.3/pkg/fedora/requirements
nagios-plugins-2.3.3/pkg/solaris/
nagios-plugins-2.3.3/pkg/solaris/preinstall
nagios-plugins-2.3.3/pkg/solaris/solpkg
nagios-plugins-2.3.3/pkg/solaris/pkginfo.in
nagios-plugins-2.3.3/pkg/solaris/pkginfo
nagios-plugins-2.3.3/pkg/redhat/
nagios-plugins-2.3.3/pkg/redhat/requirements
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$ █
```

```
make[2]: Entering directory '/home/ec2-user/downloads/nagios-plugins-2.3.3/plugins-root'
/usr/bin/install -c -o nagios -g nagios check_dhcp /usr/local/nagios/libexec/check_dhcp
chown root /usr/local/nagios/libexec/check_dhcp
chmod ug=rx,u+s /usr/local/nagios/libexec/check_dhcp
/usr/bin/install -c -o nagios -g nagios check_icmp /usr/local/nagios/libexec/check_icmp
chown root /usr/local/nagios/libexec/check_icmp
chmod ug=rx,u+s /usr/local/nagios/libexec/check_icmp
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-plugins-2.3.3/plugins-root'
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-plugins-2.3.3/plugins-root'
Making install in po
make[1]: Entering directory '/home/ec2-user/downloads/nagios-plugins-2.3.3/po'
/usr/bin/mkdir -p /usr/local/nagios/share
installing fr.gmo as /usr/local/nagios/share/locale/fr/LC_MESSAGES/nagios-plugins.mo
installing de.gmo as /usr/local/nagios/share/locale/de/LC_MESSAGES/nagios-plugins.mo
if test "nagios-plugins" = "gettext-tools"; then \
  /usr/bin/mkdir -p /usr/local/nagios/share/gettext/po; \
  for file in Makefile.in.in remove-potcdate.sin  Makevars.template; do \
    /usr/bin/install -c -o nagios -g nagios -m 644 ./${file} \
      /usr/local/nagios/share/gettext/po/${file}; \
  done; \
  for file in Makevars; do \
    rm -f /usr/local/nagios/share/gettext/po/${file}; \
  done; \
else \
:; \
fi
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-plugins-2.3.3/po'
make[1]: Entering directory '/home/ec2-user/downloads/nagios-plugins-2.3.3'
make[2]: Entering directory '/home/ec2-user/downloads/nagios-plugins-2.3.3'
make[2]: Nothing to be done for 'install-exec-am'.
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-plugins-2.3.3'
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-plugins-2.3.3'
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$ █
```

```
Running pre-flight check on configuration data...

Checking objects...
    Checked 8 services.
    Checked 1 hosts.
    Checked 1 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 1 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
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$ █
```

Checking misc settings...

Total Warnings: 0  
Total Errors: 0

Things look okay - No serious problems were detected during the pre-flight check

```
[ec2-user@ip-172-31-87-21 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 Tue 2024-10-01 09:04:30 UTC; 41s ago
     Docs: https://www.nagios.org/documentation
 Process: 69042 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
 Process: 69043 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
 Main PID: 69044 (nagios)
   Tasks: 6 (limit: 1112)
  Memory: 2.1M
    CPU: 21ms
   CGroup: /system.slice/nagios.service
           ├─69044 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
           ├─69045 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
           ├─69046 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
           ├─69047 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
           ├─69048 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
           └─69049 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: qh: Socket '/usr/local/nagios/var/rw/nagios.gh' successfully initialized
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: qh: core query handler registered
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: qh: echo service query handler registered
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: qh: help for the query handler registered
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: wproc: Successfully registered manager as @wproc with query handler
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: wproc: Registry request: name=Core Worker 69047;pid=69047
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: wproc: Registry request: name=Core Worker 69048;pid=69048
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: wproc: Registry request: name=Core Worker 69046;pid=69046
Oct 01 09:04:30 ip-172-31-87-21.ec2.internal nagios[69044]: wproc: Registry request: name=Core Worker 69045;pid=69045
Lines 1-27 █
```

Step.16 Go back to EC2 Console and copy the Public IP address of this instance

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with navigation links like EC2 Dashboard, EC2 Global View, Events, and various Instance and Image categories. The main area displays a table of instances. One instance is selected, labeled 'nagios-host' with the ID i-094481053ee570f32. The instance is shown as 'Running' with a green status icon. It's a t2.micro type, has 2/2 checks passed, and is in the us-east-1c availability zone. The public IP listed is 44.203.145.24. Below the table, a detailed view for the selected instance is expanded, showing its summary information including Instance ID, Public IPv4 address (44.203.145.24), Instance state (Running), and Private IP DNS name (ip-172-31-87-21.ec2.internal).

Step.17 Open up your browser and look for [http://<your\\_public\\_ip\\_address>/nagios](http://<your_public_ip_address>/nagios)

The screenshot shows the Nagios Core web interface. The URL in the browser bar is 44.203.145.24/nagios/. The main page features the Nagios logo at the top. On the left, there's a vertical navigation menu with sections like General, Current Status, Reports, and System. The 'Current Status' section is expanded, showing links for Tactical Overview Map (Legacy), Hosts, Services, Host Groups, Service Groups, and Problems. The 'Reports' section also has several legacy links. The main content area displays the Nagios Core logo and version 4.4.6, along with a note that the daemon is running with PID 69044. A blue banner at the bottom of the main content area informs users that a new version (4.5.5) is available for download. The right side of the page contains two boxes: 'Get Started' with a list of links for monitoring infrastructure, extending Nagios, getting support, training, and certification; and 'Quick Links' with links to the Nagios Library, Labs, Exchange, Support, and official website.

## Experiment.10

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

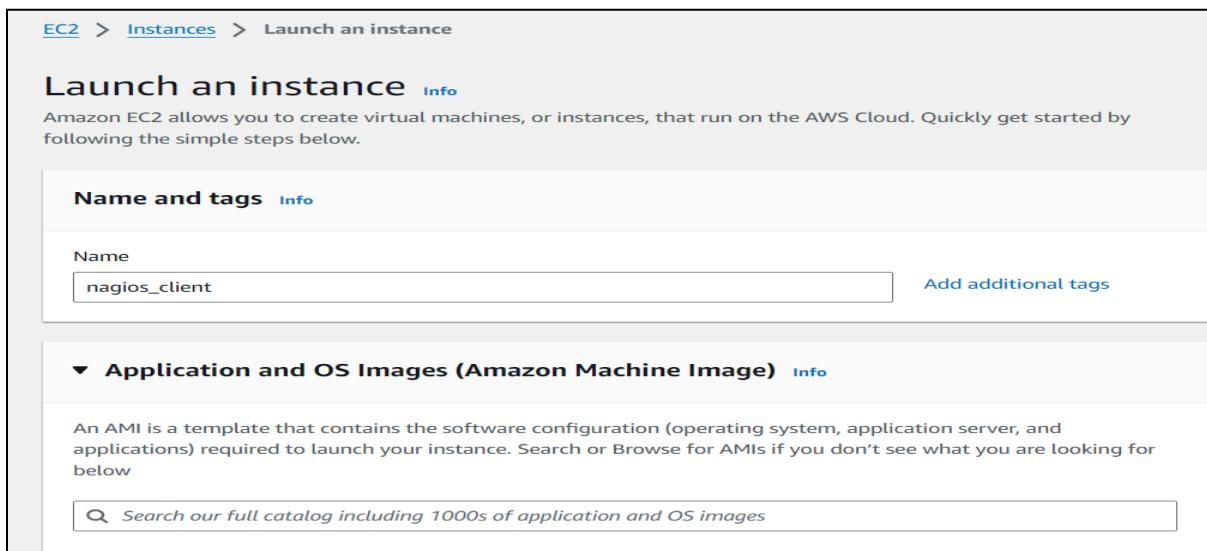
Step.1 To Confirm that Nagios is running on the server side, run this sudo systemctl status nagios on the “NAGIOS HOST”

```
Checking misc settings...

