

# ADVANCE DEVOPS EXP-1

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D15A/64

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

**Launch an instance** Info

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.

**Name and tags** Info

Name  
Pranav's Server Add additional tags

**▼ 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 	Windows 	Red Hat 	SUSE Li 
---	--	---	--	---	--

 [Browse more AMIs](#)  
Including AMIs from AWS, Marketplace and the Community

**▼ Instance type** [Info](#) | [Get advice](#)

**Instance type**

**t3.micro**  
 Family: t3 2 vCPU 1 GiB Memory Current generation: true  
 On-Demand RHEL base pricing: 0.0396 USD per Hour  
 On-Demand SUSE base pricing: 0.0108 USD per Hour  
 On-Demand Linux base pricing: 0.0108 USD per Hour  
 On-Demand Windows base pricing: 0.02 USD per Hour

**Free tier eligible**

All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

**▼ Key pair (login)** [Info](#)

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

**Key pair name - required**

Default value ▾

[Create new key pair](#)

**▼ Network settings** [Info](#) [Edit](#)

**Network** [Info](#)  
 vpc-0246aa0b2b4afcc38

**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-9**' with the following rules:

**Allow SSH traffic from**  
Helps you connect to your instance

0.0.0.0/0

**Allow HTTPS traffic from the internet**  
To set up an endpoint, for example when creating a web server

**Allow HTTP traffic from the internet**  
To set up an endpoint, for example when creating a web server

**⚠️** Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Instances (2) <a href="#">Info</a>		<a href="#">C</a>	<a href="#">Connect</a>	Instance state ▾	Actions ▾	<a href="#">Launch instances</a> ▾
<input type="text"/> Find Instance by attribute or tag (case-sensitive)		All states ▾				
<input type="checkbox"/>	Name ↴	Instance ID	Instance state	Instance type	Status check	Alarm status
<input type="checkbox"/>	Pranav's Server	i-0473b7ad796b995d5	<span style="color: green;">Running</span>	<span style="color: green;">t3.micro</span>	<span style="color: green;">Initializing</span>	<a href="#">View alarms +</a>
					eu-north-1b	ec2-13-61-22-221.eu-n...
						13.61

```
[*] login as: ubuntu
[*] Authenticating with public key "test-key"
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-1009-aws x86_64)

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

System information as of Mon Jul 29 17:28:10 UTC 2024

System load: 0.02          Processes: 109
Usage of /: 10.5% of 14.46GB  Users logged in: 0
Memory usage: 20%          IPv4 address for enX0: 172.31.43.87
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.
```

```
root@ip-172-31-43-87:/# 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-172-31-43-87:/# 
root@ip-172-31-43-87:/# 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 05:02:47 UTC; 12min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 494 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
 Main PID: 527 (apache2)
    Tasks: 55 (limit: 1130)
   Memory: 8.3M (peak: 8.5M)
      CPU: 94ms
     CGroup: /system.slice/apache2.service
             └─527 /usr/sbin/apache2 -k start
                 ├─532 /usr/sbin/apache2 -k start
                 └─533 /usr/sbin/apache2 -k start

Jul 30 05:02:45 ip-172-31-43-87 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Jul 30 05:02:47 ip-172-31-43-87 systemd[1]: Started apache2.service - The Apache HTTP Server.
root@ip-172-31-43-87:/# 
```

```
root@ip-172-31-43-87:/# cd /var/www/html/
root@ip-172-31-43-87:/var/www/html#
```



# 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.

## Contents:

1. s3 bucket
2. ec2 instance
3. elastic beanstalk

The screenshot shows the Amazon S3 Buckets page. At the top, there is a green header bar with the text "To upload files and folders, or to configure additional bucket settings, choose View details." Below this, the main content area has a title "Amazon S3 > Buckets". A "Account snapshot - updated every 24 hours" section displays "All AWS Regions" and a "View Storage Lens dashboard" button. Below this, there are tabs for "General purpose buckets" (which is selected) and "Directory buckets". A search bar labeled "Find buckets by name" is present. The main table lists one bucket: "riya-website" (Name), "US East (N. Virginia) us-east-1" (AWS Region), "View analyzer for us-east-1" (IAM Access Analyzer), and "August 12, 2024, 21:17:46 (UTC+05:30)" (Creation date). Action buttons for "Copy ARN", "Empty", "Delete", and "Create bucket" are located at the top right of the table. At the bottom, there are links for "CloudShell", "Feedback", "© 2024, Amazon Web Services, Inc. or its affiliates.", "Privacy", "Terms", and "Cookie preferences".

Name	AWS Region	IAM Access Analyzer	Creation date
riya-website	US East (N. Virginia) us-east-1	<a href="#">View analyzer for us-east-1</a>	August 12, 2024, 21:17:46 (UTC+05:30)

Object Lock  
Disabled

#### Requester pays

When enabled, the requester pays for requests and data transfer costs, and anonymous access to this bucket is disabled. [Learn more](#)

Edit

Requester pays  
Disabled

#### Static website hosting

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

Edit

Static website hosting  
Disabled

Amazon S3 > Buckets > [riya-website](#) > Edit static website hosting

## Edit static website hosting [Info](#)

#### 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](#)

see [Using Amazon S3 Block Public Access](#)

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

`index.html`

**Error document – optional**  
This is returned when an error occurs.

`error.html`

**Redirection rules – optional**  
Redirection rules, written in JSON, automatically redirect webpage requests for specific content. [Learn more](#)

`1`

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**

S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Cancel

Save changes

**Successfully edited public access**  
View details below.

**Make public: status**

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

**Summary**

Source	Successfully edited public access	Failed to edit public access
<a href="s3://riya1-website/Html1/">s3://riya1-website/Html1/</a>	Successfully edited public access 3 objects, 9.7 KB	Failed to edit public access 0 objects



# Welcome to Mess Company

[Company Details](#) [Our Services](#) [Our Meals](#)

## Our Services

- Custom Catering Services
- Home Cooked Meals
- Fresh Food
- Fruits, Salad, Milk

Using EC2 Instance

EC2 > Instances > Launch an instance

## Launch an instance Info

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.

### Name and tags Info

Name  
riyaweb Add additional tags

### 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

### Configure storage Info

Advanced

1x  GiB  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

**Advanced details Info**

### Summary

Number of instances Info  
1

Software Image (AMI)  
Canonical, Ubuntu, 24.04 LTS, ...read more  
ami-04a81a99f5ec58529

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

Storage (volumes)  
1 volume(s) - 8 GiB

Review commands

Cancel **Launch instance**

## Select an existing key pair or create a key pair

X

 We noticed that you didn't select a key pair. If you want to be able to connect to your instance it is recommended that you create one or select an existing one.

Existing key pair

Create new key pair

Proceed without key pair

Key pair name

vockey



Cancel

Launch instance

## ▼ Network settings [Info](#)

Edit

Network [Info](#)

vpc-0775017352e40f883

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

Helps you connect to your instance

Anywhere

0.0.0.0/0



Allow HTTPS traffic from the internet

To set up an endpoint, for example when creating a web server

Allow HTTP traffic from the internet

To set up an endpoint, for example when creating a web server

**⚠** Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting [X](#) security group rules to allow access from known IP addresses only.

```
* Support:      https://ubuntu.com/pro

System information as of Tue Aug 20 07:27:04 UTC 2024

System load: 0.17          Temperature:      -273.1 C
Usage of /: 22.7% of 6.71GB Processes:        112
Memory usage: 24%          Users logged in:   0
Swap usage:  0%          IPv4 address for ens5: 172.31.37.143

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.

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-172-31-37-143:~$
```

```
root@ip-172-31-37-143:/home/ubuntu# apt install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

The screenshot shows a web browser window with the following tabs:

- SecurityGroups | EC2 | ap-sou
- EC2 Instance Connect | ap-sou
- Apache2 Ubuntu Default Page
- Untitled document - Google Doc

The main content area displays the Apache2 Default Page for an Ubuntu system. The page features the Ubuntu logo and the text "It works!". Below this, there is a detailed explanation of the default welcome page and its purpose. A section titled "Configuration Overview" provides information about the configuration layout, mentioning the main configuration file (apache2.conf) and other files like ports.conf and \*.conf. A code block shows the directory structure of the configuration files.

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at /var/www/html/index.html) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

**Configuration Overview**

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in /usr/share/doc/apache2/README.Debian.gz**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the apache2-doc package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   '-- ports.conf
|-- mods-enabled
|   '-- *.load
|   '-- *.conf
|-- conf-enabled
|   '-- *.conf
|-- sites-enabled
|   '-- *.conf
```

- apache2.conf is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- ports.conf is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the mods-enabled/, conf-enabled/ and sites-enabled/ directories contain particular configuration snippets which manage modular global configuration framework as

# Elastic Beanstalk

## Application information Info

Application name

Maximum length of 100 characters.

### ► Application tags (optional)

## Environment information Info

Choose the name, subdomain and description for your environment. These cannot be changed later.

Environment name

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.

Domain

Environment description

**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

4.3.4 (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.

Create connection | CodePipeline | eu-north-1 - Google Chrome  
eu-north-1.console.aws.amazon.com/codesuite/settings/connections/create?origin=...

aws Services Stockholm AnshSarfare

Developer Tools > Connections > Create connection

Create a connection [Info](#)

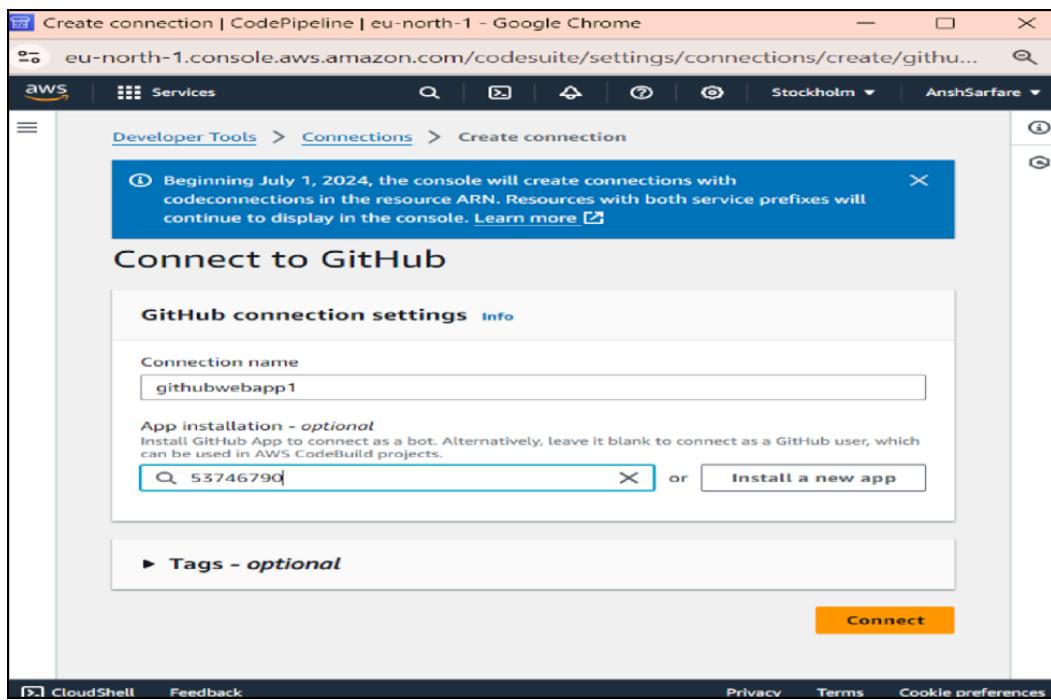
Create GitHub App connection [Info](#)

Connection name  
githubwebapp1

Tags - optional

Connect to GitHub

CloudShell Feedback Privacy Terms Cookie preferences



## 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-ei X or [Connect to GitHub](#)



#### Ready to connect

Your GitHub connection is ready for use.

### Repository name

Choose a repository in your GitHub account.

Ansh476/aws-codepipeline-s3-codedeploy-linux-2.0 X

You can type or paste the group path to any project that the provided credentials can access. Use the format 'group/subgroup/project'.

### Default branch

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

master X

### Output artifact format

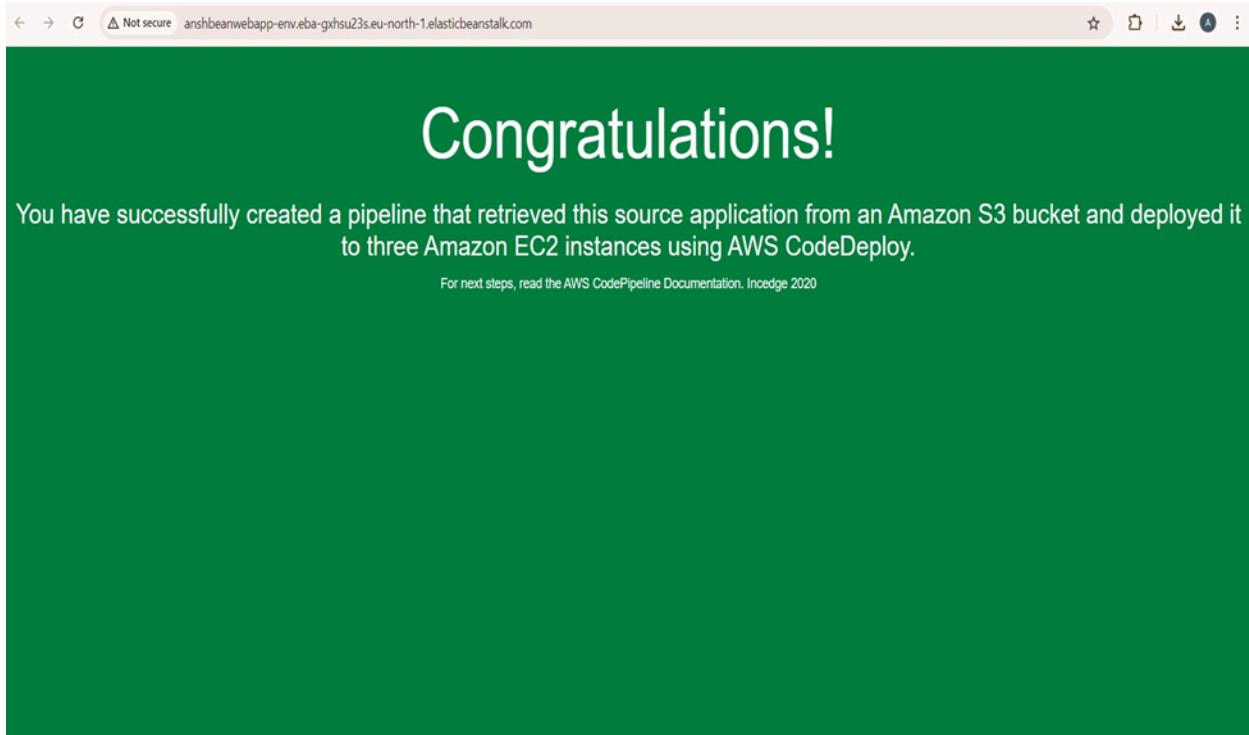
Choose the output artifact format.

**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.



#### 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.

aws-elasticbeanstalk-service-role

[View permission details](#)

#### EC2 key pair

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

riya



#### EC2 instance profile

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



[View permission details](#)

# **ADVANCE DEVOPS EXPERIMENT NO 3**

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

**Theory:**

Container-based microservices architectures have revolutionized how development and operations teams test and deploy modern software. Containers allow companies to scale and deploy applications more efficiently, but they also introduce new challenges, adding complexity by creating a whole new infrastructure ecosystem. Today, both large and small software companies are deploying thousands of container instances daily. Managing this level of complexity at scale requires advanced tools. Enter Kubernetes. Originally developed by Google, Kubernetes is an open-source container orchestration platform designed to automate the deployment, scaling, and management of containerized applications. Kubernetes has quickly become the de facto standard for container orchestration and is the flagship project of the Cloud Native Computing Foundation (CNCF), supported by major players like Google, AWS, Microsoft, IBM, Intel, Cisco, and Red Hat. Kubernetes simplifies the deployment and operation of applications in a microservice architecture by providing an abstraction layer over a group of hosts. This allows development teams to deploy their applications while Kubernetes takes care of key tasks, including:

- Managing resource consumption by applications or teams
- Distributing application load evenly across the infrastructure
- Automatically load balancing requests across multiple instances of an application
- Monitoring resource usage to prevent applications from exceeding resource limits and automatically restarting them if needed
- Moving application instances between hosts when resources are low or if a host fails
- Automatically utilizing additional resources when new hosts are added to the cluster
- Facilitating canary deployments and rollbacks with ease

**Necessary Requirements:**

- EC2 Instance: The experiment required launching a t2.medium EC2 instance with 2 CPUs, as

Kubernetes demands sufficient resources for effective functioning.

- Minimum Requirements:
  - Instance Type: t2.medium
  - CPUs: 2
  - Memory: Adequate for container orchestration.

This ensured that the Kubernetes cluster had the necessary resources to function smoothly.

Step 1: Log in to your AWS Academy/personal account and launch 3 new Ec2 Instances. 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 3 Different keys or 1 common key also.

Note: A minimum of 2 CPUs are required so Please select t2.medium and do not forget to stop the instance after the experiment because it is not available in the free tier. Also Select Security groups from existing.

The screenshot shows the AWS Quick Start interface. At the top, there are tabs for 'Recents' and 'Quick Start', with 'Quick Start' being active. Below the tabs, there is a grid of AMI icons: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, and a placeholder icon with a question mark. To the right of the grid is a search icon and a link to 'Browse more AMIs'. Below the grid, the text 'Amazon Machine Image (AMI)' is displayed. A detailed box highlights the 'Ubuntu Server 24.04 LTS (HVM), SSD Volume Type' entry, which includes the AMI ID 'ami-04cdc91e49cb06165', a note that it's 'Free tier eligible', and a dropdown menu. Below this box, the 'Description' section provides information about the Ubuntu Server 24.04 LTS AMI. Further down, the 'Architecture' section shows '64-bit (x86)' selected, along with the AMI ID 'ami-04cdc91e49cb06165', the 'Username' 'ubuntu', and a 'Verified provider' badge.

Step 2: After creating the instances click on Connect & connect all 3 instances and navigate to SSH Client.

Instances (1/3) <a href="#">Info</a>		Last updated 6 minutes ago	<a href="#">C</a>	<a href="#">Connect</a>	Instance state <a href="#">▼</a>	Actions <a href="#">▼</a>	<a href="#">Launch instances</a> <a href="#">▼</a>	<a href="#">Ohio</a> <a href="#">▼</a>	Riya <a href="#">▼</a>
		<a href="#">Find Instance by attribute or tag (case-sensitive)</a>		<a href="#">All states</a> <a href="#">▼</a>					
		<a href="#">Instance state = running</a> <a href="#">X</a>	<a href="#">Clear filters</a>						
	Name <a href="#">▼</a>	Instance ID	Instance state <a href="#">▼</a>	Instance type <a href="#">▼</a>	Status check	Alarm status	Availability Zone <a href="#">▼</a>		
<input type="checkbox"/>	Node2	i-0de2b7d01fc70605f	<span>Running</span> <a href="#">Q</a> <a href="#">Q</a>	t2.micro	<span>2/2 checks passed</span> <a href="#">View alarms</a> <a href="#">+</a>	us-east-2c			
<input checked="" type="checkbox"/>	Master	i-083c2a456c634c34	<span>Running</span> <a href="#">Q</a> <a href="#">Q</a>	t2.micro	<span>2/2 checks passed</span> <a href="#">View alarms</a> <a href="#">+</a>	us-east-2c			
<input type="checkbox"/>	Node1	i-0832ddc7d78b29744	<span>Running</span> <a href="#">Q</a> <a href="#">Q</a>	t2.micro	<span>2/2 checks passed</span> <a href="#">View alarms</a> <a href="#">+</a>	us-east-2c			

Downloaded key:

```

-----BEGIN RSA PRIVATE KEY-----
MIIEdwIBAAKCAQEAmXmBChZxtYAUfNoAUjG9DfW82GzVMSBU9dXdsEP0Wi87gcsI
GsLZ0cjeIrIA36vpxebkRycADaspLZ8r0zejNx6bdjTho09hrj3DAOGn/Mlscapd
QyxxHJVVU79N7VzrhBUDGegf2sp9rapUyGcVcpGiBTD6Rq8DK/wDeTcO+a1AK5XDX
9PjRzE45xCe4iaKzVrzf/GURIV6v1KSXeCuQYSEhvBtzBXu12ALonmlpbbtzhUQ
vk0jSyncE6UTam+1VNAxK9N31Xg/MN66C5EcJztPCXzsxthu3XNg+yDCAfamKGWOX
0JIMGxzAeu37XM0lsZLJff10eUZH9NBBLmBowIDAQABoIBACoGpZk3kCedvB21
LLJVQGnEMtQo6TAsFc1GyGbWhwf9vGRwURiuvbBRGLHz4lwL/GrSjNZsKANKJcX
kPbupbkApp3d2TMSmfL2qqFpkXEFTxbJcgTM9KRa382xAwvOeAeR1lbkO1+ql+wX
uShpbPbwTwer0oPvpSay/CzbPxcpJ++i8aisP2BPapPXIyIR8EU6iR1dnXtJ+l/GP
0q+YemwbT8n4Y/t3kDMvzHXNFKxb6Kc7c1ZAwtTUFBVgxo01Pk1jM6s\0ao4awZ
PF7WQBqbK5U07P5efpF6/FEmuM1/d7Wzkr1s06LW3Ja64fFYdEYnwd3nwpw7ntiv
ffUvWNECgYEA/u7uqzDSGi30lu62lmeYTFPildr/BHPt9QG496xE7Q4Zw20nA+h1
jYqyk8Xu5mlF+VEszD7I4bhu9pJtWCzrGEVhji+1jQk3u3IZggKm2e/WZijUkoSW
mesez/nuD9puticB08/RwiKFrRgYzc4Z5BZI/ED6+IXj7L0baejhhMjkCgYEAmh31
W1Y5GhSaqnJBH1wEsxNvGEIxItCTCDjv7sBmIDNVQtR0y1i+cLOp9swb6eGty49A
LLyg+ZFFgUiXgP5IidMZeC4G0VAiYatDr6e7o4H0oG1MPb6xoxRlerj0CdzbKw6V
73XF66J3cekq0LMD0oC6ZylWX8NMF0ZsBF13ZscGyBhkshAXRYdrwuTwzGx/1/
RR+p826NLW7byRXDsT2oc30gQNMrh/gQ3RjoH72CtawPIRTy7fgw74j+xkEhXSZ
Pny+aoAnqZ7mDB593vyrLum1BfcuFzaQxG9v1C2sPaL7f7n/HX5u1sh86YSps48A
NeATHKByeTZR+uFMjas9CQKBgHExug31vFr/fGEZOSqPIw+J8cKFpp0YCBYg87rx
F1E7mN24...1...M7...76...C7...a...-...X...Y...O...G...1...L...K...T...N...u...G...1...4...a...p...O...G...M...M...C...
Ln 1, Col 1 | 1,674 characters | 100% | Unix (LF) | UTF-8

```

Step 3: Now open the folder in the terminal 3 times for Master, Node1 & Node 2 where our .pem key is stored and paste the Example command (starting with ssh -i ..... ) in the terminal.( [ssh](#) [-i](#) "Master\_Ec2\_Key.pem" [ubuntu@ec2-54-196-129-215.compute-1.amazonaws.com](#))

**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: 3.16.146.0/29. [Learn more](#).

Instance ID

 [i-0832ddc7d78b29744 \(Node1\)](#)

Connection Type

 **Connect using EC2 Instance Connect**

Connect using the EC2 Instance Connect browser-based client, with a public IPv4 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

 [3.143.230.115](#)

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, `ubuntu`.