Total Warnings: 0
Total Errors: 0

Things look okay - No serious problems were detected during the pre-flight check
[ec2-user@ip-172-31-87-21 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 Tue 2024-10-01 09:04:30 UTC; 41s ago
      Docs: https://www.nagios.org/documentation
   Process: 69042 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/na
   Process: 69043 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagio
 Main PID: 69044 (nagios)
    Tasks: 6 (limit: 1112)
   Memory: 2.1M
      CPU: 21ms
```

Step.2 To monitor a Linux machine, create an Ubuntu 20.04 server EC2 Instance in AWS. Provide it with the same security group as the Nagios Host and name it ‘linux-client’ alongside the host.

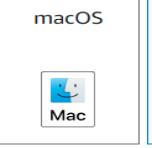
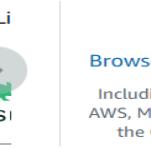


▼ Application and OS Images (Amazon Machine Image) [Info](#)

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

 [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>).

▼ 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*

 [Create new key pair](#)

[Edit](#)

▼ Network settings [Info](#)

Network [Info](#)  
vpc-0052a92254f95b1cf

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.

# Shreya Sawant D15A 54

EC2 > Instances > Launch an instance

Success  
Successfully initiated launch of instance (i-016ad2dca7639d679)

▶ Launch log

Inbound rules <small>Info</small>						
Security group rule ID	Type <small>Info</small>	Protocol <small>Info</small>	Port range	Source <small>Info</small>	Description - optional <small>Info</small>	
sgr-09cd71942884596a0	HTTPS	TCP	443	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>
sgr-08f43cb5bdcb0e5f1	HTTP	TCP	80	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>
sgr-0f62e5432684a8fe5	All traffic	All	All	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>
sgr-03ab7c9f2147e2999	SSH	TCP	22	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>
sgr-05b65924d75b6cbdc	All ICMP - IPv6	IPv6 ICMP	All	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>
sgr-00f29b9376b253f54	All ICMP - IPv4	ICMP	All	Custom ▾	Q <input type="text"/> 0.0.0.0/0 <span style="color: blue;">X</span>	<span style="color: blue;">Delete</span>

⌚ Inbound security group rules successfully modified on security group (sg-06baaffb58b00dd40 | launch-wizard-4)

▶ Details

EC2 > Security Groups > sg-06baaffb58b00dd40 - launch-wizard-4

### sg-06baaffb58b00dd40 - launch-wizard-4

Actions ▾

Details			
Security group name <span style="color: blue;">▶</span> launch-wizard-4	Security group ID <span style="color: blue;">▶</span> sg-06baaffb58b00dd40	Description <span style="color: blue;">▶</span> launch-wizard-4 created 2024-10-01T09:11:39.581Z	VPC ID <span style="color: blue;">▶</span> vpc-0052a92254f95b1cf <span style="color: blue;">🔗</span>
Owner <span style="color: blue;">▶</span> 010928179348	Inbound rules count 6 Permission entries	Outbound rules count 1 Permission entry	

The screenshot shows the AWS EC2 Instance Connect interface. At the top, there are four tabs: EC2 Instance Connect (selected), Session Manager, SSH client, and EC2 serial console. A yellow warning box at the top states: "All ports are open to all IPv4 addresses in your security group. All ports are currently open to all IPv4 addresses, indicated by All and 0.0.0.0/0 in the inbound rule in your security group. For increased security, consider restricting access to only the EC2 Instance Connect service IP addresses for your Region: 18.206.107.24/29. [Learn more](#)". Below this, the "Instance ID" is listed as "i-016ad2dca7639d679 (nagios\_client)". The "Connection Type" section contains three options: "Connect using EC2 Instance Connect" (selected), "Public IPv4 address" (selected), and "IPv6 address". Under "Username", it says "ubuntu". A note at the bottom of the connection type section states: "Note: In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions".

Step.3 On the server, run this command

```
ps -ef | grep nagios
```

```
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$ ps -ef | grep nagios
nagios  69044      1  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios  69045  69044  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
nagios  69046  69044  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
nagios  69047  69044  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
nagios  69048  69044  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.gh
nagios  69049  69044  0 09:04 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
ec2-user  70083  3334  0 09:22 pts/0    00:00:00 grep --color=auto nagios
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$
```

Step.4 Become a root user and create 2 folders

```
sudo su
```

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

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

```
[ec2-user@ip-172-31-87-21 nagios-plugins-2.3.3]$ sudo su
/usr/local/nagios/etc/objects/monitorhosts
/usr/local/nagios/etc/objects/monitorhosts/linuxhosts
[root@ip-172-31-87-21 nagios-plugins-2.3.3]# cp /usr/local/nagios/etc/objects/localhost.cfg
/usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg
cp: missing destination file operand after '/usr/local/nagios/etc/objects/localhost.cfg'
Try 'cp --help' for more information.
bash: /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg: No such file or directory
```

Shreya Sawant D15A 54

Step.5 Copy the sample localhost.cfg file to linuxhost folder

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

```
[root@ip-172-31-87-21 linuxhost]# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg  
cp: cannot create regular file '/usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg': No such file or directory  
[root@ip-172-31-87-21 linuxhost]# cd ..  
[root@ip-172-31-87-21 monitorhosts]# mkdir linuxhosts  
[root@ip-172-31-87-21 monitorhosts]# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg  
[root@ip-172-31-87-21 monitorhosts]# cd linuxhosts/  
[root@ip-172-31-87-21 linuxhosts]# ls  
linuxserver.cfg  
[root@ip-172-31-87-21 linuxhosts]# sudo nano /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg  
[root@ip-172-31-87-21 linuxhosts]# sudo nano /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg  
[root@ip-172-31-87-21 linuxhosts]# nano /usr/local/nagios/etc/nagios.cfg  
[root@ip-172-31-87-21 linuxhosts]# service nagios restart  
Redirecting to /bin/systemctl restart nagios.service  
[root@ip-172-31-87-21 linuxhosts]#  
Broadcast message from root@localhost (Tue 2024-10-01 09:58:28 UTC):
```

```
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1012-aws x86_64)  
  
 * Documentation:  https://help.ubuntu.com  
 * Management:    https://landscape.canonical.com  
 * Support:       https://ubuntu.com/pro  
  
System information as of Tue Oct  1 09:20:11 UTC 2024  
  
 System load:  0.0          Processes:           106  
 Usage of /:   22.8% of 6.71GB  Users logged in:  0  
 Memory usage: 20%          IPv4 address for enx0: 172.31.90.61  
 Swap usage:   0%  
  
Expanded Security Maintenance for Applications is not enabled.  
0 updates can be applied immediately.  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/*copyright.
```

i-016ad2dca7639d679 (nagios\_client)  
PublicIPs: 18.212.58.57 PrivateIPs: 172.31.90.61

Step.6 Make a package index update and install gcc, nagios-nrpe-server and the plugins.

sudo apt update -y

sudo apt install gcc -y

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

```
ubuntu@ip-172-31-90-61:~$ sudo apt install gcc -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu cpp cpp-13 cpp-13-x86-64-linux-gnu cpp-x86_64-linux-gnu fontconfig-config fonts-dejavu-core
  fonts-dejavu-mono gcc-13 gcc-13-base gcc-13-x86_64-linux-gnu gcc-x86_64-linux-gnu libatomic3 libasan8 libatomic1 libbinutils libc-dev-bin libc-devtools libc6-dev
  libcc1-0 libcrypt-dev libctf-nobfd0 libctf0 libde265-0 libdeflate0 libfontconfig1 libgcc-13-dev libgd3 libgomp1 libprofng0 libheif-plugin-aomdec
  libheif-plugin-aomenc libheif-plugin-libde265 libheif1 libwasan0 libisl23 libitm libjbig0 libjpeg-turbo8 libjpeg8 liblrc4 liblsan0 libmpc3 libquadmath0
  libssframe1 libsharpuyv0 libtiff6 libtsan2 libubsan1 libwebp7 libxpm4 linux-libc-dev manpages-dev rpcsvc-proto
Suggested packages:
  binutils-doc gprofng-gui cpp-doc gcc-13-locales cpp-13-doc gcc-multilib make autoconf automake libtool flex bison gdb gcc-doc gcc-13-multilib gcc-13-doc
  gdb-x86_64-linux-gnu libgcc-doc libgd-tools libheif-plugin-ffmpegdec libheif-plugin-jpegdec libheif-plugin-jpegenc libheif-plugin-j2kdec
  libheif-plugin-j2kenc libheif-plugin-ravle libheif-plugin-svtenc
The following NEW packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu cpp cpp-13 cpp-13-x86_64-linux-gnu cpp-x86_64-linux-gnu fontconfig-config fonts-dejavu-core
  fonts-dejavu-mono gcc-13 gcc-13-base gcc-13-x86_64-linux-gnu gcc-x86_64-linux-gnu libatomic3 libasan8 libatomic1 libbinutils libc-dev-bin libc-devtools
  libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0 libctf0 libde265-0 libdeflate0 libfontconfig1 libgcc-13-dev libgd3 libgomp1 libprofng0 libheif-plugin-aomdec
  libheif-plugin-aomenc libheif-plugin-libde265 libheif1 libwasan0 libisl23 libitm libjbig0 libjpeg-turbo8 libjpeg8 liblrc4 liblsan0 libmpc3 libquadmath0
  libssframe1 libsharpuyv0 libtiff6 libtsan2 libubsan1 libwebp7 libxpm4 linux-libc-dev manpages-dev rpcsvc-proto
0 upgraded, 57 newly installed, 0 to remove and 0 not upgraded.
Need to get 62.6 MB of archives.
After this operation, 222 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 binutils-common amd64 2.42-4ubuntu2 [239 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libssframe1 amd64 2.42-4ubuntu2 [14.8 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libbinutils amd64 2.42-4ubuntu2 [572 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libctf-nobfd0 amd64 2.42-4ubuntu2 [97.1 kB]
```

i-016ad2dca7639d679 (nagios\_client)

PublicIPs: 18.212.58.57 PrivateIPs: 172.31.90.61