 `ubuntu`

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

[Cancel](#)[Connect](#)

Step 4: Run on Master, Node 1, and Node 2 the below commands to install and setup Docker in Master, Node1, and Node2.

```
sudo apt-get update
```

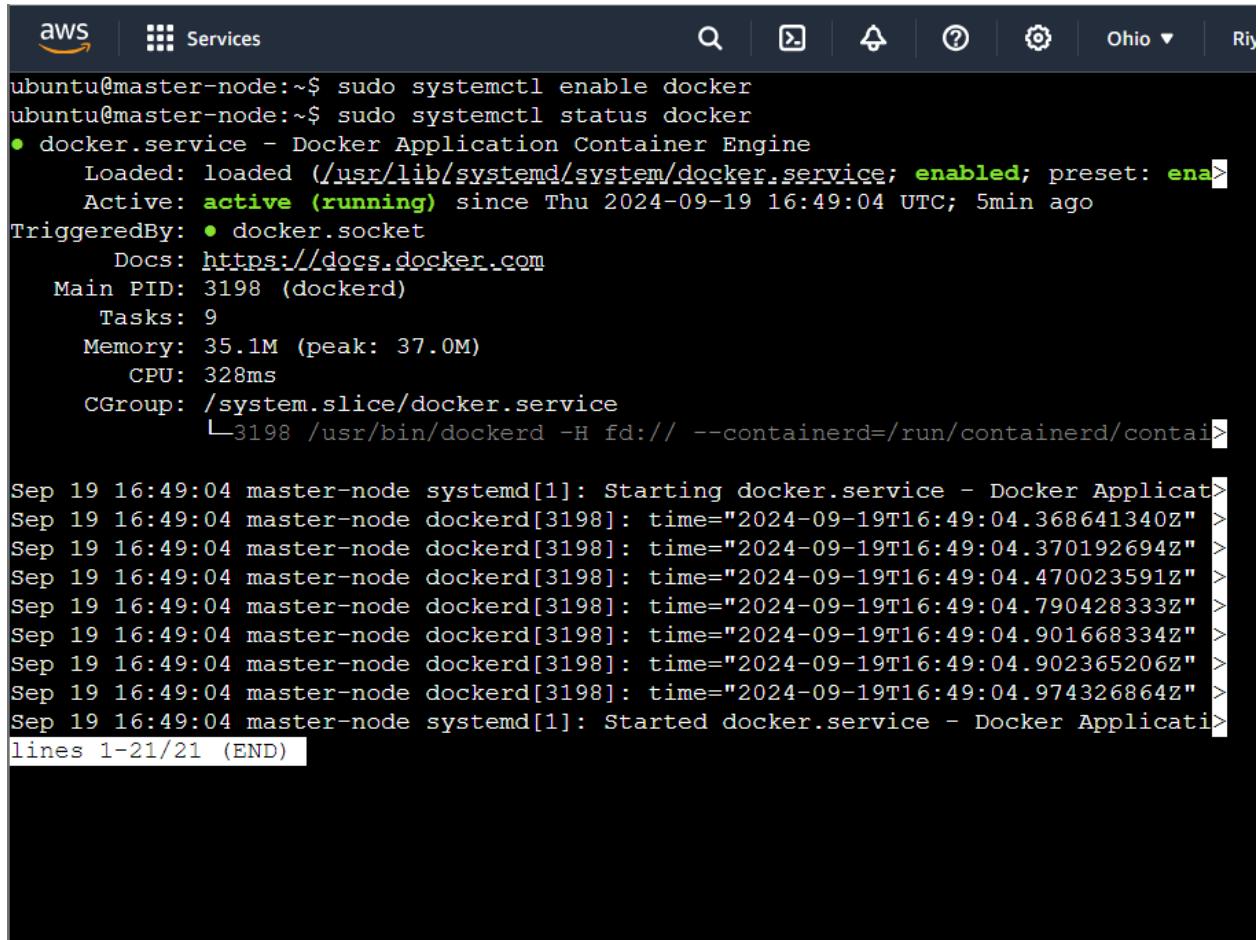
```
ubuntu@node2:~$ sudo apt-get update
Hit:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [377 kB]
]
Get:7 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [81.4 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [4516 B]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [269 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [13 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 [10.1 kB]
```

## Sudo apt-get install docker.io

```
ubuntu@master-node:~$ sudo apt-get install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-buildx
  docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc
  ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 139 not upgraded.
Need to get 76.8 MB of archives.
After this operation, 289 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 pigz amd64 2.8-1 [65.6 kB]
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/main amd64 bridge-util amd64 1.7.1-1ubuntu2 [33.9 kB]
Get:3 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 run amd64 1.1.12-0ubuntu3.1 [8599 kB]
Get:4 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 containerd amd64 1.7.12-0ubuntu4.1 [38.6 MB]
Get:5 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/main amd64 dns-root-da a all 2023112702~willsync1 [4450 B]
Get:6 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/main amd64 dnsmasq-base amd64 2.90-2build2 [375 kB]
Get:7 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 docker.io amd64 24.0.7-0ubuntu4.1 [29.1 MB]
Get:8 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 ubuntu-an all 0.12.16 [35.2 kB]
```

## Sudo systemctl enable docker

## Sudo systemctl status docker



A screenshot of the AWS CloudWatch Services interface. The top navigation bar shows 'aws' and 'Services'. Below it, a search bar and various filter icons are present. The main area displays log entries for the 'docker.service' on an 'ubuntu@master-node'. The logs show the service being enabled and started successfully, with detailed metrics like CPU usage and memory consumption. The log output ends with 'Started docker.service - Docker Application Container Engine'.

```
ubuntu@master-node:~$ sudo systemctl enable docker
ubuntu@master-node:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
    Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: enabled)
    Active: active (running) since Thu 2024-09-19 16:49:04 UTC; 5min ago
      TriggeredBy: ● docker.socket
        Docs: https://docs.docker.com
     Main PID: 3198 (dockerd)
        Tasks: 9
       Memory: 35.1M (peak: 37.0M)
         CPU: 328ms
      CGroup: /system.slice/docker.service
              └─3198 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Sep 19 16:49:04 master-node systemd[1]: Starting docker.service - Docker Application Container Engine
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.368641340Z" level=info msg="main.go:100: Docker daemon initialized"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.370192694Z" level=info msg="main.go:101: Docker daemon listening on fd://"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.470023591Z" level=info msg="main.go:102: Docker daemon ready to handle requests"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.790428333Z" level=info msg="main.go:103: Docker daemon has received its first request"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.901668334Z" level=info msg="main.go:104: Docker daemon has received its first request"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.902365206Z" level=info msg="main.go:105: Docker daemon has received its first request"
Sep 19 16:49:04 master-node dockerd[3198]: time="2024-09-19T16:49:04.974326864Z" level=info msg="main.go:106: Docker daemon has received its first request"
Sep 19 16:49:04 master-node systemd[1]: Started docker.service - Docker Application Container Engine
lines 1-21/21 (END)
```

Sudo systemctl start docker

```
ubuntu@node2:~$ sudo systemctl start docker
ubuntu@node2:~$ █
```

Step 5: Run the below command to install Kubernets.

```
ubuntu@master-node:~$ sudo apt-get update
Hit:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Hit:3 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Fetched 126 kB in 1s (204 kB/s)
Reading package lists... Done
ubuntu@master-node:~$ █
```

sudo apt-get install -y apt-transport-https ca-certificates curl

```

Reading package lists... Done
ubuntu@master-node:~$ sudo apt-get install -y apt-transport-https ca-certificates
curl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20240203).
ca-certificates set to manually installed.
The following additional packages will be installed:
  libcurl3t64-gnutls libcurl4t64
The following NEW packages will be installed:
  apt-transport-https
The following packages will be upgraded:
  curl libcurl3t64-gnutls libcurl4t64
3 upgraded, 1 newly installed, 0 to remove and 136 not upgraded.
Need to get 904 kB of archives.
After this operation, 38.9 kB of additional disk space will be used.
Get:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 apt-tran
sport-https all 2.7.14build2 [3974 B]
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 curl
  amd64 8.5.0-2ubuntu10.4 [227 kB]
Get:3 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libo
url14t64 amd64 8.5.0-2ubuntu10.4 [341 kB]
Get:4 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libo
url3t64-gnutls amd64 8.5.0-2ubuntu10.4 [333 kB]

```

```

$ sudo curl -fsSLo /usr/share/keyrings/kubernetes-archive-keyring.gpg
https://packages.cloud.google.com/apt/doc/apt-key.gpg
(download the google cloud public signing key)
(curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.31/deb/Release.key | sudo gpg --dearmor
-o /etc/apt/keyrings/kubernetes-apt-keyring.gpg)

```

```

$ echo "deb [signed-by=/usr/share/keyrings/kubernetes-archive-keyring.gpg]
https://apt.kubernetes.io/ kubernetes-xenial main" | sudo tee /etc/apt/sources.list.d/kubernetes.list (add the Kubernetes apt repository:)
(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
)

```

```

ubuntu@worker1:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.31/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
ubuntu@worker1:~$ 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/
ubuntu@worker1:~$ 

```

```
aws Services Q Search [Alt+5]
ubuntu@master-node:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:v1.31/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
ubuntu@master-node:~$ 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/
ubuntu@master-node:~$
```

\$ sudo apt-get update

\$ sudo apt-get install -y kubelet kubeadm kubectl

\$ sudo apt-mark hold kubelet kubeadm kubectl

```
aws Services Q Search [Alt+5]
ubuntu@master-node:~$ sudo apt-get update
Get:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Get:3 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Get:4 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb InRelease [1186 B]
Get:5 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb Packages [1065 B]
Get:6 http://security.ubuntu.com/ubuntu noble-security InRelease
Fetches:6551 B in 1s (8671 B/s)
Reading package lists... Done
ubuntu@master-node:~$ 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:
  containerd cri-tools kubernetes-cni
The following NEW packages will be installed:
  containerd cri-tools kubelet kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 0 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://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 containerd amd64 1:1.4.8-1ubuntu1 [37.9 kB]
Get:2 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb cri-tools 1.31.1-1.1 [15.7 kB]
Get:3 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb kubelet 1.31.1-1.1 [31.4 kB]
Get:4 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb kubernetes-cni 1.5.1-1.1 [33.9 kB]
Get:5 https://prod-cdn.pkgs.k8s.io/repos/llvm/kubernetes:/core/stable:v1.31/deb kubelet 1.31.1-1.1 [35.2 kB]
Fetches:67.4 kB in 1s (65.5 MB/s)
Selecting previously unselected package containerd.
(Reading database ... 48112 files and directories currently installed.)
Preparing to unpack .../0 containerd_1%{version}_1%{architecture}_amd64.deb ...
Unpacking containerd (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 kubelet.
Preparing to unpack .../2 kubelet 1.31.1-1.1_amd64.deb ...
Unpacking kubelet (1.31.1-1.1) ...
Setting up containerd (1:1.4.8-1ubuntu1) ...
Setting up kubelet (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 kubelet (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@master-node:~$ sudo apt-mark hold kubelet kubeadm
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
ubuntu@master-node:~$
```

```

ubuntu@lambda-worker1:~$ sudo apt-get update
Get:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu mobile-updates InRelease
Get:3 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu mobile-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb InRelease [1186 B]
Get:6 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb Packages (4065 B)
Fetched 4051 B in 1s (1023 B/s)
Reading package lists... Done
lambda-worker1:~$ 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:
  cni-project cri-tools kubernetes-cni
The following NEW packages will be installed:
  cni-project cri-tools kubeadm kubectl kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 130 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://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 cni-project amd64 1:1.4.8-lubuntu [37.9 kB]
Get:2 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb cri-tools 1.31.1-1.1 [15.7 kB]
Get:3 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb kubeadm 1.31.1-1.1 [11.4 kB]
Get:4 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb kubectl 1.31.1-1.1 [11.2 kB]
Get:5 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb kubernetes-cni 1.5.1-1.1 [10.9 kB]
Get:6 https://prod-cdn-packages.k8s.io/repositories/inv:/kubernetes:/core:/stable:/v1.31/deb kubelet 1.31.1-1.1 [15.2 kB]
Fetched 87.4 MB in 1s (7.4 MB/s)
Selecting previously unselected package cni-project.
(Reading database ... 40112 files and directories currently installed.)
Preparing to unpack .../0-cni-project_1%3a1.4.8-lubuntu_amd64.deb ...
Unpacking cni-project (1:1.4.8_lubuntu) ...
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 kubernetes-cni.
Preparing to unpack .../2-kubernetes-cni_1.5.1-1.1_amd64.deb ...
Unpacking kubernetes-cni (1.5.1-1.1) ...
Selecting previously unselected package kubeadm.
Preparing to unpack .../3-kubeadm_1.31.1-1.1_amd64.deb ...
Unpacking kubeadm (1.31.1-1.1) ...
Selecting previously unselected package kubectl.
Preparing to unpack .../4-kubectl_1.31.1-1.1_amd64.deb ...
Unpacking kubectl (1.31.1-1.1) ...
Selecting previously unselected package kubernetes-cni.
Preparing to unpack .../5-kubernetes-cni_1.5.1-1.1_amd64.deb ...
Unpacking kubernetes-cni (1.5.1-1.1) ...
Selecting previously unselected package kubeadm.
Preparing to unpack .../6-kubeadm_1.31.1-1.1_amd64.deb ...
Unpacking kubeadm (1.31.1-1.1) ...
Setting up cni-project (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 kubectl (1.31.1-1.1) ...
Processing triggers for man-db (2.12.0-4ubuntu1) ...
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.
lambda-worker1:~$ sudo apt-mark hold kubelet kubeadm
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
lambda-worker1:~$

```

## Kubernetes Deployment (master only)

### Begin Kubernetes Deployment

```
$ sudo swapoff -a
```

### Initialize Kubernetes on Master Node

```
$ sudo kubeadm init --pod-network-cidr=10.244.0.0/16 --ignore-preflight-errors=all
```

```

ubuntu@master-node:~$ sudo kubeadm init --pod-network-cidr=10.244.0.0/16 --ignore-preflight-errors=all
[init] Using Kubernetes version: v1.31.0
[preflight] Running pre-flight checks
    [WARNING Mem]: the system RAM (914 MB) is less than the minimum 1700 MB
    [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 internet connection
[preflight] You can also perform this action beforehand using 'kubeadm config images pull'
W0919 18:23:42.736017    7569 checks.go:846] detected that the sandbox image "registry.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 sandbox image.
[certs] Using certificatebir folder "/etc/kubernetes/pki"
[certs] Generating "ca" certificate and key
[certs] Generating "apiserver" certificate and key
[certs] apiserver serving cert is signed for DNS names [kubernetes kubernetes.default kubernetes.default.svc kubernetes.default.svc.cluster.local master-node] and IPs [10.96.0.1 172.31.40.240]
[certs] Generating "apiserver-kubelet-client" certificate and key
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-client" certificate and key
[certs] Generating "etcd/ca" certificate and key
[certs] Generating "etcd/server" certificate and key
[certs] etcd/server serving cert is signed for DNS names [localhost master-node] and IPs [172.31.40.240 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [localhost master-node] and IPs [172.31.40.240 127.0.0.1 ::1]
[certs] Generating "etcd/healthcheck-client" certificate and key
[certs] Generating "apiserver-etcd-client" certificate and key

```

### Deploy Pod Network to Cluster

```
$ mkdir -p $HOME/.kube
```

```

$ sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
$ sudo chown $(id -u):$(id -g) $HOME/.kube/config
$ kubectl apply -f
https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml

```

```

kubeadm join 172.31.40.240:6443 --token i0zoaj.tblkx57b8mg41aq3 \
    --discovery-token-ca-cert-hash sha256:b66cf6a507714d87b3012ab879b7af89f0d484df29bd6bcc7808e713a1c52fa
ubuntu@master-node:~$ mkdir -p $HOME/.kube
ubuntu@master-node:~$ sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
ubuntu@master-node:~$ sudo chown $(id -u):$(id -g) $HOME/.kube/config
ubuntu@master-node:~$ ^C
ubuntu@master-node:~$ kubectl apply -f https://github.com/flannel-io/flannel/releases/latest/download/kube-flannel.yml
namespace/kube-flannel created
serviceaccount/flannel created
clusterrole.rbac.authorization.k8s.io/flannel created
clusterrolebinding.rbac.authorization.k8s.io/flannel created
configmap/kube-flannel-cfg created
daemonset.apps/kube-flannel-ds created
ubuntu@master-node:~$ █

```

```
$ kubectl get pods --all-namespaces
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-flannel	kube-flannel-ds-gmnqm	1/1	Running	0	4m57s
kube-system	coredns-7c65d6fcf9-bb6x4	1/1	Running	0	15m
kube-system	coredns-7c65d6fcf9-zfsvw	1/1	Running	0	15m
kube-system	etcd-master-node	1/1	Running	0	15m
kube-system	kube-apiserver-master-node	1/1	Running	0	15m
kube-system	kube-controller-manager-master-node	1/1	Running	0	15m
kube-system	kube-proxy-k2ksj	0/1	CrashLoopBackOff	6 (2m40s ago)	15m
kube-system	kube-scheduler-master-node	1/1	Running	0	15m

Join Worker Node to Cluster (on worker node)

```
sudo kubeadm join 172.31.40.240:6443 --token i0zoaj.tblkx57b8mg41aq3 --discovery-token-ca-cert-hash
```

```
sha256:b66cf6a507714d87b3012ab879b7af89f0d484df29bd6bcc7808e713a1c52fa –
ignore-preflight-errors=all
```

```

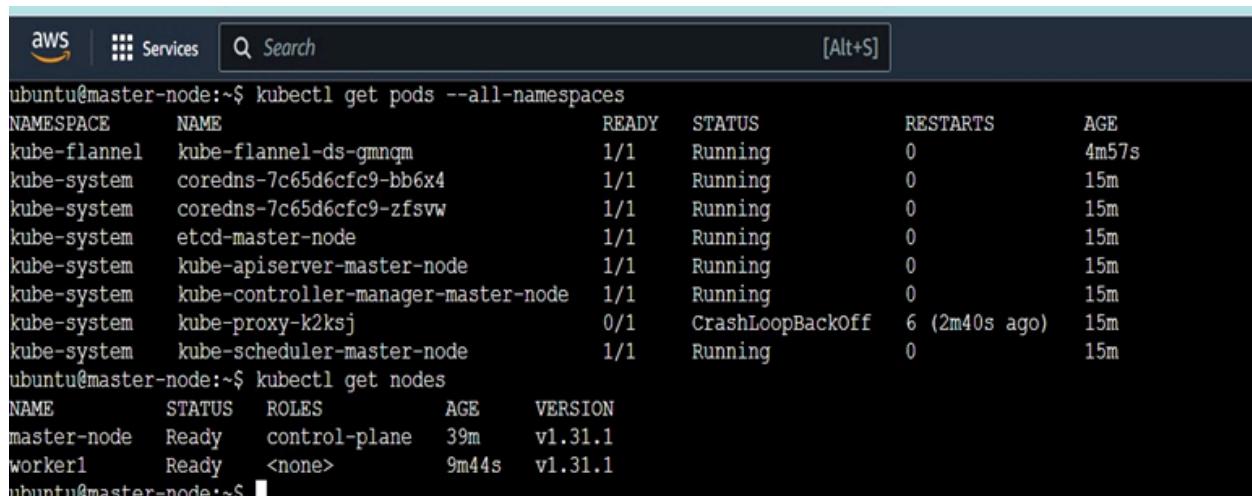
ubuntu@worker1:~$ sudo kubeadm join 172.31.40.240:6443 --token i0zoaj.tblkx57b8mg4lag3 --discovery-token-ca-cert-hash sha256:b66cf6a507714d87b3012ab879b7af89f0
4df29bd8bcc7808e713alc52fa --ignore-preflight-errors=all
[preflight] Running pre-flight checks
[WARNING FileExisting-socat]: socat not found in system path
[preflight] Reading configuration from the cluster...
[preflight] FYI: You can look at this config file with 'kubectl -n kube-system get cm kubeadm-config -o yaml'
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"
[kubelet-start] Starting the kubelet
[kubelet-check] Waiting for a healthy kubelet at http://127.0.0.1:10248/healthz. This can take up to 4m0s
[kubelet-check] The kubelet is healthy after 502.220002ms
[kubelet-start] Waiting for the kubelet to perform the TLS Bootstrap

This node has joined the cluster:
* Certificate signing request was sent to apiserver and a response was received.
* The Kubelet was informed of the new secure connection details.

Run 'kubectl get nodes' on the control-plane to see this node join the cluster.

```

\$ kubectl get nodes (on master node )



The screenshot shows the AWS CloudWatch interface with the 'Services' tab selected. A search bar is present at the top. Below it, two command-line outputs are displayed:

```

ubuntu@master-node:~$ kubectl get pods --all-namespaces
NAMESPACE      NAME                           READY   STATUS    RESTARTS   AGE
kube-flannel   kube-flannel-ds-gmngm          1/1     Running   0          4m57s
kube-system    coredns-7c65d6cfc9-bb6x4        1/1     Running   0          15m
kube-system    coredns-7c65d6cfc9-zfsvw        1/1     Running   0          15m
kube-system    etcd-master-node               1/1     Running   0          15m
kube-system    kube-apiserver-master-node     1/1     Running   0          15m
kube-system    kube-controller-manager-master-node 1/1     Running   0          15m
kube-system    kube-proxy-k2ksj              0/1     CrashLoopBackoff 6 (2m40s ago) 15m
kube-system    kube-scheduler-master-node     1/1     Running   0          15m
ubuntu@master-node:~$ kubectl get nodes
NAME       STATUS   ROLES      AGE     VERSION
master-node Ready    control-plane 39m    v1.31.1
worker1     Ready    <none>    9m44s   v1.31.1

```

## Conclusion

Successfully understood the Kubernetes cluster architecture and deployed a Kubernetes cluster on Linux machines/cloud platforms, demonstrating seamless setup and orchestration.

## Experiment 4

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

Step 1: Log in to your AWS Academy/personal account and launch a new Ec2 Instance. Select Ubuntu as AMI and t2.medium as Instance Type, create a key of type RSA with .pem extension, and move the downloaded key to the new folder

The screenshot shows the AWS Lambda console interface. At the top, there's a search bar labeled "Search our full catalog including 1000s of application and OS images". Below it, there are two tabs: "Recents" and "Quick Start", with "Quick Start" being the active tab. There are six cards representing different operating systems: Amazon Linux (with the AWS logo), macOS (with a Mac logo), Ubuntu (with the Ubuntu logo), Windows (with the Microsoft logo), Red Hat (with the Red Hat logo), and SUSE Linux (with the SUSE logo). To the right of these cards is a "Browse more AMIs" section with a magnifying glass icon and text indicating it includes AMIs from AWS Marketplace and the Community. At the bottom, there's a summary card for "Ubuntu Server 24.04 LTS (HVM), SSD Volume Type" which includes details like "ami-04cdc91e49cb06165 (64-bit (x86)) / ami-02b7539372433cf6b (64-bit (Arm))", "Virtualization: hvm", "ENA enabled: true", "Root device type: ebs", and "Free tier eligible".

▼ Instance type [Info](#) | [Get advice](#)

Instance type

t3.medium

Family: t3 2 vCPU 4 GiB Memory Current generation: true  
On-Demand RHEL base pricing: 0.072 USD per Hour  
On-Demand Linux base pricing: 0.0432 USD per Hour  
On-Demand Windows base pricing: 0.0616 USD per Hour  
On-Demand SUSE base pricing: 0.0995 USD per Hour

All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

▼ Key pair (login) [Info](#)

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

Key pair name - *required*

worker\_key

[!\[\]\(72c3240ee67ca6107f727634a17f171f\_img.jpg\) Create new key pair](#)

[EC2](#) > [Instances](#) > [Launch an instance](#)

Success

Successfully initiated launch of instance (i-09bc04278935d87f4)

[▶ Launch log](#)

**Connect to instance** Info

Connect to your instance i-09bc04278935d87f4 (experiment4) using any of these options

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

Instance ID  
i-09bc04278935d87f4 (experiment4)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is `worker_key.pem`
3. Run this command, if necessary, to ensure your key is not publicly viewable.  
chmod 400 "worker\_key.pem"
4. Connect to your instance using its Public DNS:  
ec2-13-60-30-82.eu-north-1.compute.amazonaws.com

Example:  
ssh -i "worker\_key.pem" ubuntu@ec2-13-60-30-82.eu-north-1.compute.amazonaws.com

i **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.

Step 3: Now open the folder in the terminal where our .pem key is stored and paste the Example command

```
PS C:\Users\siddi\downloads> cd exp4
PS C:\Users\siddi\downloads\exp4> ssh -i "worker_key.pem" ubuntu@ec2-13-60-3
0-82.eu-north-1.compute.amazonaws.com
The authenticity of host 'ec2-13-60-30-82.eu-north-1.compute.amazonaws.com (64:ff9b::d3c:1e52)' can't be established.
ED25519 key fingerprint is SHA256:poqkTnWc7IrjE4zQbuKp8iPtPdLEF+pM5aZMfdtY9L
o.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-13-60-30-82.eu-north-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
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 Sep 24 18:53:42 UTC 2024

System load: 0.11              Temperature:          -273.1 C
Usage of /:   22.8% of 6.71GB  Processes:            112
Memory usage: 5%                Users logged in:      0
Swap usage:  0%                IPv4 address for ens5: 172.31.37.243
```

Step 4: Run the below commands to install and setup Docker. 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"
```

```
ubuntu@ip-172-31-37-243:~$ 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-----

mQINBFit2ioBEADhWpZ8/wvZ6hUTiXOwQHXMAlaFHcPH9hAtr4F1y2+0YdbtMuth
lqqwp028AqyY+PRfVmSYMbjuQuu5byyKR01BbqYhuS3jtqQmljZ/bJvXqnmiVXh
38UuLa+z077PxyxQhu5BbqntTPQMfiyqEiU+BKbq2WmANUKQf+1AmZY/IruOXbnq
L4C1+gJ8vfmXQt99npCaxEjaNRVYfOS8QcixNzHUYnb6emjlANyEvLZzeqo7XkL7
UrwV5inawTSzWNvtjEjj4nJL8NsLwscpLPQUhTQ+7BbQXAwAmeHCUTQIVvvWXqw0N
cmhh4HgeQscQHYg0JjjDVfoY5MucvgIbIgCqfzAHW9jxmRL4qbMZj+b1XoePEtbt
ku4bIQN1X5P07fNWzIgaRL5Z4POXDDZTLIQ/El58j9kp4bnWRCJW0lya+f8ocodo
vZZ+Doi+fy4D5ZGrL4XEcIQP/Lv5uFyf+kQtI/94VFYVJ0leAv8W92KdgDkhTcTD
G7c0tIkVEKNUq48b3aQ64NOZQW7fVjfokwEZd0qPE72Pa45jrZzvUFxSpdiNk2tZ
XYukHjlxxEgBdC/J3cMMNRE1F4NCA3ApfV1Y7/hTe0nmDuDYwr9/obA8t016Yljj
```

```
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 5s (5866 kB/s)
Reading package lists... Done
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-172-31-37-243:~$ |
```

```
sudo apt-get update
sudo apt-get install -y docker-ce
```

```
ubuntu@ip-172-31-37-243:~$ sudo apt-get update
sudo apt-get install -y docker-ce
Hit:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-updates InReleas
e
Hit:3 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRele
ase
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 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
```

```
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 → /us
r/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-172-31-37-243:~$ |
```

```
sudo mkdir -p /etc/docker cat <<EOF | sudo
tee /etc/docker/daemon.json
{
"exec-opts": ["native.cgroupdriver=systemd"]
}
EOF
```

```
ubuntu@ip-172-31-37-243:~$ 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-172-31-37-243:~$ |
```

```
sudo systemctl enable docker
sudo systemctl daemon-reload
sudo systemctl restart docker
```

```
ubuntu@ip-172-31-37-243:~$ 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-172-31-37-243:~$ |
```

Step 5: Run the below command to install Kubernets.

```
curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.31/deb/Release.key | sudo gpg --dearmor -o
```

```
/etc/apt/keyrings/kubernetes-apt-keyring.gpg 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
```

```
ubuntu@ip-172-31-37-243:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.3  
1/deb/Release.key | sudo gpg --dearmor -o  
/etc/apt/keyrings/kubernetes-apt-keyring.gpg  
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  
gpg: missing argument for option "-o"  
-bash: /etc/apt/keyrings/kubernetes-apt-keyring.gpg: No such file or directo  
ry  
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg]  
https://pkgs.k8s.io/core:/stable:/v1.31/deb/ /  
ubuntu@ip-172-31-37-243:~$ |
```

Error:

```
ubuntu@ip-172-31-37-243:~$ 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 (U  
RI)  
E: The list of sources could not be read.  
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (U  
RI)  
E: The list of sources could not be read.  
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (U  
RI)  
E: The list of sources could not be read.
```

```
ubuntu@ip-172-31-37-243:~$ sudo mkdir -p /etc/apt/keyrings
ubuntu@ip-172-31-37-243:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.3
1/deb/Release.key | sudo gpg --dearmor -o
/etc/apt/keyrings/kubernetes-apt-keyring.gpg
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
gpg: missing argument for option "-o"
-bash: /etc/apt/keyrings/kubernetes-apt-keyring.gpg: No such file or directo
ry
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg]
https://pkgs.k8s.io/core:/stable:/v1.31/deb/ /
ubuntu@ip-172-31-37-243:~$ 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 (U
RI)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (U
RI)
E: The list of sources could not be read.
E: Malformed entry 1 in list file /etc/apt/sources.list.d/kubernetes.list (U
RI)
E: The list of sources could not be read.
ubuntu@ip-172-31-37-243:~$ sudo mkdir -p /etc/apt/keyrings
ubuntu@ip-172-31-37-243:~$ 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
ubuntu@ip-172-31-37-243:~$ 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.k8
s.io/core:/stable:/v1.31/deb/
ubuntu@ip-172-31-37-243:~$ sudo apt-get update
Hit:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-updates InReleas
e
Hit:3 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRele
ase
```

```
ubuntu@ip-172-31-37-243:~$ 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 139 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://eu-north-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 (78.5 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.

Setting up kubelet (1.31.1-1.1) ...
Setting up kubeadm (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-172-31-37-243:~$ sudo apt-mark hold kubelet kubeadm kubectl
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
ubuntu@ip-172-31-37-243:~$ |
```

```
sudo systemctl enable --now kubelet sudo kubeadm  
init --pod-network-cidr=10.244.0.0/16
```

```
ubuntu@ip-172-31-37-243:~$ 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  
W0924 19:06:55.141347    4241 checks.go:1080] [preflight] WARNING: Couldn't  
create the interface used for talking to the container runtime: failed to cr  
eate new CRI runtime service: validate service connection: validate CRI v1 r  
untime API for endpoint "unix:///var/run/containerd/containerd.sock": rpc er  
ror: code = Unimplemented desc = 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  
internet connection  
[preflight] You can also perform this action beforehand using 'kubeadm confi  
g images pull'  
error execution phase preflight: [preflight] Some fatal errors occurred:  
failed to create new CRI runtime service: validate service connection: valid  
ate CRI v1 runtime API for endpoint "unix:///var/run/containerd/containerd.s  
ock": rpc error: code = Unimplemented desc = unknown service runtime.v1.Runt  
imeService[preflight] If you know what you are doing, you can make a check n  
on-fatal with '--ignore-preflight-errors='...'  
To see the stack trace of this error execute with --v=5 or higher  
ubuntu@ip-172-31-37-243:~$ |
```

```
sudo apt-get install -y containerd
```

```
ubuntu@ip-172-31-37-243:~$ 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 139 not upgraded.  
Need to get 47.2 MB of archives.  
After this operation, 53.1 MB disk space will be freed.  
Get:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 runc amd64 1.1.12-0ubuntu3.1 [8599 kB]  
Get:2 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 containerd amd64 1.7.12-0ubuntu4.1 [38.6 MB]  
Fetched 47.2 MB in 1s (81.0 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) ...  
Processing triggers for man-db (2.12.0-4build2) ...  
Scanning processes...  
Scanning linux images...
```

```
sudo mkdir -p /etc/containerd sudo containerd config default | sudo
```

```
tee /etc/containerd/config.toml
```

```
ubuntu@ip-172-31-37-243:~$ 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

[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-172-31-37-243:~$
```

```
sudo systemctl restart containerd
sudo systemctl enable containerd
sudo systemctl status containerd
```

```
ubuntu@ip-172-31-37-243:~$ 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; preset: enabled)
   Active: active (running) since Tue 2024-09-24 19:09:13 UTC; 325ms ago
     Docs: https://containerd.io
    Main PID: 4718 (containerd)
      Tasks: 8
        Memory: 13.2M (peak: 13.8M)
          CPU: 73ms
        CGroup: /system.slice/containerd.service
                  └─4718 /usr/bin/containerd

Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Starting containerd"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
Sep 24 19:09:13 ip-172-31-37-243 systemd[1]: Started containerd.service - container runtime
Sep 24 19:09:13 ip-172-31-37-243 containerd[4718]: time="2024-09-24T19:09:13+00:00" level=info msg="Listening on /run/containerd/containerd.sock"
lines 1-21/21 (END)

● containerd.service - containerd container runtime
   Loaded: loaded (/usr/lib/systemd/system/containerd.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-09-24 19:09:13 UTC; 325ms ago
     Docs: https://containerd.io
    Main PID: 4718 (containerd)
      Tasks: 8
        Memory: 13.2M (peak: 13.8M)
          CPU: 73ms
        CGroup: /system.slice/containerd.service
                  └─4718 /usr/bin/containerd
```

```
sudo apt-get install -y socat
```

```
ubuntu@ip-172-31-37-243:~$ 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 139 not upgraded.
Need to get 374 kB of archives.
After this operation, 1649 kB of additional disk space will be used.
Get:1 http://eu-north-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 socat amd64 1.8.0.0-4build3 [374 kB]
Fetched 374 kB in 0s (22.1 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-172-31-37-243:~$ |
```

Step 6: Initialize the Kubecluster sudo kubeadm init

--pod-network-cidr=10.244.0.0/16

```
ubuntu@ip-172-31-37-243:~$ sudo kubeadm init --pod-network-cidr=10.244.0.0/1
6
[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'
W0924 19:12:15.863783    5009 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-172-31-37-243 kub
ernetes kubernetes.default kubernetes.default.svc kubernetes.default.svc.clu
ster.local] and IPs [10.96.0.1 172.31.37.243]
[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-172-31-37-243 l
ocalhost] and IPs [172.31.37.243 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [ip-172-31-37-243 loc
alhost] and IPs [172.31.37.243 127.0.0.1 ::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
ests"
```

```
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 172.31.37.243:6443 --token 83t146.gii8h4xivxue1bio \
    --discovery-token-ca-cert-hash sha256:d3833aa042f888a0a506ff97a41023
c5524cd0e0b533ba00adb635a5eff723d9
ubuntu@ip-172-31-37-243:~$ |
```

Copy the mkdir and chown commands from the top and execute them.

```
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-172-31-37-243:~$ mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
ubuntu@ip-172-31-37-243:~$ |
```

Add a common networking plugin called flannel as mentioned in the code.

```
kubectl apply -f
https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml
```

```
ubuntu@ip-172-31-37-243:~$ 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-172-31-37-243:~$ |
```

Step 7: Now that the cluster is up and running, we can deploy our nginx server on this cluster.

Apply this deployment file using this command to create a deployment  
kubectl apply -f https://k8s.io/examples/application/deployment.yaml

```
ubuntu@ip-172-31-37-243:~$ kubectl apply -f https://k8s.io/examples/application/deployment.yaml
deployment.apps/nginx-deployment created
ubuntu@ip-172-31-37-243:~$ |
```

kubectl get pods

```
POD_NAME=$(kubectl get pods -l app=nginx -o jsonpath="{.items[0].metadata.name}")
kubectl port-forward $POD_NAME 8081:80
```

```
kubectl taint nodes --all node-role.kubernetes.io/control-plane-node/ip-172-31-20-171
untainted
kubectl get nodes
```

```
ubuntu@ip-172-31-37-243:~$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
nginx-deployment-d556bf558-ptclv   0/1     Pending   0          55s
nginx-deployment-d556bf558-rsgxw   0/1     Pending   0          55s
ubuntu@ip-172-31-37-243:~$ POD_NAME=$(kubectl get pods -l app=nginx -o jsonpath=".items[0].metadata.name")
ubuntu@ip-172-31-37-243:~$ kubectl port-forward $POD_NAME 8080:80
error: unable to forward port because pod is not running. Current status=Pending
ubuntu@ip-172-31-37-243:~$ kubectl taint nodes --all node-role.kubernetes.io/control-plane-node/ip-172-31-20-171 untainted
error: at least one taint update is required
ubuntu@ip-172-31-37-243:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE   VERSION
ip-172-31-37-243   Ready   control-plane   10m   v1.31.1
ubuntu@ip-172-31-37-243:~$ kubectl taint nodes --all node-role.kubernetes.io/control-plane-node/ip-172-31-37-243 untainted
ubuntu@ip-172-31-37-243:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE   VERSION
ip-172-31-37-243   Ready   control-plane   10m   v1.31.1
ubuntu@ip-172-31-37-243:~$ |
```

```
ubuntu@ip-172-31-37-243:~$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
nginx-deployment-d556bf558-ptclv   1/1     Running   0          8m32s
nginx-deployment-d556bf558-rsgxw   1/1     Running   0          8m32s
ubuntu@ip-172-31-37-243:~$ |
```

```
ubuntu@ip-172-31-37-243:~$ POD_NAME=$(kubectl get pods -l app=nginx -o jsonpath=".items[0].metadata.name")
```

```
ubuntu@ip-172-31-37-243:~$ kubectl port-forward $POD_NAME 8081:80
Forwarding from 127.0.0.1:8081 -> 80
Forwarding from [::1]:8081 -> 80
Forwarding from 127.0.0.1:8081 -> 80
Forwarding from [::1]:8081 -> 80
```

**Step 8:** Verify your deployment Open up a new terminal and ssh to your EC2 instance.

Then, use this curl command to check if the Nginx server is running. curl --head http://127.0.0.1:8080

```
PS C:\Users\siddi\downloads\exp4> ssh -i "worker_key.pem" ubuntu@ec2-13-60-3
0-82.eu-north-1.compute.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 Tue Sep 24 19:52:47 UTC 2024

System load: 0.01          Temperature:      -273.1 C
Usage of /:   55.5% of 6.71GB Processes:       149
Memory usage: 20%          Users logged in:  1
Swap usage:   0%           IPv4 address for ens5: 172.31.37.243

Expanded Security Maintenance for Applications is not enabled.

143 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: Tue Sep 24 19:41:15 2024 from 152.57.249.67
ubuntu@ip-172-31-37-243:~$ curl --head http://127.0.0.1:8080
HTTP/1.1 200 OK
Server: nginx/1.14.2
Date: Tue, 24 Sep 2024 19:53:04 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

ubuntu@ip-172-31-37-243:~$ |
```

# ADVANCE DEVOPS EXPERIMENT NO 5

## A) Installation and Configuration of Terraform in Windows

### Step 1: Download terraform

The screenshot shows the Terraform website's download section for Windows. On the left, a sidebar lists operating systems: macOS, Windows (selected), Linux, FreeBSD, OpenBSD, and Solaris. The main content area shows binary download options for Windows. It includes sections for 'Binary download' (AMD64 and ARM64) and 'Windows' (386 and AMD64). Each section has a 'Download' button next to its respective version number (1.9.4).

### Step 2: Extract the downloaded setup file Terraform.exe in C:\Terraform directory

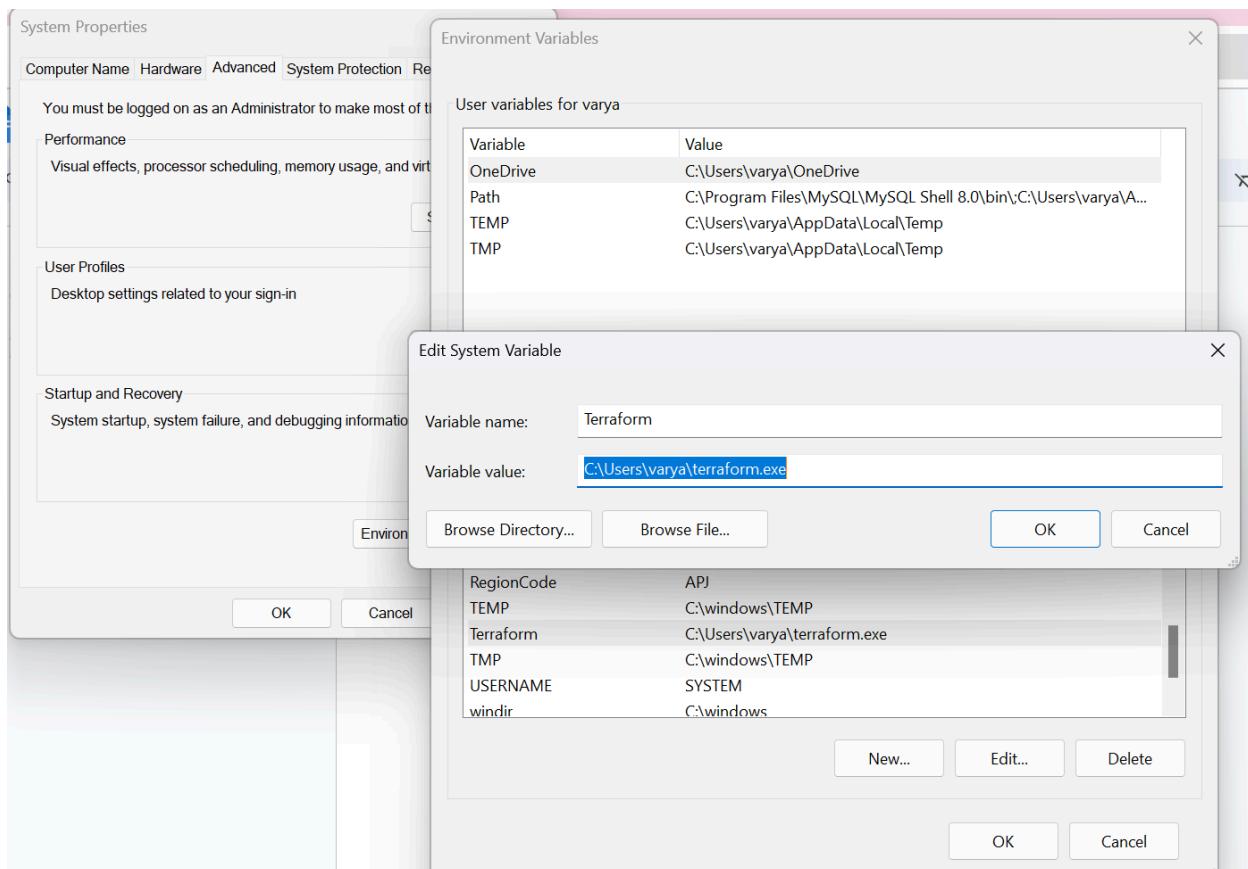
The screenshot shows a Windows File Explorer window titled 'terraform\_1.9.4\_windows\_amd'. The path is 'Downloads > terraform\_1.9.4\_windows\_amd64'. The contents of the folder are listed in a table:

Name	Type	Compressed size	Password pr...	Size	Ratio	Date modified
LICENSE	Text Source File	2 KB	No	5 KB	63%	07-08-2024 06:57
terraform	Application	26,703 KB	No	88,918 KB	70%	07-08-2024 06:57

The right pane shows the file details for 'terraform'. The file is an application (exe) of size 26,703 KB, compressed at 70%, and was modified on 07-08-2024 06:57.