```
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libtsan2 amd64 14-20240412-0ubuntu1 [2736 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libubsan1 amd64 14-20240412-0ubuntu1 [1175 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libhwasan0 amd64 14-20240412-0ubuntu1 [1632 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libquadmath0 amd64 14-20240412-0ubuntu1 [153 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libgcc-13-dev amd64 13.2.0-23ubuntu14 [2688 kB]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 gcc-13-x86_64-linux-gnu amd64 13.2.0-23ubuntu4 [21.9 MB]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 gcc-13 amd64 13.2.0-23ubuntu4 [482 kB]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 gcc-x86_64-linux-gnu amd64 4:13.2.0-7ubuntu1 [1212 B]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 gcc amd64 4:13.2.0-7ubuntu1 [5018 B]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 gccam3 amd64 3.8.2-2ubuntu0.1 [1941 kB]
Ign:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libc-dev-bin amd64 2.39-0ubuntu8.2
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libfontconfig1 amd64 2.15.0-1ubuntu2 [139 kB]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libsharpuyv0 amd64 1.3.2-0.4build3 [15.8 kB]
Get:38 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libheif-plugin-aomdec amd64 1.17.6-1ubuntu4 [10.3 kB]
Get:39 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libde265-0 amd64 0.1.0.15-build3 [166 kB]
Get:40 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libheif-plugin-libde265 amd64 1.17.6-1ubuntu4 [8158 B]
Get:41 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libjbig0 amd64 1.17.6-1ubuntu4 [276 kB]
Get:42 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libjpeg-turbo8 amd64 2.1.5-2ubuntu2 [150 kB]
Get:43 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libjpeg8 amd64 8c-2ubuntu11 [2148 B]
Get:44 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libdeflate0 amd64 1.19-build1 [43.8 kB]
Get:45 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libjbig0 amd64 2.1-6.lubuntu2 [29.7 kB]
Get:46 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 liblrc4 amd64 4.0.0+ds-4ubuntu2 [179 kB]
Get:47 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libwebp7 amd64 1.3.2-0.4build3 [230 kB]
Ign:48 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libtiff6 amd64 4.5.1+git230720-4ubuntu2.1
Get:49 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libxpm4 amd64 1:3.5.17-1build2 [36.5 kB]
Get:50 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libgd3 amd64 2.3.3-9ubuntu5 [128 kB]
Ign:51 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libc-devtools amd64 2.39-0ubuntu8.2
Err:35 http://security.ubuntu.com/ubuntu noble-updates/main amd64 libc-dev-bin amd64 2.39-0ubuntu8.2
```

i-016ad2dca7639d679 (nagios\_client)

PublicIPs: 18.212.58.57 PrivateIPs: 172.31.90.61

## Shreya Sawant D15A 54

```
ubuntu@ip-172-31-90-61:~$ sudo apt update -y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [380 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [83.1 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [4576 B]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [274 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [116 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [8632 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [10.4 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [353 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [68.1 kB]
Get:16 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [428 B]
Get:17 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [10.9 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2808 B]
Get:19 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:20 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [344 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
```

```
Get:50 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 c-n-f Metadata [116 B]
Fetched 29.1 MB in 6s (4991 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
143 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-90-61:~$ sudo apt install gcc -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
binutils binutils-common binutils-x86_64-linux-gnu cpp cpp-13 cpp-13-x86_64-linux-gnu cpp-x86_64-linux-gnu fontconfig-config fonts-dejavu-core
fonts-dejavu-mono gcc-13 gcc-13-base gcc-13-x86_64-linux-gnu gcc-x86_64-linux-gnu libbaom3 libasan8 libatomic1 libbinutils libc-bin libc-dev-bin libc-devtools
libc6 libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0 libctf0 libde265-0 libdeflate0 libfontconfig1 libgcc-13-dev libgd3 libgomp1 libgprofng0
libheif-plugin-aomdec libheif-plugin-aomenc libheif-plugin-libde265 libheif1 libhwasan0 libisl23 libitm1 libjbig0 libjpeg-turbo8 libjpeg8 liblerc4 liblsan0
libmpc3 libquadmath0 libsframe1 libsharpyuv0 libtiff6 libtsan2 libubsan1 libwebp7 libxpm4 linux-libc-dev linux-tools-common manpages-dev rpcsvc-proto
Suggested packages:
binutils-doc gprofng-gui cpp-doc gcc-13-locales cpp-13-doc gcc-multilib make autoconf automake libtool flex bison gdb gcc-doc gcc-13-multilib gcc-13-doc
gdb-x86_64-linux-gnu glibc-doc libnss-nis libnss-nisplus libgd-tools libheif-plugin-x265 libheif-plugin-ffmpegdec libheif-plugin-jpegdec
libheif-plugin-jpegenc libheif-plugin-j2kdec libheif-plugin-j2kenc libheif-plugin-ravle libheif-plugin-svtenc
The following NEW packages will be installed:
binutils binutils-common binutils-x86_64-linux-gnu cpp cpp-13 cpp-13-x86_64-linux-gnu cpp-x86_64-linux-gnu fontconfig-config fonts-dejavu-core
fonts-dejavu-mono gcc gcc-13 gcc-13-base gcc-13-x86_64-linux-gnu gcc-x86_64-linux-gnu libbaom3 libasan8 libatomic1 libbinutils libc-bin libc-dev-bin libc-devtools
libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0 libctf0 libde265-0 libdeflate0 libfontconfig1 libgcc-13-dev libgd3 libgomp1 libgprofng0 libheif-plugin-aomdec
libheif-plugin-aomenc libheif-plugin-libde265 libheif1 libhwasan0 libisl23 libitm1 libjbig0 libjpeg-turbo8 libjpeg8 liblerc4 liblsan0 libmpc3 libquadmath0
libsframe1 libsharpyuv0 libtiff6 libtsan2 libubsan1 libwebp7 libxpm4 linux-libc-dev manpages-dev rpcsvc-proto
The following packages will be upgraded:
libc-bin libc6 linux-tools-common locales
```

```
Selecting previously unselected package rpcsvc-proto.
Preparing to unpack .../54-rpcsvc-proto_1.4.2-0ubuntu7_amd64.deb ...
Unpacking rpcsvc-proto (1.4.2-0ubuntu7) ...
Selecting previously unselected package libc6-dev:amd64.
Preparing to unpack .../55-libc6-dev_2.39-0ubuntu8.3_amd64.deb ...
Unpacking libc6-dev:amd64 (2.39-0ubuntu8.3) ...
Selecting previously unselected package libheif-plugin-aomenc:amd64.
Preparing to unpack .../56-libheif-plugin-aomenc_1.17.6-1ubuntu4_amd64.deb ...
Unpacking libheif-plugin-aomenc:amd64 (1.17.6-1ubuntu4) ...
Preparing to unpack .../57-linux-tools-common_6.8.0-45.45_all.deb ...
Unpacking linux-tools-common (6.8.0-45.45) over (6.8.0-39.39) ...
Selecting previously unselected package manpages-dev.
Preparing to unpack .../58-manpages-dev_6.7-2_all.deb ...
Unpacking manpages-dev (6.7-2) ...
Setting up libsharpyuv0:amd64 (1.3.2-0.4build3) ...
Setting up libaom3:amd64 (3.8.2-2ubuntu0.1) ...
Setting up manpages-dev (6.7-2) ...
Setting up liblerc4:amd64 (4.0.0+ds-4ubuntu2) ...
Setting up libxpm4:amd64 (1:3.5.17-1build2) ...
Setting up binutils-common:amd64 (2.42-4ubuntu2) ...
Setting up libdeflate0:amd64 (1.19-1build1.1) ...
Setting up linux-libc-dev:amd64 (6.8.0-45.45) ...
Setting up libctf-nobfd0:amd64 (2.42-4ubuntu2) ...
Setting up libgomp1:amd64 (14-20240412-0ubuntu1) ...
Setting up locales (2.39-0ubuntu8.3) ...
Generating locales (this might take a while)...
  en_US.UTF-8... done
Generation complete.
```