### Step 3: Set the System path for Terraform in Environment Variables

## Riya Varyani D15A 64



## Step 4: Open PowerShell with Admin Access

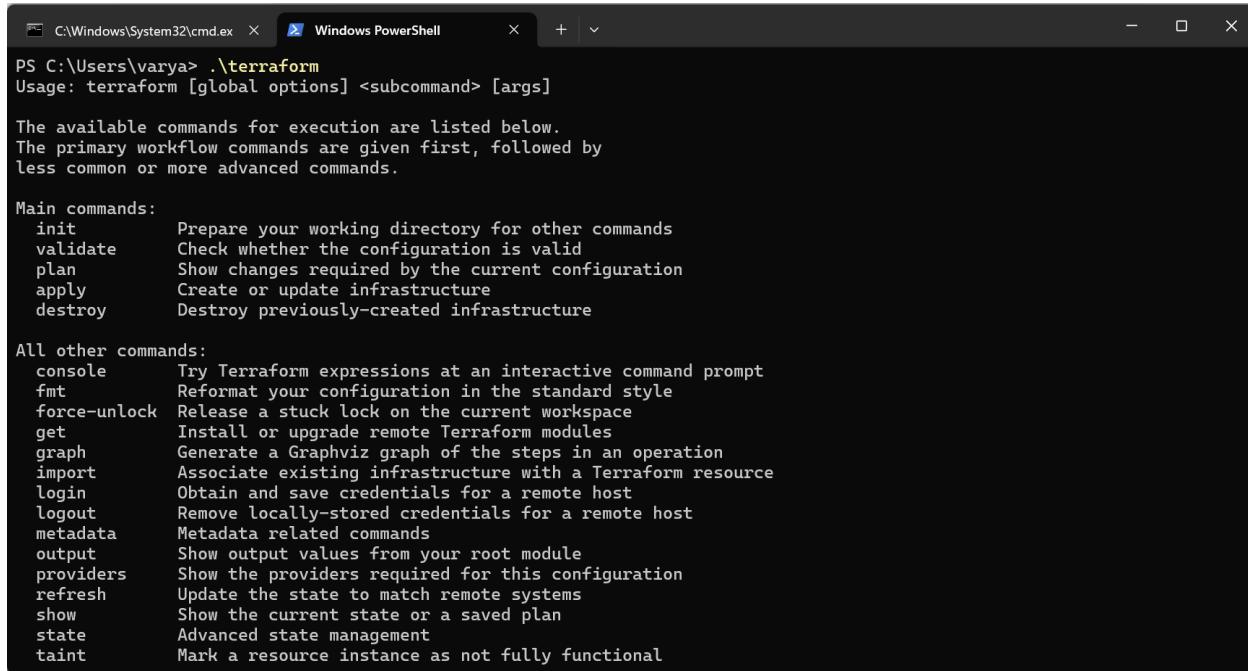
```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

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

PS C:\windows\system32>
```

## Step 5 : Open Terraform in PowerShell and check its functionality

# Riya Varyani D15A 64



The screenshot shows a Windows PowerShell window titled "Windows PowerShell" with the path "C:\Windows\System32\cmd.exe" in the title bar. The window displays the usage and command list for Terraform. It includes sections for "Main commands:" and "All other commands:", each listing a command name and its description.

```
PS C:\Users\varya> .\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
```

## ADVANCE DEVOPS EXPERIMENT NO 6

### A. Creating docker image using terraform

1) Download and Install Docker Desktop from <https://www.docker.com/>

Step 1: Check the docker functionality

The screenshot shows the Docker website homepage and a separate window titled "Installing Docker Desktop 4.33.1 (161083)".

**Docker Website Screenshot:**

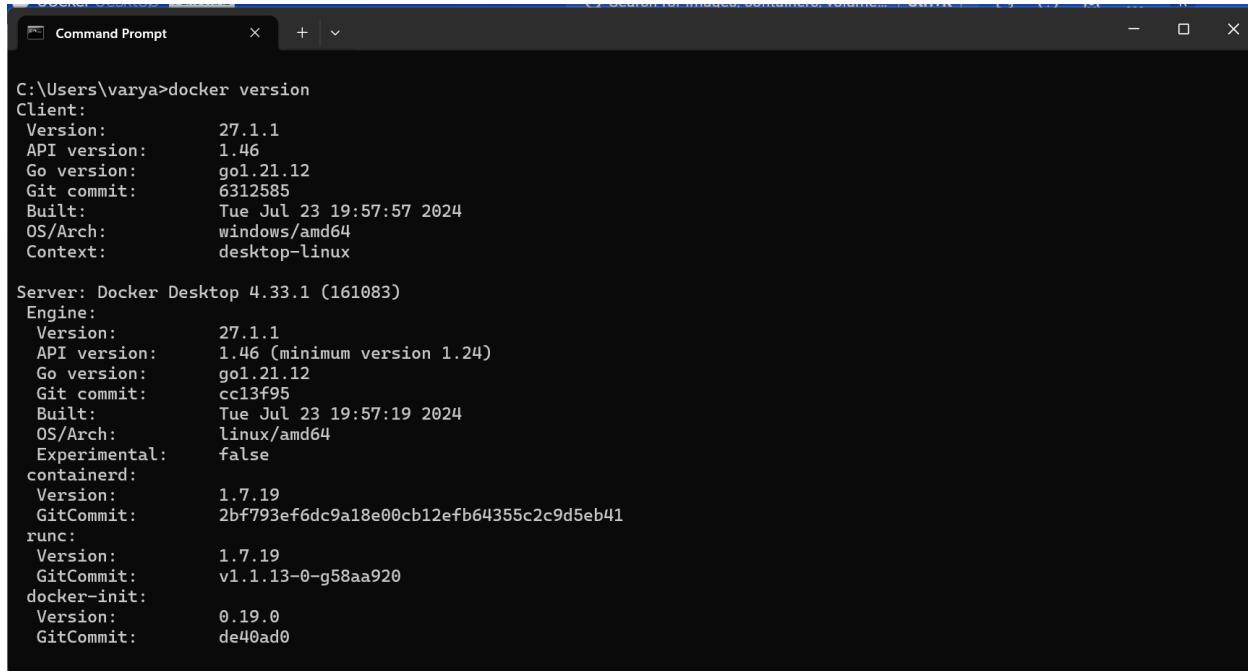
- Header:** docker.
- Navigation:** Products ▾, Developers ▾, Pricing, Support, Blog, Company ▾.
- Main Content:** Large text "Develop faster Run anywhere". Below it: "Build with the #1 most-used developer tool".
- Download Buttons:** "Download for Windows" (with a dropdown arrow), "Learn more about Docker".
- Right Panel:** "Recent download history" showing:
  - Docker Desktop Installer.exe (492 MB • Done)
  - Docker Desktop Installer.exe (Canceled)
  - terraform\_1.9.4\_windows\_amd64.zip (26.1 MB • 44 minutes ago)
  - Arnav\_Sawant\_D15A\_Ad-DevOps-Exp2.docx (3.2 MB • 50 minutes ago)
  - Arnav\_Sawant\_D15A\_Ad-DevOps-Exp1.docx (1,319 KB • 51 minutes ago)
- Bottom:** "Full download history" button.

**Installing Docker Desktop Window:**

- Title Bar:** "Installing Docker Desktop 4.33.1 (161083)" with standard window controls.
- Content Area:** "Docker Desktop 4.33.1".
- Message:** "Unpacking files...".
- Log Output:** A scrollable list of file unpacking messages:

```
Unpacking file: resources/docker-desktop.iso
Unpacking file: resources/ddvp.ico
Unpacking file: resources/config-options.json
Unpacking file: resources/componentsVersion.json
Unpacking file: resources/bin/docker-compose
Unpacking file: resources/bin/docker
Unpacking file: resources/.gitignore
Unpacking file: InstallerCli.pdb
Unpacking file: InstallerCli.exe.config
Unpacking file: frontend/vk_swiftshader_icd.json
Unpacking file: frontend/v8_context_snapshot.bin
Unpacking file: frontend/snapshot_blob.bin
Unpacking file: frontend/resources/regedit/vbs/util.vbs
Unpacking file: frontend/resources/regedit/vbs/regUtil.vbs
```
- Progress Bar:** A horizontal progress bar at the bottom of the window.

# RIYA VARYANI D15A 64



```
C:\Users\varya>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
```

**Now, create a folder named ‘Terraform Scripts’ in which we save our different types of scripts which will be further used in this experiment.**

**Step 2:** Firstly create a new folder named ‘Docker’ in the ‘TerraformScripts’ folder. Then

create a new dteocker.tf file using Atom editor and write the following contents into it to create a Ubuntu Linux container.

Script:

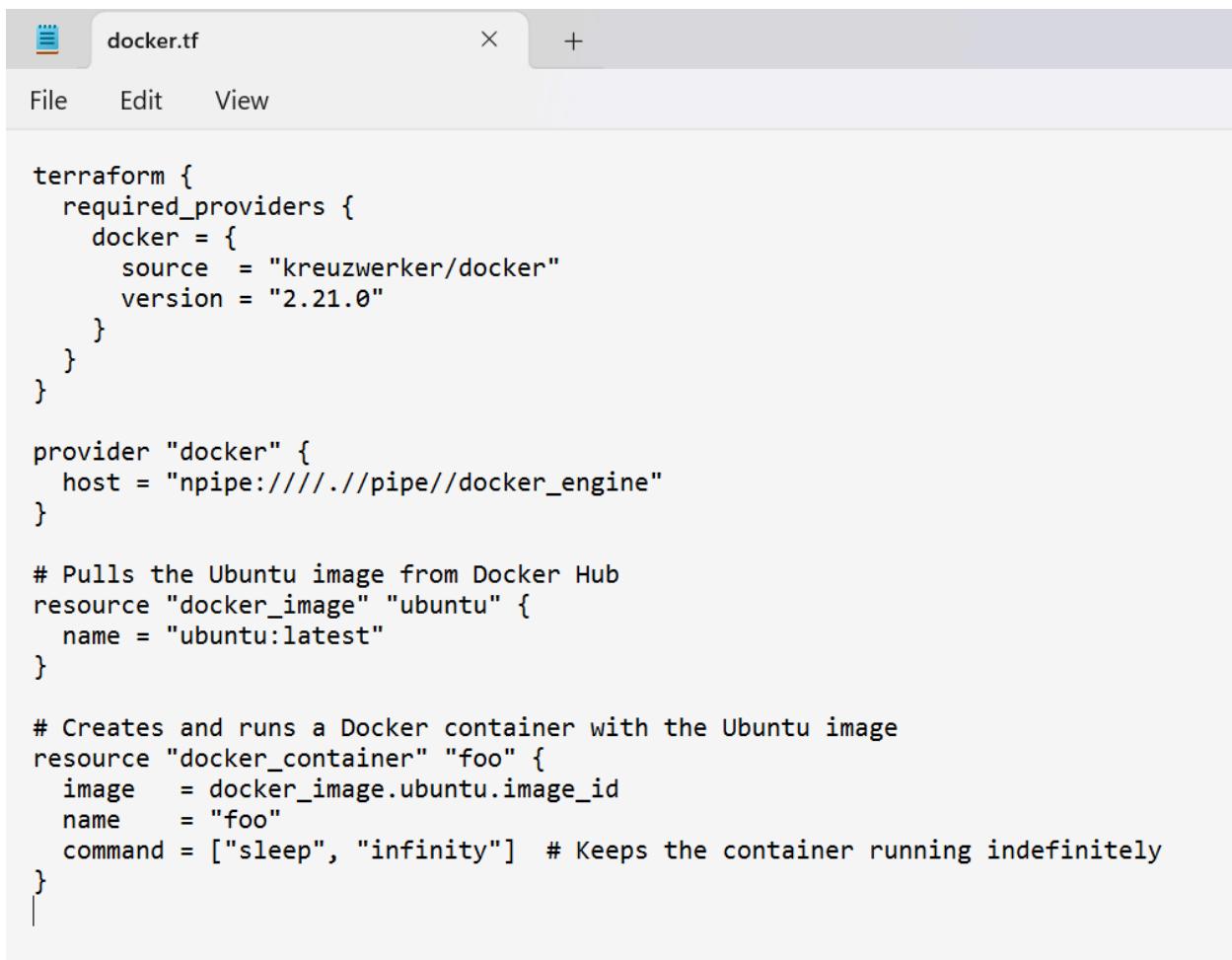
```
terraform
```

```
{ required_providers
{docker = {
source = "kreuzwerker/docker"
version = "2.21.0"
}
}
}
provider "docker" {
host = "npipe:///./pipe//docker_engine"
}
```

## RIYA VARYANI D15A 64

```
# Pulls the image
resource "docker_image" "ubuntu"
{name = "ubuntu:latest"
}

# Create a container
resource "docker_container" "foo"
{ image =
  docker_image.ubuntu.image_idname =
"foo"
}
```



The screenshot shows a code editor window with a tab bar at the top labeled "docker.tf". Below the tab bar is a menu bar with "File", "Edit", and "View" options. The main area of the editor contains Terraform configuration code. The code starts with a provider block for Docker, followed by a provider block for Docker itself, then a resource block to pull the Ubuntu image from Docker Hub, and finally a resource block to create a Docker container named "foo".

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

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

# Pulls the Ubuntu image from Docker Hub
resource "docker_image" "ubuntu" {
  name = "ubuntu:latest"
}

# Creates and runs a Docker container with the Ubuntu image
resource "docker_container" "foo" {
  image    = docker_image.ubuntu.image_id
  name     = "foo"
  command  = ["sleep", "infinity"] # Keeps the container running indefinitely
}
```

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

## RIYA VARYANI D15A 64

```
C:\Users\varya>cd C:\Users\varya\TerraformScripts\Docker  
C:\Users\varya\TerraformScripts\Docker>terraform init  
Initializing the backend...  
Initializing provider plugins...  
- Reusing previous version of kreuzwerker/docker from the dependency lock file  
- Using previously-installed kreuzwerker/docker v2.21.0  
  
Terraform has been successfully initialized!  
  
You may now begin working with Terraform. Try running "terraform plan" to see  
any changes that are required for your infrastructure. All Terra  
form commands  
should now work.  
  
If you ever set or change modules or backend configuration for Terraform,  
rerun this command to reinitialize your working directory. If you  
forget, other  
commands will detect it and remind you to do so if necessary.
```

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

```
C:\Users\varya\TerraformScripts\Docker>terraform plan  
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8  
a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:lates  
t]  
  
Terraform used the selected providers to generate the following  
execution plan. Resource actions are indicated with the  
following symbols:  
+ create  
  
Terraform will perform the following actions:  
  
# docker_container.foo will be created  
+ resource "docker_container" "foo" {  
    + attach          = false  
    + bridge          = (known after apply)  
    + command         = [  
        + "sleep",  
        + "infinity",  
    ]  
    + 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)
```

## RIYA VARYANI D15A 64

**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:\Users\varya\TerraformScripts\Docker>terraform apply
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8
a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:lates
t]

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

Terraform will perform the following actions:

# docker_container.foo will be created
+ resource "docker_container" "foo" {
    + attach          = false
    + bridge          = (known after apply)
    + command         = [
        + "sleep",
        + "infinity",
    ]
}
```

Docker images, Before Executing Apply step:

```
C:\Users\varya\TerraformScripts\Docker>docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
ubuntu          latest   edbfe74c41f8  2 weeks ago  78.1MB
```

**Step 6:** Execute Terraform destroy to delete the configuration, which will automatically delete the Ubuntu Container.

## RIYA VARYANI D15A 64

```
C:\Users\varya\TerraformScripts\Docker>terraform destroy
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8
a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:lates
t]
docker_container.foo: Refreshing state... [id=1dc9c4a8bbccf62fe
a18099efddb1af6fdcf0a85deab004c503949cb7d16554]

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

Terraform will perform the following actions:

# docker_container.foo will be destroyed
- resource "docker_container" "foo" {
```

Docker images After Executing Destroy step

```
C:\Users\varya\TerraformScripts\Docker>docker images
REPOSITORY      TAG          IMAGE ID      CREATED      SIZE
```

# ADVANCE DEVOPS EXP-7

RIYA VARYANI

D15A/64

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

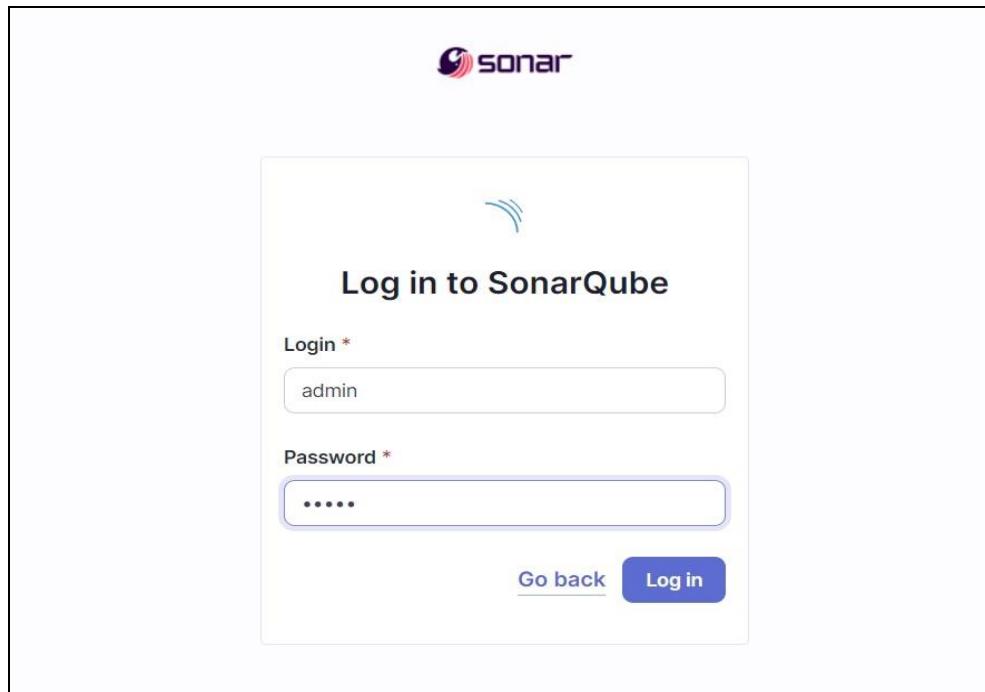
**Step-1:** Open up Jenkins Dashboard on localhost, port 8080 or whichever port it is at for you.

The screenshot shows the Jenkins dashboard interface. At the top, there's a navigation bar with the Jenkins logo, a search bar containing "Search (CTRL+K)", a help icon, a user profile for "Riya Varyani", and a "log out" button. Below the navigation bar, the main content area has a title "Dashboard >". On the left, there's a sidebar with links: "New Item", "Build History", "Project Relationship", "Check File Fingerprint", "Manage Jenkins", "My Views", and "Restart Safely". The main area displays a table of active Jenkins jobs. The columns are labeled: S (Status), W (Last Build), Name, Last Success, Last Failure, and Last Duration. The jobs listed are: "first-job" (Status: green, Last Success: 18 hr #1, Last Failure: N/A, Last Duration: 0.62 sec), "MavenBuild" (Status: green, Last Success: 18 hr #1, Last Failure: N/A, Last Duration: 34 sec), and "pipeline" (Status: green, Last Success: 18 hr #2, Last Failure: N/A, Last Duration: 4.1 sec). Below the table, there are two dropdown menus: "Build Queue" (No builds in the queue) and "Build Executor Status" (Built-In Node). A legend for job status icons (S, M, L) is also present.

**Step-2:** Run SonarQube in a Docker container using this command :-  
a] docker -v  
b] docker run -d --name sonarqube -e  
SONAR\_ES\_BOOTSTRAP\_CHECKS\_DISABLE=true -p 9000:9000 sonarqube:latest

```
C:\Users\varya>docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest
Unable to find image 'sonarqube:latest' locally
latest: Pulling from library/sonarqube
7478e0ac0f23: Pull complete
90a925ab929a: Pull complete
7d9a34308537: Pull complete
80338217a4ab: Pull complete
1a5fd5c7e184: Pull complete
7b87d6fa783d: Pull complete
bd819c9b5ead: Pull complete
4f4fb700ef54: Pull complete
Digest: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31aecde
Status: Downloaded newer image for sonarqube:latest
b186ed1336af1631917ede88ae9f1d4d688cccd35cc77eb5bfd47b1764967a2c6
C:\Users\varya>
```

**Step-3:** Once the container is up and running, you can check the status of SonarQube at localhost port 9000. The login id is “admin” and the password is also “admin”.



**Step-4:** Create a local project in SonarQube with the name sonarqube

A screenshot of the "Create a local project" step 1 of 2. The title "1 of 2" is at the top left. The main heading "Create a local project" is in bold. There are three input fields with validation: "Project display name \*" with "sonarqube" and a green checkmark; "Project key \*" with "sonarqube" and a green checkmark; and "Main branch name \*" with "main". Below these is a note: "The name of your project's default branch [Learn More](#)". At the bottom are "Cancel" and "Next" buttons.

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.

Reference branch  
Choose a branch as the baseline for the new code.  
Recommended for projects using feature branches.

[Back](#) [Create project](#)

**Step-5:** Setup the project and come back to Jenkins Dashboard. Go to Manage Jenkins → Plugins and search for SonarQube Scanner in Available Plugins and install it.

Dashboard > Manage Jenkins > Plugins

Plugins

Search (CTRL+K)

Available plugins

SonarQube Scanner for Jenkins 2.17.2

This plugin allows an easy integration of SonarQube, the open source platform for Continuous Inspection of code quality.

Report an issue with this plugin

Enabled

**Step-6:** Under ‘Manage Jenkins → System’, look for SonarQube Servers and enter these details. Name : sonarqube, Server URL : <http://localhost:9000>

**SonarQube servers**

If checked, job administrators will be able to inject a SonarQube server configuration as environment variables in the build.

**Environment variables**

**SonarQube installations**

List of SonarQube installations

Name	sonarqube
Server URL	Default is http://localhost:9000 http://localhost:9000
Server authentication token	SonarQube authentication token. Mandatory when anonymous access is disabled. - none - + Add ▾
Advanced ▾	

**Step-7:** Search for SonarQube Scanner under Global Tool Configuration. Choose the latest configuration and choose Install automatically. Manage Jenkins → Tools → SonarQube Scanner Installation.

**SonarQube Scanner installations**

Add SonarQube Scanner

**SonarQube Scanner**

Name

sonarqube

**Install automatically** ?

**Install from Maven Central**

Version

SonarQube Scanner 6.2.0.4584

Add Installer ▾

Add SonarQube Scanner

**Step-8:** After the configuration, create a New Item in Jenkins, choose a freestyle project named sonarqube.

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.

 **Maven project**  
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

 **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.

 **Multibranch Pipeline**  
Creates a set of Pipeline projects according to detected branches in one SCM repository.

 **Organization Folder**  
Creates a set of multibranch project subfolders by scanning for repositories

**OK**

**Step-9:** Choose this GitHub repository in Source Code Management.

[https://github.com/shazforiot/MSBuild\\_firstproject.git](https://github.com/shazforiot/MSBuild_firstproject.git). It is a sample hello-world project with no vulnerabilities and issues, just to test the integration.

Configure

Source Code Management

None

Git

Repositories

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

Repository browser: (Auto)

Save Apply

The screenshot shows the Jenkins configuration interface for a new job. The left sidebar has sections for General, Source Code Management (selected), Build Triggers, Build Environment, Build Steps, and Post-build Actions. The main area is titled 'Source Code Management' and is set to 'Git'. It shows a repository URL of 'https://github.com/shazforiot/MSBuild\_firstproject.git', no credentials added, and an advanced section. Below that is an 'Add Repository' button. Under 'Branches to build', it shows a branch specifier of '\*/master' and an 'Add Branch' button. At the bottom are 'Save' and 'Apply' buttons.

**Step-10:** Under Build-> Execute SonarQube Scanner, enter these Analysis Properties. Mention the SonarQube Project Key, Login, Password, Source path and Host URL.

sonar.projectKey=sonarqube

sonar.login=admin

sonar.password=riya 123

sonar.sources=.

sonar.host.url=http://localhost:9000

**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=ansh
sonar.sources=,
sonar.host.url=http://localhost:9000
```

**Analysis properties** ?

**Additional arguments** ?

**JVM Options** ?

**Step-11:** Go to <http://localhost:9000/admin/permissions> and allow Execute Permissions to the Admin user.

	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
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

4 of 4 shown

**Step-12:** Run The Build and check the console output.

Jenkins

Dashboard > SonarQube >

Status Changes Workspace Build Now Configure Delete Project SonarQube Rename

SonarQube

SonarQube

Permalinks

- Last build (#2), 1 hr 14 min ago
- Last stable build (#2), 1 hr 14 min ago
- Last successful build (#2), 1 hr 14 min ago
- Last failed build (#1), 1 hr 19 min ago
- Last unsuccessful build (#1), 1 hr 19 min ago
- Last completed build (#2), 1 hr 14 min ago

Build History trend Filter... #2 Sep 26, 2024, 10:51PM

Jenkins

Search (CTRL+K) Riya Varyani log out

Dashboard > SonarQube > #2 > Console Output

Status Changes Console Output Edit Build Information Delete build '#2' Timings Git Build Data Previous Build

Console Output

Download Copy View as plain text

```
Started by user Riya Varyani
Running as SYSTEM
Building on the built-in node in workspace C:\ProgramData\Jenkins\.jenkins\workspace\SonarQube
The recommended git tool is: NONE
No credentials specified
> git.exe rev-parse --resolve-git-dir C:\ProgramData\Jenkins\.jenkins\workspace\SonarQube\.git # timeout=10
Fetching changes from the remote Git repository
> git.exe config remote.origin.url https://github.com/shazforiot/MSBuild_firstproject.git # 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 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"
> git.exe rev-list --no-walk f2bc042c04c6e72427c380bcaee6d6fee7b49adf # timeout=10
```

Dashboard > SonarQube > #2 > Console Output

```

22:52:22.244 INFO Sensor Zero Coverage Sensor
22:52:22.262 INFO Sensor Zero Coverage Sensor (done) | time=18ms
22:52:22.264 INFO SCM Publisher SCM provider for this project is: git
22:52:22.266 INFO SCM Publisher 4 source files to be analyzed
22:52:22.679 INFO SCM Publisher 4/4 source files have been analyzed (done) | time=413ms
22:52:22.683 INFO CPD Executor Calculating CPD for 0 files
22:52:22.684 INFO CPD Executor CPD calculation finished (done) | time=0ms
22:52:22.691 INFO SCM revision ID 'f2bc042c04c6e72427c380bc4ee6d6fee7b49ad'
22:52:22.947 INFO Analysis report generated in 128ms, dir size=201.0 kB
22:52:23.019 INFO Analysis report compressed in 58ms, zip size=22.5 kB
22:52:23.156 INFO Analysis report uploaded in 135ms
22:52:23.156 INFO ANALYSIS SUCCESSFUL, you can find the results at: http://localhost:9000/dashboard?id=sonarqube
22:52:23.158 INFO Note that you will be able to access the updated dashboard once the server has processed the submitted analysis report
22:52:23.158 INFO More about the report processing at http://localhost:9000/api/ce/task?id=7cb01bac-c199-40ab-8c99-3c356296e6a80
22:52:23.165 INFO Analysis total time: 17.327 s
22:52:23.165 INFO SonarScanner Engine completed successfully
22:52:23.216 INFO EXECUTION SUCCESS
22:52:23.227 INFO Total time: 24.808s
Finished: SUCCESS

```

[REST API](#) Jenkins 2.462.2

### Step-13: Once the build is complete, check the project in SonarQube.

The screenshot shows the SonarQube web interface. At the top, there is a navigation bar with links for Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, and More. A search bar and a 'Create Project' button are also present. On the left, there is a sidebar with 'My Favorites' and 'All' buttons, followed by 'Filters' and 'Reliability' sections. The 'Quality Gate' section shows one 'Passed' item (green checkmark) and zero 'Failed' items (red cross). The main content area displays a project card for 'sonarqube' (PUBLIC). The card indicates the last analysis was 18 minutes ago and notes that the main branch is empty. A green checkmark and the word 'Passed' are displayed next to the project name.

SonarQube Projects Issues Rules Quality Profiles Quality Gates Administration More 

sonarqube / main ✓ ?

Overview Issues Security Hotspots Measures Code Activity Project Settings ▾ Project Information

main Version not provided Set as homepage Last analysis 17 minutes ago

Quality Gate Passed

The last analysis has warnings. See details

New Code Overall Code

Security Reliability Maintainability

Open issues	A	Open issues	A	Open issues	A
0 H		0 M		0 L	

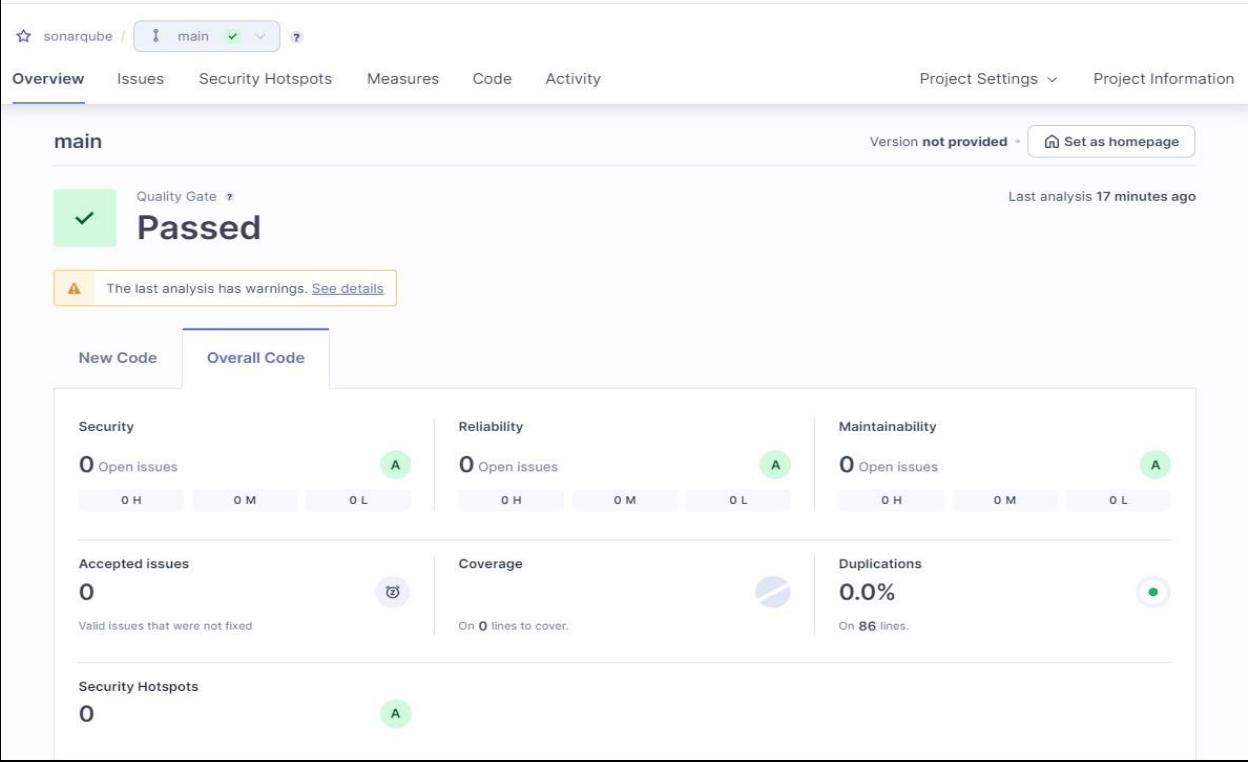
Accepted issues Coverage Duplications

Valid issues that were not fixed	On 0 lines to cover.	On 86 lines.
0	0%	0.0%

Coverage: On 0 lines to cover.

Duplications: On 86 lines.

Security Hotspots: 0 A



## 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: Log in to sonarqube portal and create a local project.

The screenshot shows the 'Create a local project' page in SonarQube. It has fields for 'Project display name' (sonarqube-pipeline), 'Project key' (sonarqube-pipeline), and 'Main branch name' (main). There is a note about the default branch and 'Next' and 'Cancel' buttons.

The screenshot shows the 'Set up project for Clean as You Code' page in SonarQube. It asks to choose a baseline for new code. The 'Use the global setting' option is selected, with 'Previous version' chosen. A note says it's recommended for regular versions. The 'Define a specific setting for this project' option is also shown with its own note.

Step 2: Go to [download sonarscanner](#) to download sonar scanner

SonarQube | Docs 10.6

Latest | Analyzing source code | Scanners | SonarScanner CLI

**SonarScanner CLI**

SonarScanner Issue Tracker Show fewer ^

**6.2** 2024-09-17

Support PKCS12 truststore generated with OpenSSL

Download scanner for: Linux x64 Linux AArch64 Windows x64 macOS x64 macOS AArch64 Docker Any (Requires a pre-installed JVM)

**Release notes**

**6.1** 2024-06-27

macOS and Linux AArch64 distributions

Download scanner for: Linux x64 Linux AArch64 Windows x64 macOS x64 macOS AArch64 Docker Any (Requires a pre-installed JVM)

**Release notes**

**6.0** 2024-06-04

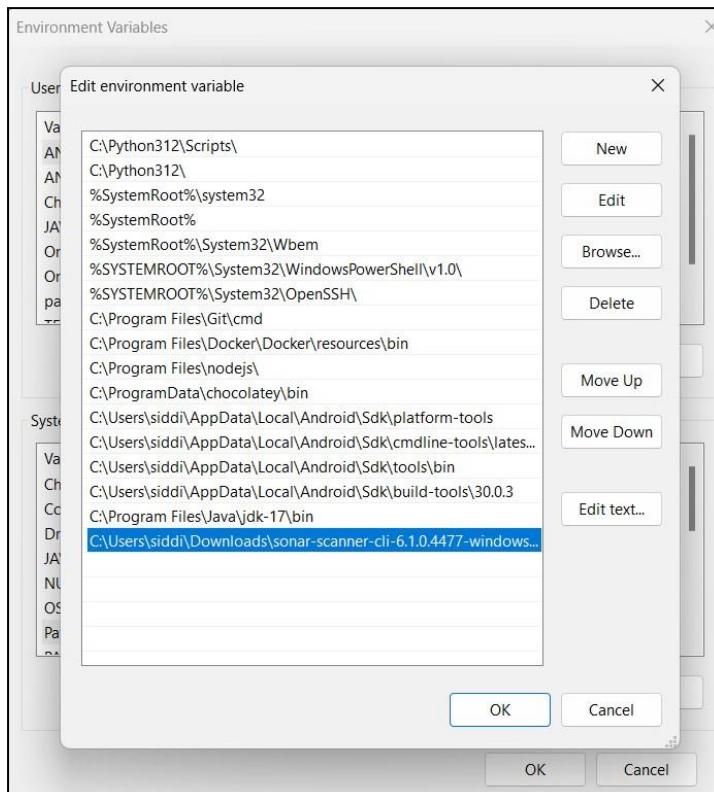
New bootstrapping mechanism and JRE provisioning with SonarQube 10.6+ and SonarCloud

Download scanner for: Linux x64 Windows x64 macOS x64 Docker Any (Requires a pre-installed JVM)

**On this page**

- Configuring your project
- Running SonarScanner CLI from the zip file
- Running SonarScanner CLI from the Docker image
- Scanning C, C++, or Objective-C projects
- Sample projects
- Alternatives to sonar-project.properties
- Alternate analysis directory
- Advanced configuration
- Troubleshooting

After the download is complete, extract the file and copy the path to bin folder  
 Go to environment variables, system variables and click on path Add a new path, paste the path copied earlier.



Step 3: Create a New Item in Jenkins, choose Pipeline.

Dashboard > All > New Item

## New Item

Enter an item name

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.
- Maven project** Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
- 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**

Dashboard > sonarqube-pipeline > Configuration

## Configure

**Pipeline**

Definition

Pipeline script

```
1+ node {
2+   stage('Cloning the GitHub Repo') {
3+     git 'https://github.com/shazfiorot/GOL.git'
4+   }
5+   stage('SonarQube analysis') {
6+     withSonarQubeEnv('sonarqube') {
7+       sh """
8+         C:\Users\sidhi\Downloads\sonar-scanner-cli-6.1.0.4477-windows-x64\sonar-scanner-6.1.0.4477-windows-x64\bin\sonar-scanner
9+           -DSonar.login=admin ^
10+           -DSonar.password=MahVLish ^
11+           -DSonar.projectKey=sonarqube-pipeline ^
12+           -DSonar.exclusions=vendor/**,resources/**,*/*.java ^
13+           -DSonar.host.url=http://localhost:9000/
14+
15+
16+
17+     }
18+   }
19+ }
```

Use Groovy Sandbox

**Save** **Apply**

Step 4: Save the pipeline and build it.

Dashboard > sonarqube-pipeline >

- █ Status
- </> Changes
- ▷ Build Now
- ⚙ Configure
- trash Delete Pipeline
- 🔍 Full Stage View
- SonarQube
- 🔗 Stages
- edit Rename
- ? Pipeline Syntax

### Stage View

		Cloning the GitHub Repo	SonarQube analysis
Average stage times: (Average full run time: ~7min 49s)		9s	3min 53s
<span style="color: #6c757d;">#2</span>	Sep 26 20:42	2s	7min 46s
<span style="color: #6c757d;">#1</span>	Sep 26 20:24	15s	1s failed

### Permalinks

- Last build (#2), 9 min 1 sec ago
- Last stable build (#2), 9 min 1 sec ago
- Last successful build (#2), 9 min 1 sec ago
- Last failed build (#1), 26 min ago
- Last unsuccessful build (#1), 26 min ago
- Last completed build (#2), 9 min 1 sec ago

## Console output:

Dashboard > sonarqube-pipeline > #2

- █ Status
- </> Changes
- 📄 Console Output
- Edit Build Information
- trash Delete build '#2'
- ⌚ Timings
- git Git Build Data
- 🔗 Pipeline Overview
- 🔗 Pipeline Console
- Replay
- ☰ Pipeline Steps
- 📁 Workspaces
- ⬅ Previous Build

### Console Output

⬇ Download  
 Copy  
 View as plain text

Skipping 4,248 KB.. [Full Log](#)

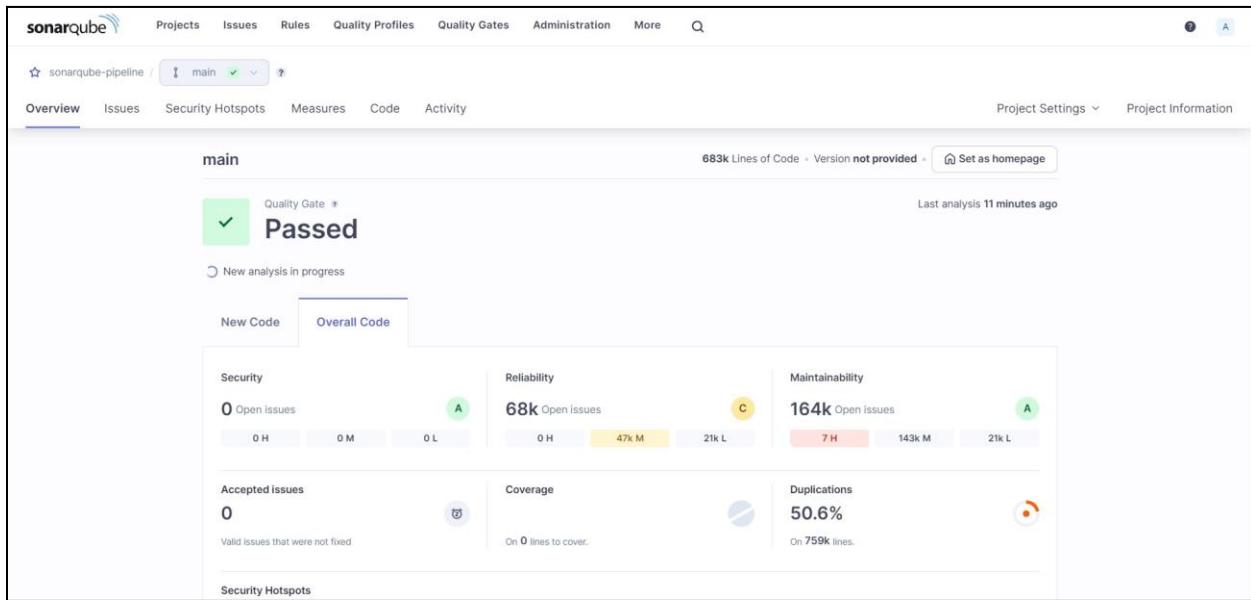
```

20:49:35.711 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/GuiPackage.html for block at line 40. Keep only the first 100 references.
20:49:35.712 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/GuiPackage.html for block at line 65. Keep only the first 100 references.
20:49:35.712 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/GuiPackage.html for block at line 41. Keep only the first 100 references.
20:49:35.712 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/GuiPackage.html for block at line 17. Keep only the first 100 references.
20:49:35.712 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/gui/GuiPackage.html for block at line 1487. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 226. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 229. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 225. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 226. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 424. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 17. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 17. Keep only the first 100 references.
20:49:35.812 WARN Too many duplication references on file gameoflife-web/tools/jmeter/docs/api/org/apache/jmeter/functions/LongSum.html for block at line 17. Keep only the first 100 references.

```

```
20:50:01.832 INFO ANALYSIS SUCCESSFUL, you can find the results at: http://localhost:9000/dashboard?id=sonarqube-pipeline
20:50:01.832 INFO Note that you will be able to access the updated dashboard once the server has processed the submitted analysis report
20:50:01.832 INFO More about the report processing at http://localhost:9000/api/ce/task?id=159a9d05-1f5f-4e17-bd27-3643a32a836a
20:50:12.108 INFO Analysis total time: 7:37.235 s
20:50:12.110 INFO SonarScanner Engine completed successfully
20:50:12.849 INFO EXECUTION SUCCESS
20:50:12.851 INFO Total time: 7:44.878s
[Pipeline] }
[Pipeline] // withSonarQubeEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

## Step 5: After that, check the project in SonarQube



The screenshot shows the SonarQube main dashboard for the 'main' branch of the 'sonarqube-pipeline' project. The dashboard is clean and modern, featuring a green 'Passed' status for the Quality Gate. Key metrics are displayed prominently: 683k Lines of Code, 0 Open issues (Security), 68k Open issues (Reliability), 164k Open issues (Maintainability), 0 Accepted issues, 0 Coverage, and 50.6% Duplications. The interface includes tabs for Overview, Issues, Security Hotspots, Measures, Code, and Activity, along with Project Settings and Project Information.

Under different tabs, check all different issues with the code.