```
Setting up libjbig0:amd64 (2.1-6.1ubuntu2) ...
Setting up libsframe1:amd64 (2.42-4ubuntu2) ...
Setting up rpcsvc-proto (1.4.2-0ubuntu7) ...
Setting up gcc-13-base:amd64 (13.2.0-23ubuntu4) ...
Setting up libquadmath0:amd64 (14-20240412-0ubuntu1) ...
Setting up fonts-dejavu-mono (2.37-8) ...
Setting up libmpc3:amd64 (1.3.1-1build1) ...
Setting up libatomic1:amd64 (14-20240412-0ubuntu1) ...
Setting up fonts-dejavu-core (2.37-8) ...
Setting up libjpeg-turbo8:amd64 (2.1.5-2ubuntu2) ...
Setting up libwebp7:amd64 (1.3.2-0.4build3) ...
Setting up libubsan1:amd64 (14-20240412-0ubuntu1) ...
Setting up libhwasan0:amd64 (14-20240412-0ubuntu1) ...
Setting up libcrypt-dev:amd64 (1:4.4.36-4build1) ...
Setting up libasan8:amd64 (14-20240412-0ubuntu1) ...
Setting up libtsan2:amd64 (14-20240412-0ubuntu1) ...
Setting up libbinutils:amd64 (2.42-4ubuntu2) ...
Setting up libisl23:amd64 (0.26-3build1) ...
Setting up libde265-0:amd64 (1.0.15-1build3) ...
Setting up libc-dev-bin (2.39-0ubuntu8.3) ...
Setting up linux-tools-common (6.8.0-45.45) ...
Setting up libcc1-0:amd64 (14-20240412-0ubuntu1) ...
Setting up liblsan0:amd64 (14-20240412-0ubuntu1) ...
Setting up libitm1:amd64 (14-20240412-0ubuntu1) ...
Setting up libctf0:amd64 (2.42-4ubuntu2) ...
Setting up libjpeg8:amd64 (8c-2ubuntu11) ...
Setting up cpp-13-x86-64-linux-gnu (13.2.0-23ubuntu4) ...
Setting up fontconfig-config (2.15.0-1.1ubuntu2) ...
```

## Shreya Sawant D15A 54

```
Setting up libgd3:amd64 (2.3.3-9ubuntu5) ...
Setting up libc-devtools (2.39-0ubuntu8.3) ...
Processing triggers for libc-bin (2.39-0ubuntu8.3) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
systemctl restart acpid.service chrony.service cron.service multipathd.service packagekit.service polkit.service rsyslog.service snapd.service ssh.service systemd-journald.service systemd-networkd.service systemd-resolved.service systemd-udevd.service udisks2.service

Service restarts being deferred:
systemctl restart ModemManager.service
/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttyS0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #3: apt[1890], sshd[1001,1453]
ubuntu @ user manager service: systemd[1348]
```

```
ubuntu@ip-172-31-90-61:~$ sudo apt install -y nagios-nrpe-server nagios-plugins
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'monitoring-plugins' instead of 'nagios-plugins'
The following additional packages will be installed:
libavahi-client3 libavahi-common-data libavahi-common3 libcurl2t64 libdbi1t64 libldb2 libmysqlclient21 libnet-snmp-perl libpq5 libradcli4 libsmbclient0
libsmp-base libsmp40t64 libtalloc2 libtdb1 libtevent0t64 liburiparser1 libwbcclient0 monitoring-plugins-basic monitoring-plugins-common
monitoring-plugins-standard mysql-common python3-gpg python3-ldb python3-markdown python3-samba python3-talloc python3-tdb rpcbind samba-common
samba-common-bin samba-dsdb-modules samba-libs smbclient snmp
Suggested packages:
cups-common libcrypt-des-perl libdigest-hmac-perl libio-socket-inet6-perl snmp-mibs-downloader icinga2 nagios-plugins-contrib fping postfix | sendmail-bin
| exim4-daemon-heavy | exim4-daemon-light qstat xinetd | inetd python-markdown-doc heimdal-clients python3-dnspython cifs-utils
The following NEW packages will be installed:
libavahi-client3 libavahi-common-data libavahi-common3 libcurl2t64 libdbi1t64 libldb2 libmysqlclient21 libnet-snmp-perl libpq5 libradcli4 libsmbclient0
libsmp-base libsmp40t64 libtalloc2 libtdb1 libtevent0t64 liburiparser1 libwbcclient0 monitoring-plugins-monitoring-plugins-common
monitoring-plugins-standard mysql-common nagios-nrpe-server python3-gpg python3-ldb python3-markdown python3-samba python3-talloc python3-tdb rpcbind
samba-common samba-common-bin samba-dsdb-modules samba-libs smbclient snmp
0 upgraded, 37 newly installed, 0 to remove and 139 not upgraded.
Need to get 16.1 MB of archives.
After this operation, 72.0 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 nagios-nrpe-server amd64 4.1.0-1ubuntu3 [356 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 rpcbind amd64 1.2.6-7ubuntu2 [46.5 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libavahi-common-data amd64 0.8-13ubuntu6 [29.7 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libavahi-common3 amd64 0.8-13ubuntu6 [23.3 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libavahi-client3 amd64 0.8-13ubuntu6 [26.8 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libcurl2t64 amd64 2.4.7-1.2ubuntu7.3 [272 kB]
```

```
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-gpg amd64 1.18.0-4.1ubuntu4 [209 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-ldb amd64 2:2.8.0+samba4.19.5+dfsg-4ubuntu9 [41.8 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-markdown all 3.5.2-1 [72.0 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-tdb amd64 1.4.10-1build1 [15.3 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-talloc amd64 2.4.2-1build2 [12.9 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-samba amd64 2:4.19.5+dfsg-4ubuntu9 [2895 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 samba-common all 2:4.19.5+dfsg-4ubuntu9 [64.1 kB]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 samba-common-bin amd64 2:4.19.5+dfsg-4ubuntu9 [1279 kB]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 samba-dsdb-modules amd64 2:4.19.5+dfsg-4ubuntu9 [317 kB]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 smbclient amd64 2:4.19.5+dfsg-4ubuntu9 [470 kB]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 snmp amd64 5.9.4+dfsg-1.1ubuntu3 [180 kB]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu/universe amd64 monitoring-plugins-common amd64 2.3.5-1ubuntu3 [30.0 kB]
Get:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 monitoring-plugins-basic amd64 2.3.5-1ubuntu3 [269 kB]
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 monitoring-plugins-standard amd64 2.3.5-1ubuntu3 [149 kB]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 monitoring-plugins-all 2.3.5-1ubuntu3 [10.7 kB]
Fetched 16.1 MB in 1s (12.8 MB/s)
Extracting templates from packages: 100%
Selecting previously unselected package nagios-nrpe-server.
(Reading database ... 72505 files and directories currently installed.)
Preparing to unpack .../00-nagios-nrpe-server_4.1.0-1ubuntu3_amd64.deb ...
Unpacking nagios-nrpe-server (4.1.0-1ubuntu3) ...
Selecting previously unselected package rpcbind.
Preparing to unpack .../01-rpcbind_1.2.6-7ubuntu2_amd64.deb ...
Unpacking rpcbind (1.2.6-7ubuntu2) ...
Selecting previously unselected package libavahi-common-data:amd64.
Preparing to unpack .../02-libavahi-common-data_0.8-13ubuntu6_amd64.deb ...
Unpacking libavahi-common-data:amd64 (0.8-13ubuntu6) ...
Selecting previously unselected package libavahi-common3:amd64.
```

## Shreya Sawant D15A 54

```
Unpacking snmp (5.9.4+dfsg-1.1ubuntu3) ...
Selecting previously unselected package monitoring-plugins-common.
Preparing to unpack .../33-monitoring-plugins-common_2.3.5-1ubuntu3_amd64.deb ...
Unpacking monitoring-plugins-common (2.3.5-1ubuntu3) ...
Selecting previously unselected package monitoring-plugins-basic.
Preparing to unpack .../34-monitoring-plugins-basic_2.3.5-1ubuntu3_amd64.deb ...
Unpacking monitoring-plugins-basic (2.3.5-1ubuntu3) ...
Selecting previously unselected package monitoring-plugins-standard.
Preparing to unpack .../35-monitoring-plugins-standard_2.3.5-1ubuntu3_amd64.deb ...
Unpacking monitoring-plugins-standard (2.3.5-1ubuntu3) ...
Selecting previously unselected package monitoring-plugins.
Preparing to unpack .../36-monitoring-plugins_2.3.5-1ubuntu3_all.deb ...
Unpacking monitoring-plugins (2.3.5-1ubuntu3) ...
Setting up mysql-common (5.8+1.1.0build1) ...
update-alternatives: using /etc/mysql/my.cnf.fallback to provide /etc/mysql/my.cnf (my.cnf) in auto mode
Setting up libmysqlclient21:amd64 (8.0.39-0ubuntu0.24.04.2) ...
Setting up libsnmp-base (5.9.4+dfsg-1.1ubuntu3) ...
Setting up libnet-snmp-perl (6.0.1-7) ...
Setting up libtdb1:amd64 (1.4.10-1build1) ...
Setting up nagios-nrpe-server (4.1.0-1ubuntu3) ...
Created symlink /etc/systemd/system/multi-user.target.wants/nagios-nrpe-server.service → /usr/lib/systemd/system/nagios-nrpe-server.service.
Setting up libdbi1:amd64 (0.9.0-6.1build1) ...
Setting up libpq5:amd64 (16.4-0ubuntu0.24.04.2) ...
Setting up rpcbind (1.2.6-7ubuntu2) ...
Created symlink /etc/systemd/system/multi-user.target.wants/rpcbind.service → /usr/lib/systemd/system/rpcbind.service.
Created symlink /etc/systemd/system/sockets.target.wants/rpcbind.socket → /usr/lib/systemd/system/rpcbind.socket.
Setting up samba-common (2:4.19.5+dfsg-4ubuntu9) ...
```

```
Creating config file /etc/samba/smb.conf with new version
Setting up libwbclient0:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up libtalloc2:amd64 (2.4.2-1build2) ...
Setting up python3-tdb (1.4.10-1build1) ...
Setting up python3-gpg (1.18.0-4.1ubuntu4) ...
Setting up libradcli4 (1.2.11-1build3) ...
Setting up libavahi-common-data:amd64 (0.8-13ubuntu6) ...
Setting up python3-markdown (3.5.2-1) ...
Setting up liburiparser1:amd64 (0.9.7+dfsg-2build1) ...
Setting up monitoring-plugins-common (2.3.5-1ubuntu3) ...
Setting up libtevent0t64:amd64 (0.16.1-2build1) ...
Setting up monitoring-plugins-basic (2.3.5-1ubuntu3) ...

Creating config file /etc/nagios-plugins/config/apt.cfg with new version
Creating config file /etc/nagios-plugins/config/dhcp.cfg with new version
Creating config file /etc/nagios-plugins/config/disk.cfg with new version
Creating config file /etc/nagios-plugins/config/dummy.cfg with new version
Creating config file /etc/nagios-plugins/config/ftp.cfg with new version
Creating config file /etc/nagios-plugins/config/http.cfg with new version
Creating config file /etc/nagios-plugins/config/load.cfg with new version
```

```
Creating config file /etc/nagios-plugins/config/snmp.cfg with new version
Setting up monitoring-plugins (2.3.5-1ubuntu3) ...
Setting up libldb2:amd64 (2:2.8.0+samba4.19.5+dfsg-4ubuntu9) ...
Setting up libavahi-client3:amd64 (0.8-13ubuntu6) ...
Setting up samba-libs:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up python3-ldb (2:2.8.0+samba4.19.5+dfsg-4ubuntu9) ...
Setting up samba-dsdb-modules:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up libsmclient0:amd64 (2:4.19.5+dfsg-4ubuntu9) ...
Setting up libcups2t64:amd64 (2.4.7-1.2ubuntu7.3) ...
Setting up python3-samba (2:4.19.5+dfsg-4ubuntu9) ...
Setting up smbclient (2:4.19.5+dfsg-4ubuntu9) ...
Setting up samba-common-bin (2:4.19.5+dfsg-4ubuntu9) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.3) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
```

```
Restarting services...