SonarQube Project Overview for sonarqube-pipeline

**Measures** tab selected.

**Reliability** section:

- Maintainability
- Security Review
- Duplications
- Size
- Complexity

**Issues** section:

- Overall Code
- Open Issues: 210,549
- Confirmed Issues: 0
- Accepted Issues: 0
- False Positive Issues: 0

**Code** section:

- sonarqube-pipeline
- View as: Tree
- Select files
- 6 files

**Activity** section:

- Open Issues: 210,549
- See history
- gameoflife-acceptance-tests: 4 issues
- gameoflife-build: 0 issues
- gameoflife-core: 603 issues
- gameoflife-deploy: 0 issues
- gameoflife-web: 209,940 issues
- pom.xml: 2 issues

6 of 6 shown

SonarQube Issues Tab for sonarqube-pipeline

**Issues** tab selected.

**Filters** section:

- My Issues
- All
- Clear All Filters

**Issues in new code**

**Clean Code Attribute** section:

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

Add to selection Ctrl + click

**Software Quality** section:

- Security: 0
- Reliability: 54k
- Maintainability: 164k

**Bulk Change** section:

- gameoflife-core/build/reports/tests/all-tests.html
- Select issues: 196,662 issues, 3075d effort
- Issues listed:

  - Insert a <!DOCTYPE> declaration to before this <html> tag.  
Reliability: Consistency user-experience
  - Remove this deprecated "width" attribute.  
Maintainability: html5 obsolete
  - Remove this deprecated "align" attribute.  
Maintainability: Consistency
  - Remove this deprecated "align" attribute.  
Maintainability: html5 obsolete

SonarQube Issues page for project sonarqube-pipeline / main

Filters: Clean Code Attribute - Intentionality (selected), Software Quality - Reliability (selected)

Issues in new code:

- Clean Code Attribute - Intentionality: 14k
- Software Quality - Reliability: 14k

gamefile-acceptance-tests/Dockerfile

- Use a specific version tag for the image. (Intentionality)
- Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)
- Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)

Introducing Clean Code Attributes (Modal):

Clean Code attributes are the characteristics that your code must have to be considered Clean Code.

You can now filter by these attributes to evaluate why your code is breaking away from being clean.

1 of 5 Next

SonarQube Issues page for project sonarqube-pipeline / main

Filters: Clean Code Attribute - Intentionality (selected), Software Quality - Reliability (selected)

Issues in new code:

- Clean Code Attribute - Intentionality: 14k
- Software Quality - Reliability: 14k

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

- Add "lang" and/or "xml:lang" attributes to this "<html>" element. (Reliability)
- Add "<th>" headers to this "<table>". (Reliability)

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

- Add "lang" and/or "xml:lang" attributes to this "<html>" element. (Reliability)
- Add "<th>" headers to this "<table>". (Reliability)

SonarQube Issues Overview

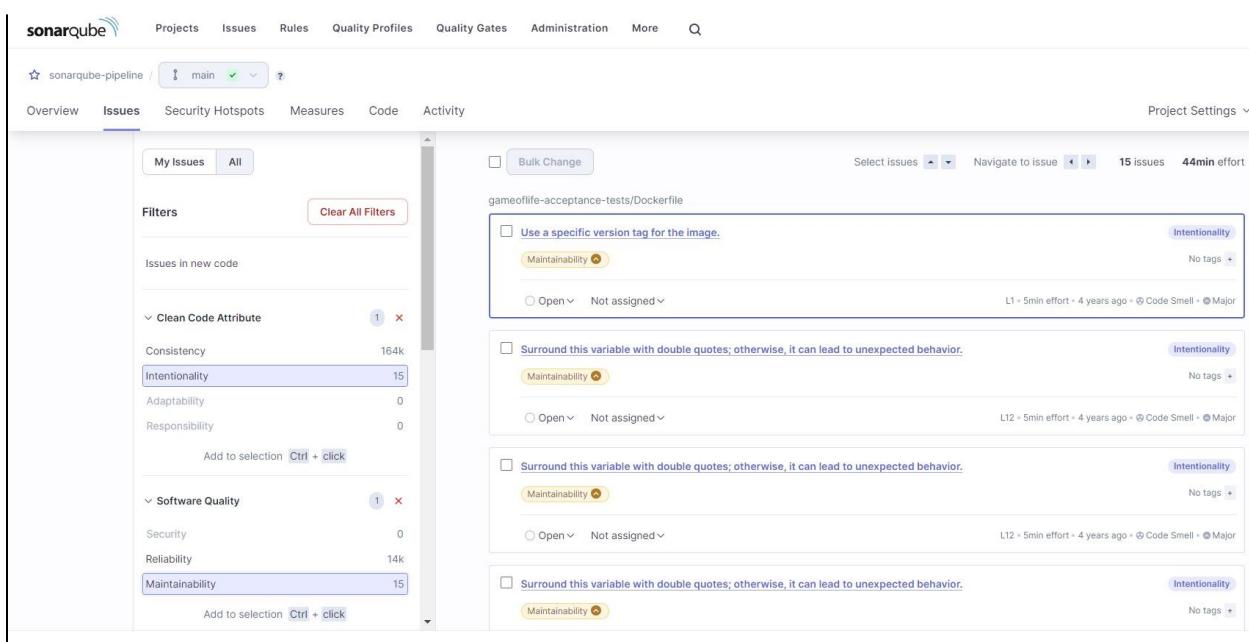
Project: sonarqube-pipeline / main

Filters: Issues in new code, Clean Code Attribute, Software Quality

Issues:

- gameoflife-acceptance-tests/Dockerfile
  - Use a specific version tag for the image. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)

Project Settings: 15 issues, 44min effort



SonarQube Issues Overview

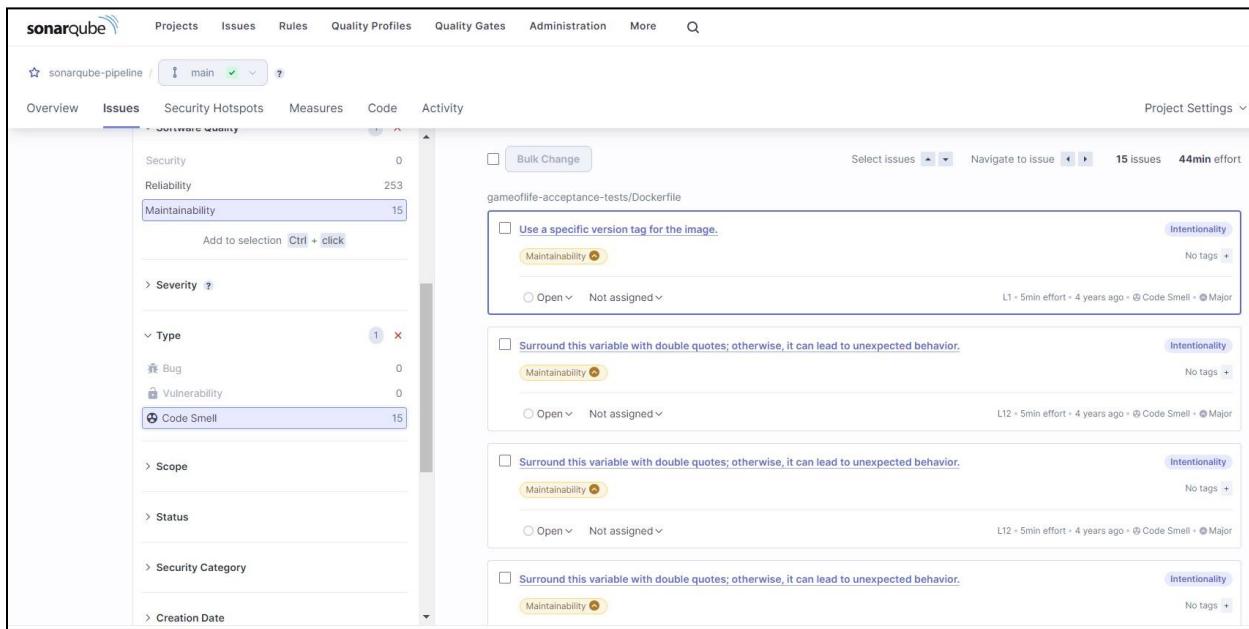
Project: sonarqube-pipeline / main

Filters: Software Quality

Issues:

- gameoflife-acceptance-tests/Dockerfile
  - Use a specific version tag for the image. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)
  - Surround this variable with double quotes; otherwise, it can lead to unexpected behavior. (Intentionality)

Project Settings: 15 issues, 44min effort



SonarQube Project: sonarqube-pipeline / main

Overview Issues Security Hotspots Measures Code Activity

0.0% Security Hotspots Reviewed

3 Security Hotspots

Review priority: Medium

Permission: The tomcat image runs with root as the default user. Make sure it is safe here.

Review priority: Low

Encryption of Sensitive Data: The tomcat image runs with root as the default user. Make sure it is safe here.

Others: The tomcat image runs with root as the default user. Make sure it is safe here.

Status: To review

This security hotspot needs to be reviewed to assess whether the code poses a risk.

Review

Where is the risk? What's the risk? Assess the risk How can I fix it? Activity

gameoflife-web/Dockerfile

FROM tomcat:8-jre8  
The tomcat image runs with root as the default user. Make sure it is safe here.  
RUN rm -rf /usr/local/tomcat/webapps/\*  
COPY target/gameoflife.war /usr/local/tomcat/webapps/ROOT.war  
EXPOSE 8080  
CMD ["catalina.sh", "run"]

Open in IDE

SonarQube Project: sonarqube-pipeline / main

Overview Issues Security Hotspots **Measures** Code Activity

Duplicated Lines (%) 50.6% See history

Category	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

SonarQube

Projects Issues Rules Quality Profiles Quality Gates Administration More Q

sonarqube-pipeline / main ?

Overview Issues Security Hotspots Measures Code Activity Project Settings Project Information

Security Review ? >

Duplications Overview

Overall Code Density 50.6%

Duplicated Lines 384,007

Duplicated Blocks 42,808

Duplicated Files 979

Size >

Complexity ? Cyclomatic Complexity 1,112

sonarqube-pipeline View as Tree Select files Navigate 6 files

Cyclomatic Complexity 1,112 See history

gameoflife-acceptance-tests

gameoflife-build

gameoflife-core 18

gameoflife-deploy

gameoflife-web 1,094

pom.xml

6 of 6 shown

The screenshot shows the SonarQube interface for the 'sonarqube-pipeline' project. The top navigation bar includes links for Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, More, and a search bar. The current project is 'sonarqube-pipeline' with a 'main' branch selected. The 'Measures' tab is active, displaying various code quality metrics. On the left, a sidebar provides a summary of duplications, overall code density (50.6%), and cyclomatic complexity (1,112). The main content area on the right shows a detailed tree view of cyclomatic complexity by file: gameoflife-acceptance-tests, gameoflife-build, gameoflife-core (with 18 issues), gameoflife-deploy, gameoflife-web (with 1,094 issues), and pom.xml. A message at the bottom indicates 6 of 6 files are shown.

# ADVANCE DEVOPS EXPERIMENT 9

Name:Riya Varyani

Class:D15A

Roll No:64

**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 and name it as nagios-host

Instances (1) <a href="#">Info</a>		Last updated 1 minute ago		<a href="#">Connect</a>	Instance state ▾	Actions ▾	<a href="#">Launch instances</a> ▾	
<input type="text"/> Find Instance by attribute or tag (case-sensitive)					All states ▾			
<input type="checkbox"/>	Instance ID = i-08373a53cb8045f0a	<a href="#">Clear filters</a>						
	Name ↗ ▾	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability	
	nagios-host	i-08373a53cb8045f0a	Running	t2.micro	Initializing	<a href="#">View alarms</a> +	ap-south-1	

**Step 2:**Edit the following inbound rules of the specified security groups and ensure HTTP,HTTPS,SSH,ICMP are accessible from anywhere

Inbound rules (7)							<a href="#">Manage tags</a>	<a href="#">Edit inbound rules</a>
	Search						< 1 >	
	▼   Security group rule... ▾	IP version	▼   Type	▼   Protocol	▼   Port range			
	sgr-0842dcf237958c987	IPv4	HTTPS	TCP	443			
	sgr-0e3b5fe756fe77f0a	IPv4	All traffic	All	All			
	sgr-07c7572562bdb3...	IPv4	Custom TCP	TCP	0			
	sgr-07882e9275b39c4...	IPv4	HTTP	TCP	80			
	sgr-08540b31df42cc513	IPv4	All ICMP - IPv4	ICMP	All			
	sgr-0dcbe24f99412dcfb	IPv6	Custom TCP	TCP	0			
	sgr-09ccae5af38c85345	IPv6	All ICMP - IPv6	IPv6 ICMP	All			

**Step 3:**Connect to your EC2 instance via the connect option available in EC2 instances menu

```
[ec2-user@ip-172-31-33-14 ~]$ sudo yum install httpd php
Last metadata expiration check: 0:19:23 ago on Thu Sep 26 08:42:17 2024.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
httpd	x86_64	2.4.62-1.amzn2023	amazonlinux	48 k
php8.3	x86_64	8.3.10-1.amzn2023.0.1	amazonlinux	10 k
<b>Installing dependencies:</b>				
apr	x86_64	1.7.2-2.amzn2023.0.2	amazonlinux	129 k
apr-util	x86_64	1.6.3-1.amzn2023.0.1	amazonlinux	98 k
generic-logos-httdp	noarch	18.0.0-12.amzn2023.0.3	amazonlinux	19 k
httpd-core	x86_64	2.4.62-1.amzn2023	amazonlinux	1.4 M
httpd-filesystem	noarch	2.4.62-1.amzn2023	amazonlinux	14 k
httpd-tools	x86_64	2.4.62-1.amzn2023	amazonlinux	81 k
libbrotli	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	315 k
libsodium	x86_64	1.0.19-4.amzn2023	amazonlinux	176 k
libxml2	x86_64	1.1.34-5.amzn2023.0.2	amazonlinux	241 k
mailx	x86_64	2.1.49-1.amzn2023.0.2	amazonlinux	22 k

**Step 4:** Update and install the required packages Use the following commands: **sudo yum update** **sudo yum install httpd php** **sudo yum install gcc glibc glibc-common** **sudo yum install gd gd-devel**

```
[ec2-user@ip-172-31-33-14 ~]$ sudo yum install gcc glibc glibc-common
Last metadata expiration check: 0:20:32 ago on Thu Sep 26 08:42:17 2024.
Package glibc-2.34-52.amzn2023.0.11.x86_64 is already installed.
Package glibc-common-2.34-52.amzn2023.0.11.x86_64 is already installed.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
gcc	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	32 M
<b>Installing dependencies:</b>				
annobin-docs	noarch	10.93-1.amzn2023.0.1	amazonlinux	92 k
annobin-plugin-gcc	x86_64	10.93-1.amzn2023.0.1	amazonlinux	887 k
cpp	x86_64	11.4.1-2.amzn2023.0.2	amazonlinux	10 M
gc	x86_64	8.0.4-5.amzn2023.0.2	amazonlinux	105 k
glibc-devel	x86_64	2.34-52.amzn2023.0.11	amazonlinux	27 k
glibc-headers-x86	noarch	2.34-52.amzn2023.0.11	amazonlinux	427 k
guile22	x86_64	2.2.7-2.amzn2023.0.3	amazonlinux	6.4 M
kernel-headers	x86_64	6.1.109-118.189.amzn2023	amazonlinux	1.4 M
libmpc	x86_64	1.2.1-2.amzn2023.0.2	amazonlinux	62 k
libtool-ltdl	x86_64	2.4.7-1.amzn2023.0.3	amazonlinux	38 k
libxml2-devel	x86_64	4.4.33-7.amzn2023	amazonlinux	32 k

```
[ec2-user@ip-172-31-33-14 ~]$ sudo yum install gd gd-devel
Last metadata expiration check: 0:21:27 ago on Thu Sep 26 08:42:17 2024.
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
gd	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	139 k
gd-devel	x86_64	2.3.3-5.amzn2023.0.3	amazonlinux	38 k
<b>Installing dependencies:</b>				
brotli	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	314 k
brotli-devel	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	31 k
bzip2-devel	x86_64	1.0.8-6.amzn2023.0.2	amazonlinux	214 k
cairo	x86_64	1.17.6-2.amzn2023.0.1	amazonlinux	684 k
cmake-filesystem	x86_64	3.22.2-1.amzn2023.0.4	amazonlinux	16 k
fontconfig	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	273 k
fontconfig-devel	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	128 k
fonts-filesystem	noarch	1:2.0.5-12.amzn2023.0.2	amazonlinux	9.5 k
fonttuna	x86_64	2.13.94-2.amzn2023.0.1	amazonlinux	422 k

**Step 5:** Create a new nagios user by writing the following commands  
**sudo adduser -m nagios** **sudo passwd nagios**

```
Complete!
[ec2-user@ip-172-31-33-14 ~]$ sudo adduser -m nagios
[ec2-user@ip-172-31-33-14 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-33-14 ~]$ █
```

**Step 6:** Create a new user group using **sudo groupadd nagcmd** and Add users to the group using the following commands:

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

```
Complete!
[ec2-user@ip-172-31-33-14 ~]$ sudo adduser -m nagios
[ec2-user@ip-172-31-33-14 ~]$ sudo passwd nagios
Changing password for user nagios.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[ec2-user@ip-172-31-33-14 ~]$ sudo groupadd nagcmd
[ec2-user@ip-172-31-33-14 ~]$ sudo usermod -a -G nagcmd nagios
[ec2-user@ip-172-31-33-14 ~]$ sudo usermod -a -G nagcmd apache
[ec2-user@ip-172-31-33-14 ~]$ mkdir downloads
[ec2-user@ip-172-31-33-14 ~]$ cd downloads
[ec2-user@ip-172-31-33-14 downloads]$ wget https://sourceforge.net/projects/nagios/files/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz/download?use_mirror=excellmedia
--2024-09-26 09:15:54-- https://sourceforge.net/projects/nagios/files/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz/download?use_mirror=excellmedia
Resolving sourceforge.net (sourceforge.net)... 172.64.150.145, 104.18.37.111, 2606:4700:4400::6812:256f, ...
Connecting to sourceforge.net (sourceforge.net)|172.64.150.145|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://downloads.sourceforge.net/project/nagios/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz?ts=qAAAAABm98ZKFW7LwD1QAJ2jNzqmSJwAPA1mQ-eAJYK8z5Nmrv ifVkhbsV-qOfPsLUvICC6yvdHu6UeeIyyNZsVGUtr9BeQ%3D%3D&use_mirror=excellmedia&r= [following]
```

**Step 7:** Create a directory for Nagios downloads using the following commands-  
Commands - **mkdir ~/downloads**

Also download Nagios and plugin source files

Commands - **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**

```

Connecting to prdownloads.sourceforge.net (prdownloads.sourceforge.net)|204.68.111.105|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://downloads.sourceforge.net/project/nagios/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz [following]
--2024-09-26 09:38:43-- https://downloads.sourceforge.net/project/nagios/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz
Resolving downloads.sourceforge.net (downloads.sourceforge.net)... 204.68.111.105
Connecting to downloads.sourceforge.net (downloads.sourceforge.net)|204.68.111.105|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://excellmedia.dl.sourceforge.net/project/nagios/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz?viasf=1 [following]
--2024-09-26 09:38:45-- https://excellmedia.dl.sourceforge.net/project/nagios/nagios-4.x/nagios-4.0.8/nagios-4.0.8.tar.gz?viasf=1
Resolving excellmedia.dl.sourceforge.net (excellmedia.dl.sourceforge.net)... 202.153.32.19, 2401:fb00:0:1fe:8000::5
Connecting to excellmedia.dl.sourceforge.net (excellmedia.dl.sourceforge.net)|202.153.32.19|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1805059 (1.7M) [application/x-gzip]
Saving to: 'nagios-4.0.8.tar.gz'

nagios-4.0.8.tar.gz          100%[=====]   1.72M  8.14MB/s    in 0.2s

2024-09-26 09:38:45 (8.14 MB/s) - 'nagios-4.0.8.tar.gz' saved [1805059/1805059]

[ec2-user@ip-172-31-33-14 downloads]$ ls
'download?use_mirror=excellmedia'  nagios-4.0.8.tar.gz
[ec2-user@ip-172-31-33-14 downloads]$ tar -xzf nagios-4.0.8.tar.gz
[ec2-user@ip-172-31-33-14 downloads]$ []

```

## Step 8-Extract the nagios source file with the following commands

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

Then run the configuration script with the following command

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

```

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: ${prefix}/var/nagios.lock
Check result directory: ${prefix}/var/spool/checkresults
Init directory: /etc/rc.d/init.d
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-172-31-33-14 nagios-4.0.8]\$ ]

## Step 9-Compile the source code with the following commands make all

```
[ec2-user@ip-172-31-33-14 nagios-4.0.8]$ make all
cd ./base && make
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.0.8/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 nerd.o nerd.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:224:12:
workers.c:209:17: warning: '%s' directive argument is null [-Wformat-overflow=]
  209 |         log_debug_info(DEBUGL_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
commands.c: In function 'process_passive_service_check':
commands.c:224:19: warning: assignment discards 'const' qualifier from pointer target type [-Wdiscarded-qualifiers]
```

## Step 10-Install binaries,init script and sample config files

Commands -

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

```
*** 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-172-31-33-14 nagios-4.0.8]$
```

## Step 11-Edit the Config File to Change the Email Address Commands

-

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

- Change the email address in the contacts.cfg file to your preferred email

## Step 12-Configure the Web Interface

Commands - **sudo make**

**install-webconf**

```

GNU nano 5.8                               /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                nagios@localhost ; <<***** CHANGE THIS TO YOUR EMAIL ADDRESS *****

}

# CONTACT GROUPS
#
# We only have one contact in this simple configuration file, so there is

^G Help      ^C Write Out    ^W Where Is      ^R Cut           ^T Execute      ^C Location     M-U Undo      M-A Set Mark   M-J To Bracket
^X Exit      ^F Read File    ^V Replace       ^U Paste         ^J Justify      ^G Go To Line   M-E Redo      M-G Copy      ^Q Where Was

```

## Step 13-Create a Nagios Admin Account

Commands -

**sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin** • You will be prompted to enter and confirm the password for the nagiosadmin user

```

GNU nano 5.8                               /usr/local/nagios/etc/objects/contacts.cfg
Modified

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                vaishnal16305@gmail.com ; <<***** CHANGE THIS TO YOUR EMAIL ADDRESS *****

}

# CONTACT GROUPS
#
# We only have one contact in this simple configuration file, so there is

^G Help      ^C Write Out    ^W Where Is      ^R Cut           ^T Execute      ^C Location     M-U Undo      M-A Set Mark   M-J To Bracket
^X Exit      ^F Read File    ^V Replace       ^U Paste         ^J Justify      ^G Go To Line   M-E Redo      M-G Copy      ^Q Where Was

```

## Step 14-. Extract the Plugins Source File

Commands - **cd**

**~/downloads**

**tar zxvf nagios-plugins-2.3.3.tar.gz**

**cd nagios-plugins-2.3.3**

```

*** External command directory configured ***

[ec2-user@ip-172-31-33-14 nagios-4.0.8]$ sudo nano /usr/local/nagios/etc/objects/contacts.cfg
[ec2-user@ip-172-31-33-14 nagios-4.0.8]$ sudo make install-webconf
/usr/bin/install -c -m 644 sample-config/httpd.conf /etc/httpd/conf.d/nagios.conf

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

```

## Step 15-19. Compile and Install Plugins

Commands -

```
./configure --with-nagios-user=nagios --with-nagios-group=nagios make  
sudo make install
```

```
[ec2-user@ip-172-31-33-14 nagios-4.0.8]$ sudo htpasswd -c /usr/local/nagios/etc/htpasswd.users nagiosadmin  
New password:  
Re-type new password:  
Adding password for user nagiosadmin
```

## Step 16-Start Nagios

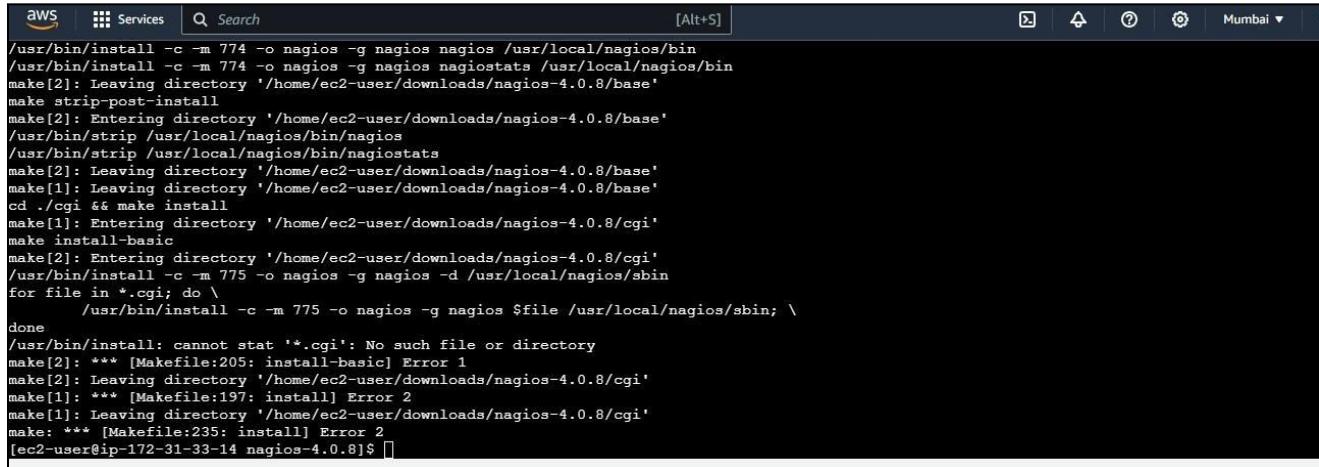
Commands - **sudo chkconfig**

**--add nagios sudo chkconfig**

**nagios on**

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

**systemctl start nagios**



```
AWS Services Search [Alt+S] Mumbai ▾  
/usr/bin/install -c -m 774 -o nagios -g nagios nagios /usr/local/nagios/bin  
/usr/bin/install -c -m 774 -o nagios -g nagios nagiosstats /usr/local/nagios/bin  
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-4.0.8/base'  
make strip-post-install  
make[2]: Entering directory '/home/ec2-user/downloads/nagios-4.0.8/base'  
/usr/bin/strip /usr/local/nagios/bin/nagios  
/usr/bin/strip /usr/local/nagios/bin/nagiosstats  
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-4.0.8/base'  
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-4.0.8/base'  
cd ./cgi && make install  
make[1]: Entering directory '/home/ec2-user/downloads/nagios-4.0.8/cgi'  
make install-basic  
make[2]: Entering directory '/home/ec2-user/downloads/nagios-4.0.8/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 -m 775 -o nagios -g nagios $file /usr/local/nagios/sbin; \  
done  
/usr/bin/install: cannot stat '*.cgi': No such file or directory  
make[2]: *** [Makefile:205: install-basic] Error 1  
make[2]: Leaving directory '/home/ec2-user/downloads/nagios-4.0.8/cgi'  
make[1]: *** [Makefile:197: install] Error 2  
make[1]: Leaving directory '/home/ec2-user/downloads/nagios-4.0.8/cgi'  
make: *** [Makefile:235: install] Error 2  
[ec2-user@ip-172-31-33-14 nagios-4.0.8]$
```

## Step 17-Access Nagios Web Interface

- Copy the Public IP address of your EC2 instance.
- Open your browser and navigate to <http://nagios>.
- Enter the username nagiosadmin and the password you set in Step 16.

# Nagios® Core™

Unable to get process status

**Nagios® Core™**  
**Version 4.4.6**  
April 28, 2020  
[Check for updates](#)

A new version of Nagios Core is available!  
Visit [nagios.org](#) to download Nagios 4.5.5.

**Get Started**

- Start monitoring your infrastructure
- Change the look and feel of Nagios
- Extend Nagios with hundreds of addons
- Get support
- Get training
- Get certified

**Quick Links**

- Nagios Library (tutorials and docs)
- Nagios Labs (development blog)
- Nagios Exchange (plugins and addons)
- Nagios Support (tech support)
- Nagios.com (company)
- Nagios.org (project)

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# ADVANCE DEVOPS EXP-10

Riya Varyani

D15A/64

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

**Step-1.** Confirm Nagios is Running on the Server. sudo systemctl status nagios Proceed if you see that Nagios is active and running.

```
[ec2-user@ip-172-31-90-152 nagios-plugins-2.3.3]$ cd
[ec2-user@ip-172-31-90-152 ~]$ sudo systemctl restart nagios
[ec2-user@ip-172-31-90-152 ~]$ sudo systemctl status nagios
● nagios.service - Nagios Core 4.5.5
   Loaded: loaded (/usr/lib/systemd/system/nagios.service; enabled; preset: disabled)
   Active: active (running) since Mon 2024-09-30 19:41:36 UTC; 7s ago
     Docs: https://www.nagios.org/documentation
 Process: 80238 ExecStartPre=/usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
 Process: 80239 ExecStart=/usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg (code=exited, status=0/SUCCESS)
 Main PID: 80240 (nagios)
   Tasks: 6 (Limit: 1112)
    Memory: 4.0M
      CPU: 15ms
     CGroup: /system.slice/nagios.service
             └─80240 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
                 ├─80241 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                 ├─80242 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                 ├─80243 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                 ├─80244 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
                 └─80245 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg

Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: qh: Socket '/usr/local/nagios/var/rw/nagios.qh' successfully initialized
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: qh: core query handler registered
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: qh: echo service query handler registered
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: qh: help for the query handler registered
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: wproc: Successfully registered manager as @wproc with query handler
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: wproc: Registry request: name=Core Worker 80244;pid=80244
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: wproc: Registry request: name=Core Worker 80243;pid=80243
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: wproc: Registry request: name=Core Worker 80242;pid=80242
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: wproc: Registry request: name=Core Worker 80241;pid=80241
Sep 30 19:41:36 ip-172-31-90-152.ec2.internal nagios[80240]: Successfully launched command file worker with pid 80245
f
```

**Step-2.** Create an Ubuntu 20.04 Server EC2 Instance

### Step-3: Verify Nagios Process on the Server

```
[ec2-user@ip-172-31-80-215 nagios-plugins-2.3.3]$ ps -ef | grep nagios
nagios  68654      1  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios -d /usr/local/nagios/etc/nagios.cfg
nagios  68655  68654  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios  68656  68654  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios  68657  68654  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios  68658  68654  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
nagios  68659  68654  0 20:29 ?        00:00:00 /usr/local/nagios/bin/nagios --worker /usr/local/nagios/var/rw/nagios.qh
ec2-user 69588  26447  0 20:44 pts/0    00:00:00 grep --color=auto nagios
[ec2-user@ip-172-31-80-215 nagios-plugins-2.3.3]$
```

### Step-4: Become Root User and Create Directories `sudo su`, `mkdir -p /usr/local/nagios/etc/objects/monitorhosts/linuxhosts` and to copy the same config file- `cp /usr/local/nagios/etc/objects/localhost.cfg`, `/usr/local/nagios/etc/objects/monitorhosts/linuxserver.cfg`

```
[ec2-user@ip-172-31-80-215 nagios-plugins-2.3.3]$ sudo su
[root@ip-172-31-80-215 nagios-plugins-2.3.3]# mkdir -p /usr/local/nagios/etc/objects/monitorhosts/linuxhosts
[root@ip-172-31-80-215 nagios-plugins-2.3.3]# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/localhost.cfg'
cp: missing destination file operand after '/usr/local/nagios/etc/objects/localhost.cfg'
Try 'cp --help' for more information.
[root@ip-172-31-80-215 nagios-plugins-2.3.3]# cp /usr/local/nagios/etc/objects/localhost.cfg /usr/local/nagios/etc/objects/monitorhosts/linuxserver.cfg
[root@ip-172-31-80-215 nagios-plugins-2.3.3]#
```

i-0ae1aae975bae3b7a (nagios-host)

### Step-5: Edit the Configuration File

`sudo nano /usr/local/nagios/etc/objects/monitorhosts/linuxhosts/linuxserver.cfg`

- Change hostname to `linuxserver` everywhere in the file
- Change address to the public IP address of your `linux-client`.
- Change `host_group` name under `hostgroup` to `linux_server`

```

#####
# HOST DEFINITION
#
#####

# Define a host for the local machine

define host {
    use          linux-server      ; Name of host template to use
                                ; This host definition will inherit all variables that are defined
                                ; in (or inherited by) the linux-server host template definition.

    host_name    linuxserver
    alias        linuxserver
    address      35.174.139.220
}

#####
# HOST GROUP DEFINITION
#
#####

# Define an optional hostgroup for Linux machines

define hostgroup {
    hostgroup_name   linux-servers1      ; The name of the hostgroup
    alias            Linux Servers       ; Long name of the group
    members          localhost           ; Comma separated list of hosts that belong to this group
}

[ Read 157 lines ]
M-A Set Mark M-J To I
M-D Copy ^Q Where
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^V Replace ^U Paste ^P Justify ^Y Go To Line M-E Redo

```

### Step-6: Update Nagios Configuration sudo

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

Add the command - cfg\_dir=/usr/local/nagios/etc/objects/monitorhosts/

```

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

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

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

```

### Step-7: Verify Configuration Files sudo /usr/local/nagios/bin/nagios -v

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

```
[ec2-user@ip-172-31-80-215 ~]$ sudo /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg

Nagios Core 4.4.6
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Website: https://www.nagios.org
Reading configuration data...
    Read main config file okay...
Warning: Duplicate definition found for service 'HTTP' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'SSH' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'Swap Usage' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'Current Load' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'Total Processes' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'Current Users' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'Root Partition' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
Warning: Duplicate definition found for service 'PING' on host 'localhost' (config file '/usr/local/nagios/etc/objects/localhost.cfg')
    Read object config files okay...

Running pre-flight check on configuration data...

Checking objects...
    Checked 8 services.
    Checked 2 hosts.
    Checked 2 host groups.
    Checked 0 service groups.
    Checked 1 contacts.
    Checked 1 contact groups.
    Checked 24 commands.
    Checked 5 time periods.
    Checked 0 host escalations.
    Checked 0 service escalations.
Checking for circular paths...
    Checked 2 hosts
    Checked 0 service dependencies
    Checked 0 host dependencies
    Checked 5 timeperiods
Checking global event handlers...
Checking obsessive compulsive processor commands...
Checking misc settings...

Total Warnings: 0
Total Errors: 0
```

**Step-8:** Restart Nagios Service  
sudo  
systemctl restart nagios

**Step-9:** SSH into the Client Machine

Use SSH or EC2 Instance Connect to access the linux-client.

**Step-10:** Update Package Index and Install Required Packages

sudo apt update -y

sudo apt install gcc -y

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

```
ubuntu@ip-172-31-86-24:~$ sudo apt update -y
sudo apt install gcc -y
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://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:5 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [380 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [83.1 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [4560 B]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [274 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [535 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [116 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [130 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [8652 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [379 kB]
```

## Step-11: Edit NRPE Configuration File

Commands -

```
sudo nano /etc/nagios/nrpe.cfg
```

Add your Nagios host IP address under allowed\_hosts:

```
allowed_hosts=<Nagios_Host_IP>
#
# Note: The daemon only does rudimentary checking of the client's IP
# address. I would highly recommend adding entries in your /etc/hosts.allow
# file to allow only the specified host to connect to the port
# you are running this daemon on.
#
# NOTE: This option is ignored if NRPE is running under either inetd or xinetd
allowed_hosts=127.0.0.1,35.174.139.220

#
# COMMAND ARGUMENT PROCESSING
# This option determines whether or not the NRPE daemon will allow clients
# to specify arguments to commands that are executed. This option only works
# if the daemon was configured with the --enable-command-args configure script
# option.
#
# *** ENABLING THIS OPTION IS A SECURITY RISK! ***
# Read the SECURITY file for information on some of the security implications
# of enabling this variable.
#
# Values: 0=do not allow arguments, 1=allow command arguments
dont_blame_nrpe=0
```

**Step-12:** Restart NRPE Server

Commands -

```
sudo systemctl restart nagios-nrpe-server
```

**Step-13:**Check Nagios Dashboard

Open your browser and navigate to `http://<Nagios_Host_IP>/nagios`.

Log in with `nagiosadmin` and the password you set earlier.

You should see the new host `linuxserver` added.

Click on Hosts to see the host details.

Click on Services to see all services and ports being monitored

**Nagios® Core™**  
Version 4.4.6  
April 28, 2020  
[Check for updates](#)

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**Nagios®**

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**Host Groups**

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**Service Groups**

[Summary](#)
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**Problems**

[Services \(Unhandled\)](#)
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Quick Search:

**Current Network Status**

Last Updated: Mon Sep 30 21:16:41 UTC 2024  
Updated every 90 seconds  
Nagios® Core™ 4.4.6 - www.nagios.org  
Logged in as nagiosadmin

[View Service Status Detail For All Host Groups](#)  
[View Status Overview For All Host Groups](#)  
[View Status Summary For All Host Groups](#)  
[View Status Grid For All Host Groups](#)

Limit Results: 100

Host	Status	Last Check	Duration	Status Information
linuxserver	UP	09-30-2024 21:14:52	0d 0h 1m 49s	PING OK - Packet loss = 0%, RTA = 0.98 ms
localhost	UP	09-30-2024 21:14:01	0d 0h 47m 2s	PING OK - Packet loss = 0%, RTA = 0.04 ms

Results 1 - 2 of 2 Matching Hosts

**Host Status Totals**

Up	Down	Unreachable	Pending
2	0	0	0
All Problems	All Types		
0	2		

**Service Status Totals**

Ok	Warning	Unknown	Critical	Pending
6	1	0	1	0
All Problems	All Types			
2	8			

**Host Status Details For All Host Groups**

Host	Status	Last Check	Duration	Status Information
linuxserver	UP	09-30-2024 21:14:52	0d 0h 1m 49s	PING OK - Packet loss = 0%, RTA = 0.98 ms
localhost	UP	09-30-2024 21:14:01	0d 0h 47m 2s	PING OK - Packet loss = 0%, RTA = 0.04 ms

**Current Network Status**

Last Updated: Mon Sep 30 21:21:11 UTC 2024  
Updated every 90 seconds  
Nagios® Core™ 4.4.6 - www.nagios.org  
Logged in as nagiosadmin

[View History For All hosts](#)  
[View Notifications For All Hosts](#)  
[View Host Status Detail For All Hosts](#)

**Host Status Totals**

Up	Down	Unreachable	Pending
2	0	0	0
All Problems	All Types		
0	2		

**Service Status Totals**

Ok	Warning	Unknown	Critical	Pending
6	1	0	1	0
All Problems	All Types			
2	8			

**Service Status Details For All Hosts**

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	09-30-2024 21:20:16	0d 0h 50m 55s	1/4	OK - load average: 0.00, 0.00, 0.00
localhost	Current Users	OK	09-30-2024 21:20:54	0d 0h 50m 17s	1/4	USERS OK - 1 users currently logged in
HTTP		WARNING	09-30-2024 21:19:31	0d 0h 46m 40s	4/4	HTTP WARNING: HTTP/1.1 403 Forbidden - 319 bytes in 0.001 second response time
PING		OK	09-30-2024 21:17:09	0d 0h 49m 2s	1/4	PING OK - Packet loss = 0%, RTA = 0.04 ms
Root Partition		OK	09-30-2024 21:17:46	0d 0h 48m 25s	1/4	DISK OK - free space: / 6080 MIB (74.91% inode=98%)
SSH		OK	09-30-2024 21:18:24	0d 0h 47m 47s	1/4	SSH OK - OpenSSH_8.7 (protocol 2.0)
Swap Usage		CRITICAL	09-30-2024 21:17:01	0d 0h 44m 10s	4/4	SWAP CRITICAL - 0% free (0 MB out of 0 MB) - Swap is either disabled, not present, or of zero size.
Total Processes		OK	09-30-2024 21:19:39	0d 0h 46m 32s	1/4	PROCS OK - 36 processes with STATE = RSZDT

Results 1 - 8 of 8 Matching Services

## Advance Devops-11

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

### Theory:

#### AWS Lambda

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

The concept of “serverless” computing refers to not needing to maintain your own servers to run these functions. AWS Lambda is a fully managed service that takes care of all the infrastructure

for you. And so “serverless” doesn’t mean that there are no servers involved: it just means that the servers, the operating systems, the network layer and the rest of the infrastructure have already been taken care of so that you can focus on writing application code.

#### Features of AWS Lambda

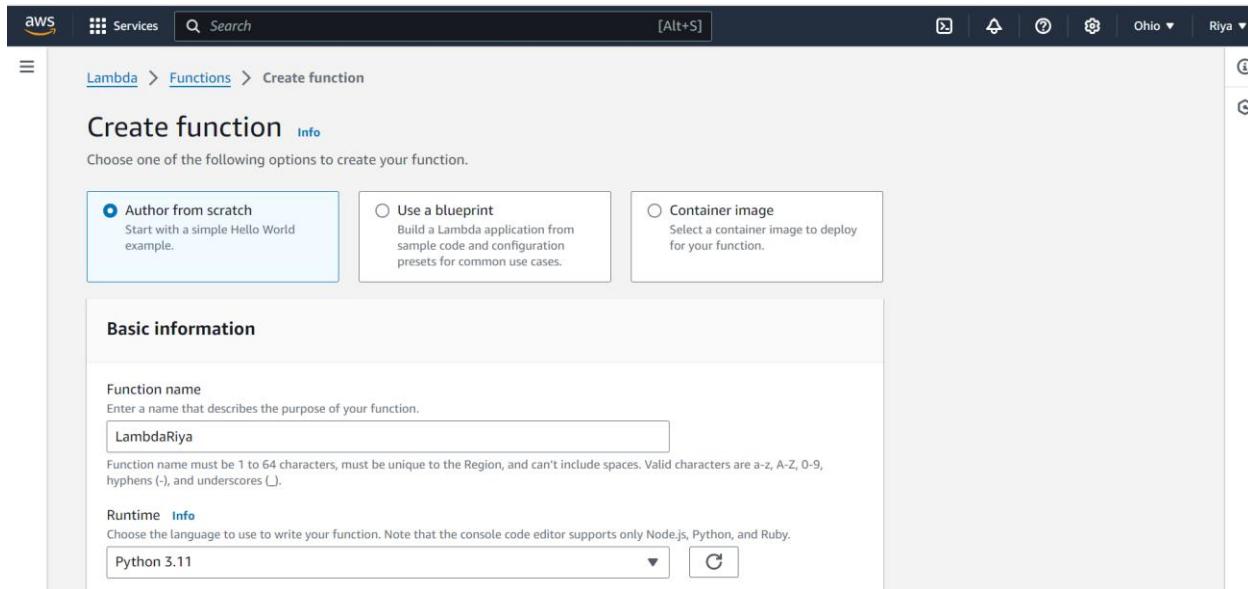
- AWS Lambda easily scales the infrastructure without any additional configuration. It reduces the operational work involved.
- It offers multiple options like AWS S3, CloudWatch, DynamoDB, API Gateway, Kinesis,

CodeCommit, and many more to trigger an event.

- You don’t need to invest upfront. You pay only for the memory used by the lambda function and minimal cost on the number of requests hence cost-efficient.
- AWS Lambda is secure. It uses AWS IAM to define all the roles and security policies.
  - It offers fault tolerance for both services running the code and the function. You do not have to worry about the application down.

## Steps to create an AWS Lambda function

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.

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The screenshot shows the AWS Lambda function creation interface. On the left, under 'Architecture', 'x86\_64' is selected. Under 'Permissions', 'Create a new role with basic Lambda permissions' is selected. A note states: 'Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.' On the right, a 'Tutorials' sidebar is open, showing a section titled 'Create a simple web app' with the subtext: 'In this tutorial you will learn how to: • Build a simple web app, consisting of a Lambda function with a function URL that outputs a webpage • Invoke your function through its function URL'. It includes a 'Learn more' link and a 'Start tutorial' button.