Service restarts being deferred:
/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttys0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #3: sshd[1001,1453]
ubuntu@ip-172-31-90-61:~$ sudo nano /etc/nagios/nrpe.cfg
ubuntu@ip-172-31-90-61:~$ sudo systemctl restart nagios-nrpe-server
ubuntu@ip-172-31-90-61:~$
Broadcast message from root@ip-172-31-90-61 (Tue 2024-10-01 09:58:28 UTC) :
```

Now, check your nagios dashboard and you'll see a new host being added.

Click on Hosts.

The screenshot shows the Nagios web interface. On the left, there's a sidebar with links for General, Current Status, Problems, and Reports. The main area displays 'Current Network Status' with a summary table and two status totals tables: 'Host Status Totals' and 'Service Status Totals'. Below these are two charts: 'Host Status Details For All Host Groups' and 'Service Status Details For All Services'. The 'Host Status Details' chart lists two hosts: 'linuxserver' and 'localhost', both marked as 'UP'. The 'Service Status Details' chart shows a single service for each host, also marked as 'UP'. The overall status is green, indicating no critical issues.

Host Status Totals			
Up	Down	Unreachable	Pending
2	0	0	0

Service Status Totals				
Ok	Warning	Unknown	Critical	Pending
12	1	0	3	0

Host Status Details For All Host Groups	
Host	Status
linuxserver	UP
localhost	UP

Service Status Details For All Services	
Host	Status
linuxserver	OK
localhost	OK

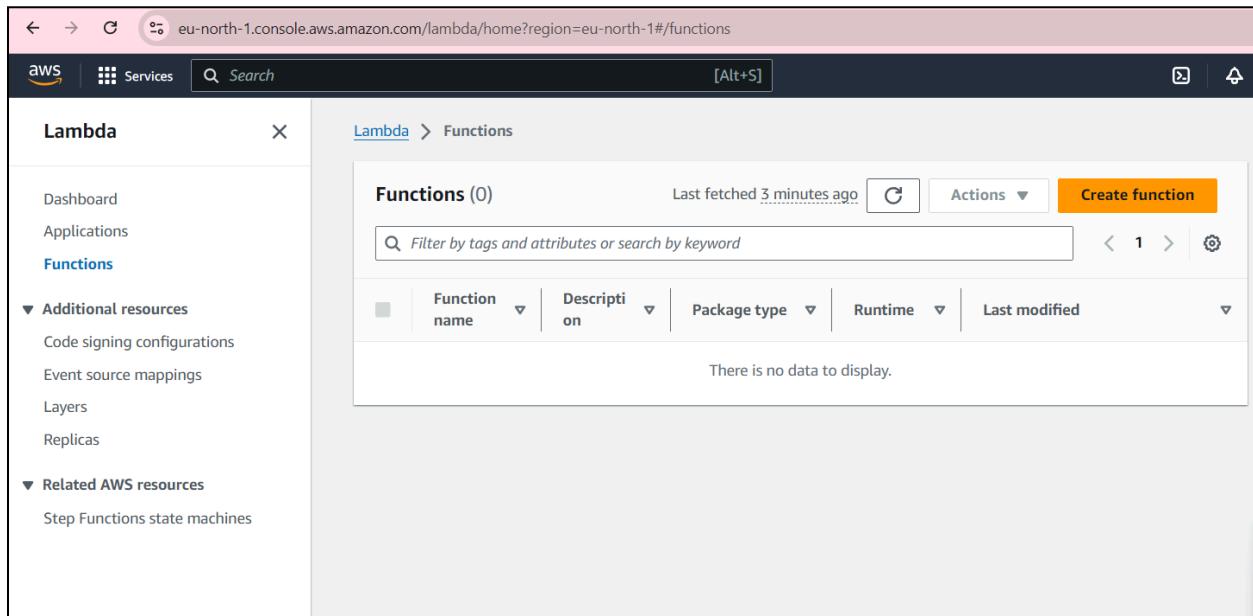
## Experiment.11

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

Steps-

1. Open up the Lambda Console and click on the Create button.

Be mindful of where you create your functions since Lambda is region-dependent.



2. Choose to create a function from scratch or use a blueprint, i.e templates defined by AWS for you with all configuration presets required for the most common use cases.

Then, choose a runtime env for your function, under the dropdown, you can see all the options AWS supports, Python, Nodejs, .NET and Java being the most popular ones.

After that, choose to create a new role with basic Lambda permissions if you don't have an existing one.

The screenshot shows the 'Create function' wizard in the AWS Lambda console. The top navigation bar includes the AWS logo, 'Services' dropdown, a search bar, and a keyboard shortcut '[Alt+S]'. The breadcrumb path 'Lambda > Functions > Create function' is visible. The main title 'Create function' has an 'Info' link. Below it, a sub-instruction says 'Choose one of the following options to create your function.' Four options are listed in boxes:

- Author from scratch**  
Start with a simple Hello World example.
- Use a blueprint**  
Build a Lambda application from sample code and configuration presets for common use cases.
- Container image**  
Select a container image to deploy for your function.
- Browse serverless app repository**  
Deploy a sample Lambda application from the AWS Serverless Application Repository.

A 'Basic information' section follows, containing fields for 'Function name' (lambdashreya), 'Runtime' (Python 3.12), and other settings.

The screenshot continues the 'Create function' wizard. The left sidebar shows the navigation path. The current step is 'Architecture' with an 'Info' link. It asks to choose an instruction set architecture. Two options are shown:

- x86\_64**
- arm64

The next section is 'Permissions' with an 'Info' link. It states that Lambda will create an execution role with CloudWatch Logs permissions by default. A note says: 'By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.'

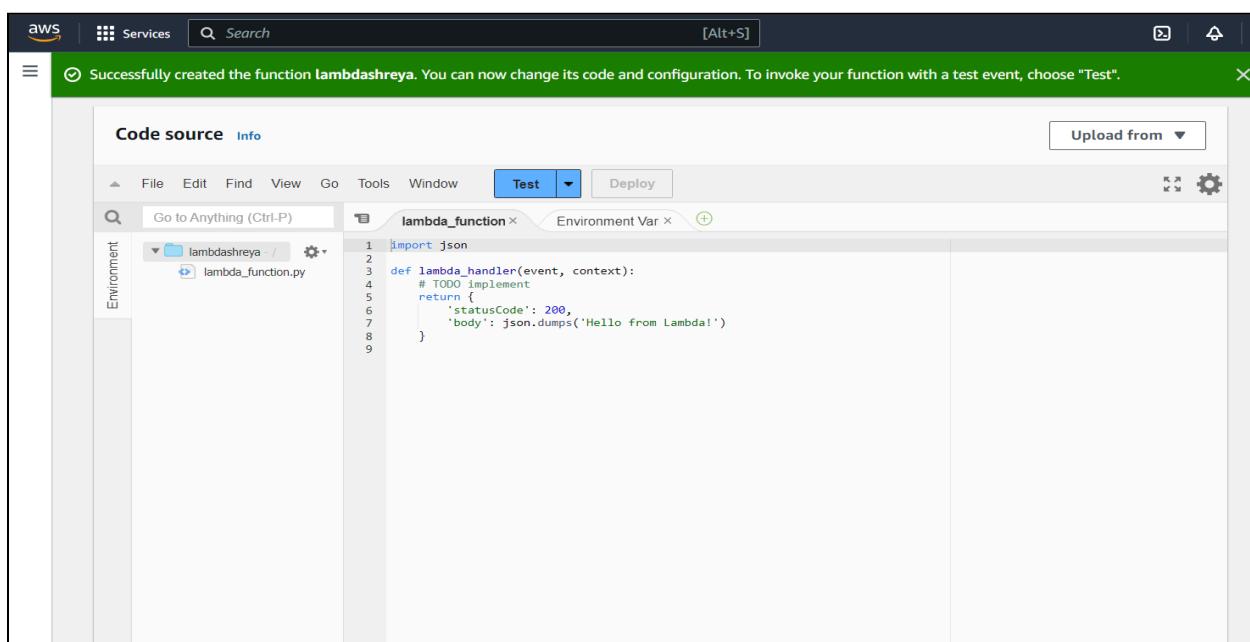
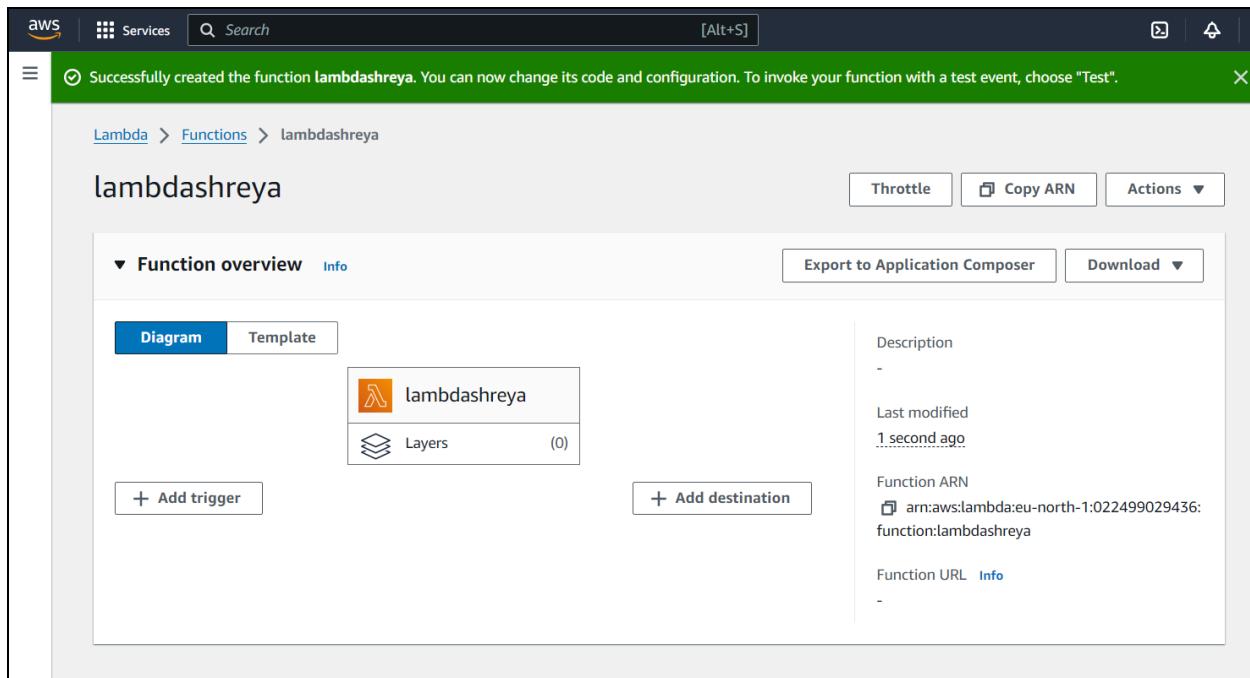
A collapsed section 'Change default execution role' is expanded, showing 'Execution role' settings. Three options are listed:

- Create a new role with basic Lambda permissions**
- Use an existing role
- Create a new role from AWS policy templates

A note in a callout box says: 'Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.'

At the bottom, a note says: 'Lambda will create an execution role named lambdashreya-role-ni9thou9, with permission to upload logs to Amazon CloudWatch Logs.'

A final section 'Additional Configurations' is partially visible at the bottom.



aws | Services | Search [Alt+S]

## Edit basic settings

**Basic settings** [Info](#)

Description - *optional*

**Memory** [Info](#)  
Your function is allocated CPU proportional to the memory configured.  
 MB  
Set memory to between 128 MB and 10240 MB.

**Ephemeral storage** [Info](#)  
You can configure up to 10 GB of ephemeral storage (/tmp) for your function. [View pricing](#)

MB  
Set ephemeral storage (/tmp) to between 512 MB and 10240 MB.

**SnapStart** [Info](#)  
Reduce startup time by having Lambda cache a snapshot of your function after the function has initialized. To evaluate whether your function code is resilient to snapshot operations, review the [SnapStart compatibility considerations](#).

Supported runtimes: Java 11, Java 17, Java 21.

**Timeout**

min  sec

**Execution role**  
Choose a role that defines the permissions of your function. To create a custom role, go to the [IAM console](#).

Use an existing role  
 Create a new role from AWS policy templates

**Existing role**  
Choose an existing role that you've created to be used with this Lambda function. The role must have permission to upload logs to Amazon CloudWatch Logs.

[View the lambdashreya-role-ni9thou9 role](#) on the IAM console.

[Cancel](#) [Save](#)

Shreya Sawant  
D15A 54

The screenshot shows the AWS Lambda console interface. At the top, there's a green success message: "Successfully updated the function lambdashreya." Below it, the navigation tabs are "Code", "Test", "Monitor", "Configuration", "Aliases", and "Versions". The "Code" tab is selected. Under "Code source", there's a toolbar with "File", "Edit", "Find", "View", "Go", "Tools", "Window", a "Test" button (which is highlighted in blue), and a "Deploy" button. To the left is an "Environment" sidebar. The main area displays the "lambda\_function.py" file content:

```
1 import json
2
3 def lambda_handler(event, context):
4     # TODO implement
5     return {
6         'statusCode': 200,
7         'body': json.dumps('Hello from Lambda!')
8     }
9
```

The screenshot shows the "Test event" configuration page. At the top, there are "Save" and "Test" buttons. The main area has a note: "To invoke your function without saving an event, configure the JSON event, then choose Test." Below it, there's a "Test event action" section with "Create new event" (selected) and "Edit saved event". The "Event name" field contains "shreyaEvent". A note says: "Maximum of 25 characters consisting of letters, numbers, dots, hyphens and underscores." Under "Event sharing settings", "Private" is selected, with a note: "This event is only available in the Lambda console and to the event creator. You can configure a total of 10." Under "Shareable", there's another note: "This event is available to IAM users within the same account who have permissions to access and use shareable events." At the bottom, there's a "Template - optional" section with a dropdown menu showing "hello-world".

Shreya Sawant  
D15A 54

Make changes to your function inside the code editor. You can also upload a zip file of your function or upload one from an S3 bucket if needed.  
Press Ctrl + S to save the file and click Deploy to deploy the changes.

The screenshot shows the AWS Lambda code editor interface. At the top, there are tabs for 'Code source' and 'Info'. Below the tabs is a toolbar with 'File', 'Edit', 'Find', 'View', 'Go', 'Tools', 'Window', 'Test' (which is currently selected), and 'Deploy'. On the right side of the toolbar is a 'Upload from' button. The main area contains a code editor window titled 'lambda\_function'. The code is as follows:

```
1 import json
2
3 def lambda_handler(event, context):
4     # TODO implement
5     return {
6         'statusCode': 200,
7         'body': json.dumps('Hello from Lambda!')
8     }
```

The screenshot shows the AWS Lambda configuration page for the 'SnapStart' settings. At the top, it says 'SnapStart' and 'Info'. A note below states: 'Reduce startup time by having Lambda cache a snapshot of your function after the function has initialized. To evaluate whether your function code is resilient to snapshot operations, review the [SnapStart compatibility considerations](#)'. A dropdown menu is set to 'None'. Below it, it says 'Supported runtimes: Java 11, Java 17, Java 21.' Under 'Timeout', there is a field set to '0 min 1 sec'. In the 'Execution role' section, a radio button is selected for 'Use an existing role'. Below that, there is a 'Existing role' section where a dropdown menu shows 'service-role/lambdashreya-role-ni9thou9' and a 'Save' button. At the bottom, there are 'Cancel' and 'Save' buttons.

Shreya Sawant  
D15A 54

**Code source** [Info](#)

File Edit Find View Go Tools Window [Test](#) [Deploy](#) Changes not deployed

Go to Anything (Ctrl-P)

Environment [lambda\\_function](#) Environment Var [+](#)

lambda\_dashreya - / [lambda\\_function.py](#)

```
1 import json
2
3 def lambda_handler(event, context):
4     # TODO implement
5     new_string="Hey,This is Shreya!!"
6     return {
7         'statusCode': 200,
8         'body': json.dumps('Hello from Lambda!')
9     }
10
```

**Test event** [Info](#)

Save [Test](#)

To invoke your function without saving an event, configure the JSON event, then choose Test.

Test event action  Create new event  Edit saved event

Event name mytestEvent Maximum of 25 characters consisting of letters, numbers, dots, hyphens and underscores.

Event sharing settings  Private This event is only available in the Lambda console and to the event creator. You can configure a total of 10. [Learn more](#) [Edit](#)

Shareable This event is available to IAM users within the same account who have permissions to access and use shareable events. [Learn more](#) [Edit](#)

Template - optional

✔ The test event **mytestEvent** was successfully saved.

Code [Test](#) [Monitor](#) [Configuration](#) [Aliases](#) [Versions](#)

Executing function: succeeded ([logs](#)) [Details](#)

Shreya Sawant

D15A 54

CloudWatch > Log groups > /aws/lambda/lambdashreya

### /aws/lambda/lambdashreya

Actions ▾ View in Logs Insights Start tailing Search log group

▼ Log group details

Log class <a href="#">Info</a>	Stored bytes	KMS key ID
Standard	-	-
ARN	Metric filters	Anomaly detection
<a href="#">arn:aws:logs:eu-north-1:022499029436:log-group:/aws/lambda/lambdashreya:*</a>	0	<a href="#">Configure</a>
Creation time	Subscription filters	Data protection
4 minutes ago	0	-
Retention	Contributor Insights rules	Sensitive data count
Never expire	-	-

Code source [Info](#)

Upload from ▾

File Edit Find View Go Tools Window Test Deploy

Go to Anything (Ctrl-P) lambda\_function Environment Var Execution result

Execution results

Test Event Name mytestEvent

Status: Succeeded | Max memory used: 32 MB | Time: 2.03 ms

Environment

lambda\_function /

lambda\_function.py

Response

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

Function Logs

```
START RequestId: 50a6c1ec-b60e-4595-821e-6bb783614ed9 Version: $LATEST
END RequestId: 50a6c1ec-b60e-4595-821e-6bb783614ed9
REPORT RequestId: 50a6c1ec-b60e-4595-821e-6bb783614ed9 Duration: 2.03 ms Billed Duration: 3 ms Memory Size: 128 MB Max Memory Used: 32 MB Init Duration: 86.56 ms
```

Request ID

```
50a6c1ec-b60e-4595-821e-6bb783614ed9
```

## Experiment.12

Aim: To create a Lambda function which will log “An Image has been added” once you add an object to a specific bucket in S3

Theory:

**AWS Lambda and S3 Integration:** AWS Lambda allows you to execute code in response to various events, including those triggered by Amazon S3. When an object is added to an S3 bucket, it can trigger a Lambda function to execute, allowing for event-driven processing without managing servers.

Workflow:

1. Create an S3 Bucket:

- First, create an S3 bucket that will store the objects. This bucket will act as the trigger source for the Lambda function.

2. Create the Lambda Function:

- Set up a new Lambda function using AWS Lambda's console. You can choose a runtime environment like Python, Node.js, or Java.
- Write code that logs a message like “An Image has been added” when triggered.

3. Set Up Permissions:

- Ensure that the Lambda function has the necessary permissions to access S3. You can do this by attaching an IAM role with policies that allow reading from the bucket and writing logs to CloudWatch.

4. Configure S3 Trigger:

- Link the S3 bucket to the Lambda function by setting up a trigger. Specify that the function should be triggered when an object is created in the bucket (e.g., when an image is uploaded).

5. Test the Setup:

- Upload an object (e.g., an image) to the S3 bucket to test the trigger. The Lambda function should execute and log the message “An Image has been added” in AWS CloudWatch Logs.

Amazon S3 > Buckets > Create bucket

## Create bucket Info

Buckets are containers for data stored in S3.

### General configuration

AWS Region  
Europe (Stockholm) eu-north-1

Bucket type Info

General purpose  
Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

Directory  
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name Info

Bucket name must be unique within the global namespace and follow the bucket naming rules. [See rules for bucket naming](#)

Copy settings from existing bucket - *optional*  
Only the bucket settings in the following configuration are copied.  
[Choose bucket](#)

Format: s3://bucket/prefix

Successfully created bucket "shreyalambdabucket"  
To upload files and folders, or to configure additional bucket settings, choose [View details](#).

View details

Amazon S3 > Buckets

► Account snapshot - updated every 24 hours All AWS Regions [View Storage Lens dashboard](#)

Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

General purpose buckets Info All AWS Regions

Buckets are containers for data stored in S3.

[C](#) [Copy ARN](#) [Empty](#) [Delete](#) [Create bucket](#)

Name	AWS Region	IAM Access Analyzer	Creation date
<input type="radio"/> shreyanewbucket	Europe (Stockholm) eu-north-1	<a href="#">View analyzer for eu-north-1</a>	October 11, 2024, 01:51:24 (UTC+05:30)
<input type="radio"/> shreyalambdabucket	Europe (Stockholm) eu-north-1	<a href="#">View analyzer for eu-north-1</a>	October 11, 2024, 10:11:49 (UTC+05:30)

## Create function Info

Choose one of the following options to create your function.

- Author from scratch  
Start with a simple Hello World example.
- Use a blueprint  
Build a Lambda application from sample code and configuration presets for common use cases.
- Container image  
Select a container image to deploy for your function.
- Browse serverless app repository  
Deploy a sample Lambda application from the AWS Serverless Application Repository.

### Basic information

Function name

Enter a name that describes the purpose of your function.

shreyaimageloader

Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (\_).

Runtime Info

Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.

Node.js 20.x

↻

Architecture Info

Choose the instruction set architecture you want for your function code.

- x86 64

⌚ Successfully created the function shreyaimageloader. You can now change its code and configuration. To invoke your function with a test event, choose "Test".

Lambda > Functions > shreyaimageloader

### shreyaimageloader

Throttle Copy ARN Actions ▾

▼ Function overview Info

Diagram Template

shreyaimageloader  
 Layers (0)

+ Add trigger + Add destination

Description  
-

Last modified  
3 seconds ago

Function ARN  
arn:aws:lambda:eu-north-1:022499029436:function:shreyaimageloader

Function URL Info  
-

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**Code source** [Info](#)

File Edit Find View Go Tools Window **Test** Deploy Changes not deployed

Go to Anything (Ctrl-P) Environment Vari Execution results lambda\_function

shreyaimageloader lambda\_function.py

```
1 import json
2
3 def lambda_handler(event, context):
4     # TODO implement
5     bucket_name = event['Records'][0]['s3']['bucket']['name']
6     object_key = event['Records'][0]['s3']['object']['key']
7
8     print(f"An Image has been added to the bucket{bucket_name}:{object_key}")
9     return {
10         'statusCode': 200,
11         'body': json.dumps('Log entry created successfully!!')
12     }
13
```

**Code source** [Info](#) Upload from ▾

File Edit Find View Go Tools Window Test Deploy

Go to Anything (Ctrl-P) Environment Vari Execution result

lambdashreya lambda\_function

Execution results Test Event Name mytestEvent

Status: Succeeded | Max memory used: 32 MB | Time: 1.95 ms

Response

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

Function Logs

```
START RequestId: f3fe2ad5-1a48-41b9-9f65-69a1f59e14f1 Version: $LATEST
END RequestId: f3fe2ad5-1a48-41b9-9f65-69a1f59e14f1
REPORT RequestId: f3fe2ad5-1a48-41b9-9f65-69a1f59e14f1 Duration: 1.95 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory Used: 32 MB Init Duration: 86.23 ms
```

Request ID

```
f3fe2ad5-1a48-41b9-9f65-69a1f59e14f1
```

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## Add trigger

### Trigger configuration [Info](#)

 S3 aws asynchronous storage ▾

**Bucket**  
Choose or enter the ARN of an S3 bucket that serves as the event source. The bucket must be in the same region as the function.  
 [X](#) [C](#)

Bucket region: eu-north-1

**Event types**  
Select the events that you want to have trigger the Lambda function. You can optionally set up a prefix or suffix for an event. However, for each bucket, individual events cannot have multiple configurations with overlapping prefixes or suffixes that could match the same object key.

[X](#)

**Prefix - optional**  
Enter a single optional prefix to limit the notifications to objects with keys that start with matching characters. Any [special characters](#) must be URL encoded.

**Suffix - optional**  
Enter a single optional suffix to limit the notifications to objects with keys that end with matching characters. Any [special characters](#)

## shreyaimageloader

 The trigger shreyalambdabucket was successfully added to function shreyaimageloader. The function is now receiving events from the trigger.

### Function overview [Info](#)

[Diagram](#) [Template](#)

 shreyaimageloader

 Layers (0)

 S3

[+ Add destination](#)

[+ Add trigger](#)

Code | Test | Monitor | Configuration | Aliases | Versions

General configuration

**Triggers**

Permissions

Destinations

Function URL

Environment variables

Triggers (1) [Info](#)

Find triggers

< 1 >

Trigger

S3: shreyalambdabucket  
arn:aws:s3:::shreyalambdabucket

Details

**ⓘ Lambda obtained this information from the following policy statements:**

- Managed policy AWSLambdaBasicExecutionRole-2a997d27-fef2-4464-af52-21cef352fb79, statement 0
- Managed policy AWSLambdaBasicExecutionRole-2a997d27-fef2-4464-af52-21cef352fb79, statement 1

Resource-based policy statements (1) [Info](#)

Resource-based policies grant other AWS accounts and services permissions to access your Lambda resources.

< 1 >

Statement ID	Principal	PrincipalOrgID	Conditions	Action
lambda-ed3d83df-7015...	s3.amazonaws.com	-	StringEquals, ArnLike	lambda:InvokeFunction

## Upload Info

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose **Add files** or **Add folder**.

Files and folders (1 Total, 245.9 KB)		Remove	Add files	Add folder
All files and folders in this table will be uploaded.				
<input type="text"/> Find by name <span style="float: right;">&lt; 1 &gt;</span>				
<input type="checkbox"/>	Name	Folder	Type	
<input type="checkbox"/>	Screenshot 2024-10-07 011458.png	-	image/png	

## Destination Info

Destination  
[s3://shreyalambdabucket](#)

▶ **Destination details**  
Bucket settings that impact new objects stored in the specified destination.

⌚ **Upload succeeded**  
View details below.

ⓘ The information below will no longer be available after you navigate away from this page.

### Summary

Destination	Succeeded	Failed
s3://shreyalambdabucket	<span style="color: green;">⌚ 1 file, 245.9 KB (100.00%)</span>	<span style="color: gray;">⌚ 0 files, 0 B (0%)</span>

[Files and folders](#) [Configuration](#)

### Files and folders (1 Total, 245.9 KB)

Find by name		Name	Folder	Type	Size	Status	Error
<input type="text"/> Find by name		<a href="#">Screenshot 2...</a>	-	image/png	245.9 KB	<span style="color: green;">⌚ Succeeded</span>	-

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CloudWatch > Log groups > /aws/lambda/shreyaimageloader > 2024/10/11/[LATEST]042cb9b30fc94174915437c333a1570c

**Log events**

You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

Filter events - press enter to search | Clear | 1m | 30m | 1h | 12h | Custom | UTC timezone | Display |

Timestamp	Message
No older events at this moment. <a href="#">Retry</a>	
2024-10-11T06:29:39.155Z	INIT_START Runtime Version: python:3.11.v44 Runtime Version ARN: arn:aws:lambda:eu-north-1::runtime:b1c790bce6ec3c3a14a715f5...
2024-10-11T06:29:39.227Z	START RequestId: fd858512-ddbe-47bd-9293-f148edd82f4f Version: \$LATEST
2024-10-11T06:29:39.228Z	An Image has been added to the bucket shreyasawantbucket:Screenshot+2024-08-03+092854.png
2024-10-11T06:29:39.229Z	END RequestId: fd858512-ddbe-47bd-9293-f148edd82f4f
2024-10-11T06:29:39.229Z	REPORT RequestId: fd858512-ddbe-47bd-9293-f148edd82f4f Duration: 1.90 ms Billed Duration: 2 ms Memory Size: 128 MB Max Mem...
No newer events at this moment. Auto retry paused. <a href="#">Resume</a>	