The screenshot shows the AWS Lambda function overview for 'LambdaRiya'. A green banner at the top indicates: 'Successfully created the function LambdaRiya. You can now change its code and configuration. To invoke your function with a test event, choose "Test".' The main area shows the function name 'LambdaRiya' and a 'Diagram' tab selected. The diagram shows a single Lambda function icon labeled 'LambdaRiya' and a 'Layers' section with '(0)'. Below the diagram are buttons for '+ Add trigger' and '+ Add destination'. To the right, there are sections for 'Description', 'Last modified' (3 minutes ago), 'Function ARN' (arn:aws:lambda:us-east-2:767828742273:function:LambdaRiya), and 'Function URL' (Info). At the bottom, the URL https://us-east-2.console.aws.amazon.com/lambda/home?region=us-east-2#/functions/LambdaRiya?tab=configure is shown, along with copyright information: © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences.

The screenshot shows the AWS Lambda Functions page. At the top, there's a search bar and navigation links for Services and Ohio. Below the header, the breadcrumb navigation shows 'Lambda > Functions'. The main area is titled 'Functions (1)' and displays a single function named 'LambdaRiya'. The table row for this function includes columns for Function name (LambdaRiya), Description (-), Package type (Zip), Runtime (Python 3.11), and Last modified (4 minutes ago). There are also 'Actions' and 'Create function' buttons.

Click on the Create button.

3. This process will take a while to finish and after that, you'll get a message that your function was successfully created.

The screenshot shows the AWS Lambda function editor for the 'lambdaanushka' function. A green success message at the top states: 'Successfully created the function lambdaanushka. You can now change its code and configuration. To invoke your function with a test event, choose "Test".' The main workspace shows the code for the 'lambda\_function' file:

```
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 right sidebar features a 'Tutorials' section titled 'Create a simple web app' with a brief description and a 'Start tutorial' button.

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**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](#) .

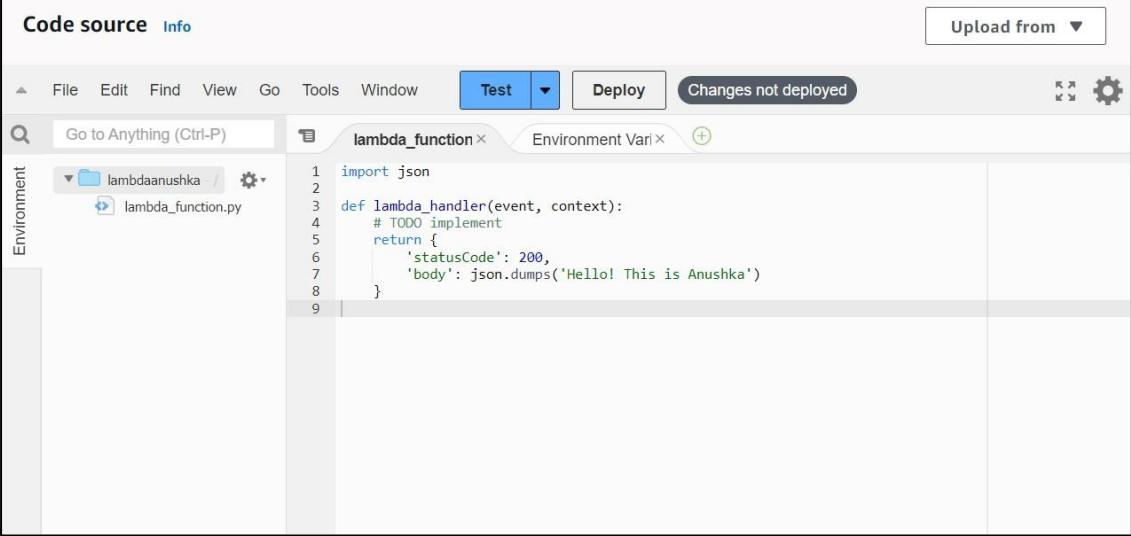
Use an existing role  
 Create a new role from AWS policy templates

**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 [LambdaRiya-role-0u6kwrc4 role](#) on the IAM console.

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

4. To change the configuration, open up the Configuration tab and under General Configuration, choose Edit.

Here, you can enter a description and change Memory and Timeout. I've changed the Timeout period to 1 sec since that is sufficient for now.



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), 'Deploy', and a status message 'Changes not deployed'. To the right of the toolbar is a gear icon for settings. On the left, there's a sidebar labeled 'Environment' with a search bar 'Go to Anything (Ctrl-P)'. The main area shows a file tree with a folder 'lambdaanushka' containing a file 'lambda\_function.py'. The code editor window displays the following Python code:

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

5. You can 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.

### Configure test event

A test event is a JSON object that mocks the structure of requests emitted by AWS services to invoke a Lambda function. Use it to see the function's invocation result.

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

myevent

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](#)

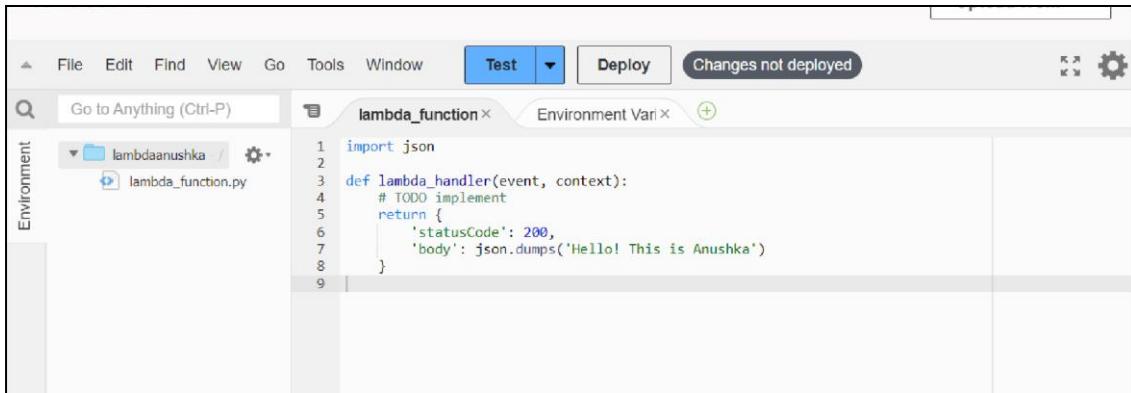
Shareable  
This event is available to IAM users within the same account who have permissions to access and use shareable events. [Learn more](#)

Template - optional

hello-world

Cancel    [Invoke](#)    [Save](#)

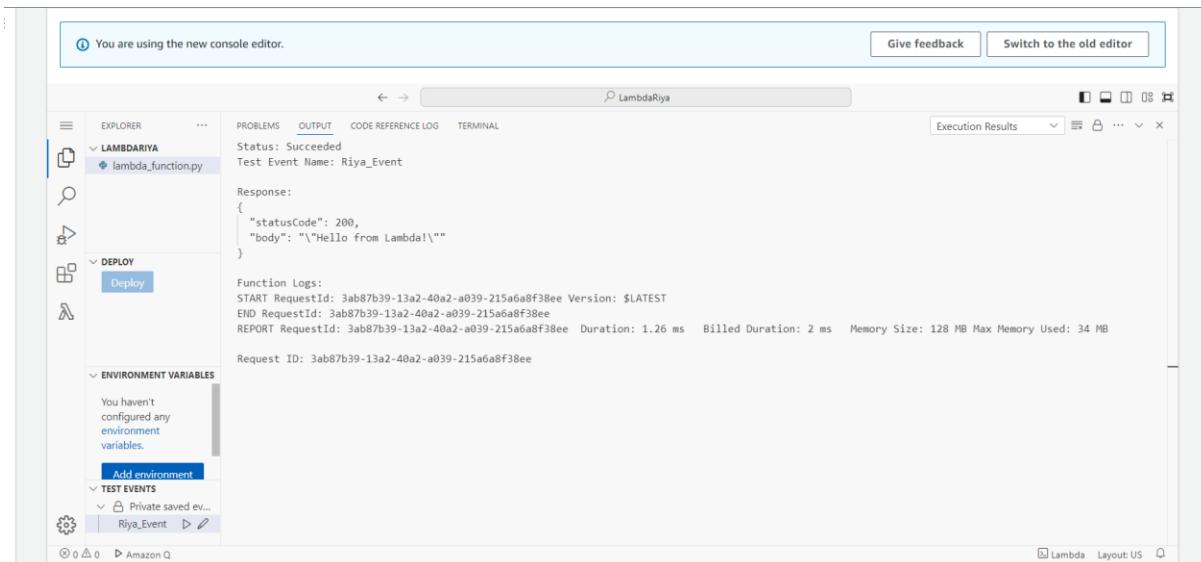
6. Click on Test and you can change the configuration, like so. If you do not have anything in the request body, it is important to specify two curly braces as valid JSON, so make sure they are there.



The screenshot shows the AWS Lambda function editor interface. At the top, there are tabs for File, Edit, Find, View, Go, Tools, Window, Test, Deploy, and a status message "Changes not deployed". On the left, there's an Environment sidebar. The main area displays a file tree under "lambdaanushka" with "lambda\_function.py" selected. The code editor shows the following Python code:

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

7. Now click on Test and you should be able to see the results.



The screenshot shows the AWS Lambda function test results in the AWS Lambda console. The interface includes sections for EXPLORER, PROBLEMS, OUTPUT, CODE REFERENCE LOG, TERMINAL, and EXECUTION RESULTS. The EXPLORER section shows the project "LAMBDAARIYA" with "lambda\_function.py" selected. The TEST EVENTS section shows a saved event named "Riya\_Event". The OUTPUT section displays the test results:

```
Status: Succeeded
Test Event Name: Riya_Event

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

Function Logs:
START RequestId: 3ab87b39-13a2-40a2-a039-215a6a8f38ee Version: $LATEST
END RequestId: 3ab87b39-13a2-40a2-a039-215a6a8f38ee
REPORT RequestId: 3ab87b39-13a2-40a2-a039-215a6a8f38ee Duration: 1.26 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory Used: 34 MB

Request ID: 3ab87b39-13a2-40a2-a039-215a6a8f38ee
```

## Conclusion:

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

## ADVANCE DEVOPS EXP-12

Riya Varyani

D15A/64

**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.

**Step 1:** Login to your AWS Personal account. Now open S3 from services and click on create S3 bucket and create a bucket.



**Step 2:** Now Give a name to the Bucket, select general purpose project and deselect the Block public access and keep other this to default.

## Create bucket Info

Buckets are containers for data stored in S3.

### General configuration

#### AWS Region

US East (Ohio) us-east-2

Bucket name [Info](#)

RiyaBucket

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

### Object Ownership Info

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.

Object Ownership

Bucket owner enforced

SUCCESSFULLY CREATED BUCKET "riya17bucket"

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

[View details](#) [X](#) [?](#) [Help](#) [Ohio](#) [Riya](#)

[General purpose buckets](#) [Directory buckets](#)

**General purpose buckets (3)** [Info](#) [All AWS Regions](#)

Buckets are containers for data stored in S3.

Find buckets by name

Name	AWS Region	IAM Access Analyzer	Creation date
<a href="#">elasticbeanstal k-us-east-2- 767828742273</a>	US East (Ohio) us-east-2	<a href="#">View analyzer for us-east-2</a>	September 24, 2024, 01:06:52 (UTC+05:30)
<a href="#">riya1-website</a>	Europe (Stockholm) eu-north-1	<a href="#">View analyzer for eu-north-1</a>	August 12, 2024, 21:45:37 (UTC+05:30)
<a href="#">riya17bucket</a>	US East (Ohio) us-east-2	<a href="#">View analyzer for us-east-2</a>	October 13, 2024, 13:41:42 (UTC+05:30)

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

**Step 3:** Open lambda console and click on create function button. Give a name to your Lambda function, Select the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby. So will select Python 3.12 , Architecture as x86, and existing Execution role

**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 functions.

**Basic information**

Function name Info  
Enter a name that describes the purpose of your function.

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.  
 ▼ C

Architecture Info  
Choose the instruction set architecture you want for your function code.  
 x86\_64  
 arm64

Permissions Info  
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.

**▼ Change default execution role**

Execution role  
Choose a role that defines the permissions of your function. To create a custom role, go to the IAM console Info.  
 Create a new role with basic Lambda permissions  
 Use an existing role  
 Create a new role from AWS policy templates

ⓘ Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.

Lambda will create an execution role named riya\_lambda-role-y63fmxrf, with permission to upload logs to Amazon CloudWatch Logs.

**▼ Additional Configurations**

Use additional configurations to set up code signing, function URL, tags, and Amazon VPC access for your function.

Enable Code signing Info  
Use code signing configurations to ensure that the code has been signed by an approved source and has not been altered since signing.

Enable function URL Info  
Use function URLs to assign HTTP(S) endpoints to your Lambda function.

Enable tags 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, track your AWS costs, and enforce attribute-based access control.

Enable VPC Info  
Connect your function to a VPC to access private resources during invocation.

Cancel **Create function**

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

Code | Test | Monitor | Configuration | Aliases | Versions

**Code source** Info

File Edit Find View Go Tools Window Test Deploy

Go to Anything (Ctrl-P)

Environment Ansh\_Lambda lambda\_function.py

```
lambda_function.x Environment Var x Execution results x
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     }
```

So See or Edit the basic settings go to configuration then click on edit general setting.

Code | Test | Monitor | Configuration | Aliases | Versions

**General configuration**

Triggers	General configuration Info		
Permissions	Description	Memory	Ephemeral storage
Destinations	-	128 MB	512 MB
Function URL	Timeout	SnapStart Info	
	0 min 3 sec	None	

### Edit basic settings

**Basic settings** Info

Description - optional:

Memory Info  
Your function is allocated CPU proportional to the memory configured.  
128 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 ↗  
512 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 ↗  
None

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

Timeout  
0 min 1 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.  
LabRole  
View the LabRole role ↗ on the IAM console.

Cancel Save

**Step 4:** Now Click on the Test tab then select Create a new event, give a name to the event and select Event Sharing to private, and select s3 put template.

Code | **Test** | Monitor | Configuration | Aliases | Versions

**Test event** Info

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

Ansh\_Bucket

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](#)

Shareable

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

Template - optional

s3-put

Save Test

```
Event JSON
```

Format JSON

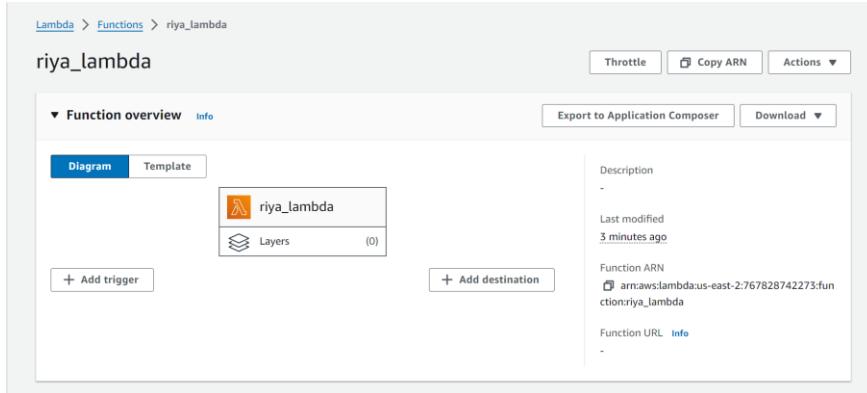
```
1+ [ ]  
2+ "Records": [  
3+   {  
4+     "eventVersion": "2.0",  
5+     "eventSource": "aws:s3",  
6+     "awsRegion": "us-east-1",  
7+     "eventTime": "1970-01-01T00:00:00.000Z",  
8+     "eventName": "ObjectCreated:Put",  
9+     "userIdentity": {  
10+       "principalId": "EXAMPLE"  
11+     },  
12+     "requestParameters": {  
13+       "sourceIPAddress": "127.0.0.1"  
14+     },  
15+     "responseElements": {  
16+       "x-amz-request-id": "EXAMPLE123456789",  
17+       "x-amz-id-2": "EXAMPLE123/5678abcdefghijklmabdasawesome/mnopqrstuvwxyzABCDEFGH"  
18+     },  
19+     "s3": {  
20+       "s3SchemaVersion": "1.0",  
21+       "configurationId": "testConfigRule",  
22+       "bucket": {  
23+         "name": "example-bucket",  
24+         "ownerIdentity": {  
25+           "principalId": "EXAMPLE"  
26+         },  
27+         "arn": "arn:aws:s3:::example-bucket"  
28+       },  
29+       "object": {  
30+         "key": "test%2Fkey",
```

**Step 5:** Now In Code section select the created event from the dropdown .

The screenshot shows the AWS Lambda function editor interface. The top navigation bar includes tabs for Code, Test, Monitor, Configuration, Aliases, and Versions. Below the navigation bar, there's a 'Code source' section with an 'Info' link. The main area displays a file named 'lambda\_function.py' containing Python code for a Lambda function. A search bar at the top left says 'Go to Anything (Ctrl-P)'. The 'Test' tab is currently selected, and a dropdown menu is open, showing options: 'Configure test event' (disabled), 'Private saved events', and 'Arsh\_Bucket' (which is highlighted). On the far left, there's an 'Environment' sidebar.

```
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
```

**Step 6:** Now In the Lambda function click on add trigger.



Now select the source as S3 then select the bucket name from the dropdown, keep other things to default and also you can add prefix to image.

### 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: us-east-2

**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.

All object create events [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](#) must be URL encoded.

**Recursive invocation**  
If your function writes objects to an S3 bucket, ensure that you are using different S3 buckets for input and output. Writing to the same bucket increases the risk of creating a recursive invocation, which can result in increased Lambda usage and increased costs. [Learn more](#)

I acknowledge that using the same S3 bucket for both input and output is not recommended and that this configuration can cause recursive invocations, increased Lambda usage, and increased costs.

Lambda will add the necessary permissions for AWS S3 to invoke your Lambda function from this trigger. Learn more [about the Lambda permissions model](#).

[Cancel](#) [Add](#)

The screenshot shows the AWS Lambda Configuration page with the 'Triggers' tab selected. On the left, a sidebar lists 'General configuration', 'Triggers' (which is selected and highlighted in blue), 'Permissions', 'Destinations', 'Function URL', and 'Environment variables'. The main panel displays a table titled 'Triggers (1) Info' with one entry: 'Trigger' (checkbox), 'S3: rya17bucket' (with icon), and 'arn:aws:s3:::rya17bucket' (with link). There are also 'Details' and 'Edit' buttons.

**Step 7:** Now Write code that logs a message like “An Image has been added” when triggered. Save the file and click on deploy

The screenshot shows the AWS Lambda Code source editor. The top navigation bar includes 'Code', 'Test', 'Monitor', 'Configuration', 'Aliases', and 'Versions'. Below the navigation is a toolbar with 'File', 'Edit', 'Find', 'View', 'Go', 'Tools', 'Window', 'Test' (selected), 'Deploy' (button), and 'Changes not deployed'. The main area shows a file tree with 'Ansh\_Lambda' folder containing 'lambda\_function.py'. The code editor window displays the following Python code:

```
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     }
```

**Step 8:** Now upload any image to the bucket

## 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, 26.6 KB)

All files and folders in this table will be uploaded.

[Remove](#)

[Add files](#)

[Add folder](#)

[Find by name](#)

< 1 >

<input type="checkbox"/>	Name	Folder	Type	Size	<input type="checkbox"/>
<input type="checkbox"/>	Screenshot 2...	-	image/png	26.6 KB	<input type="checkbox"/>

## Destination Info

### Destination

[s3://riya17bucket](#)

► **Destination details**

Bucket settings that impact new objects stored in the specified destination.

► **Permissions**

Grant public access and access to other AWS accounts.

► **Properties**

Specify storage class, encryption settings, tags, and more.

[Cancel](#)

[Upload](#)

Upload succeeded  
View details below.

Upload: status Close

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

### Summary

Destination	Succeeded	Failed
s3://riya17bucket	<span style="color: green;">Succeeded</span> 1 file, 26.6 KB (100.00%)	<span style="color: gray;">Failed</span> 0 files, 0 B (0%)

**Files and folders** Configuration

**Files and folders (1 Total, 26.6 KB)**

Name	Folder	Type	Size	Status	Error
Screenshot 2...	-	image/png	26.6 KB	<span style="color: green;">Succeeded</span>	-

**Step 10:** Now to click on test in lambda to check whether it is giving log when image is added to S3.

Code Test Monitor Configuration Aliases Versions

Code source Info Upload from

File Edit Find View Go Tools Window Test Deploy

Go Anything (Ctrl-P) Environment

lambda\_function Environment Var Execution result

Execution results Status: Succeeded | Max memory used: 32 MB | Time: 2.20 ms

Test Event Name Ansh\_Bucket

Response

```
{
  "statusCode": 200,
  "body": "Log entry created successfully!"
}
```

Function Logs

```
START RequestId: a6553fea-5799-4188-8571-a3aff8306732 Version: $LATEST
An image has been added to the bucket example-bucket:testS3Key
END RequestId: a6553fea-5799-4188-8571-a3aff8306732
REPORT RequestId: a6553fea-5799-4188-8571-a3aff8306732 Duration: 2.20 ms Billed Duration: 3 ms Memory Size: 128 MB Max Memory Used: 32 MB Init Duration: 93.83 ms
```

Request ID a6553fea-5799-4188-8571-a3aff8306732

**Step 11:** Now Lets see the log on Cloud watch. To see it go to monitor section and then click on view cloudwatch logs.

Log events



Actions ▾

Start tailing

Create metric filter

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>		
▶	2024-10-13T08:33:37.853Z	INIT_START Runtime Version: python:3.12.v36 Runtime Version ARN: arn:aws:lambda:us-east-2::runtime:188d9ca2e2714ff5637...
▶	2024-10-13T08:33:37.949Z	START RequestId: dce5596e-7da9-44c6-b40c-c6e0da44e2c3 Version: \$LATEST
▶	2024-10-13T08:33:37.950Z	An image has been added to the bucket example-bucket:test%2Fkey
▶	2024-10-13T08:33:37.954Z	END RequestId: dce5596e-7da9-44c6-b40c-c6e0da44e2c3
▶	2024-10-13T08:33:37.954Z	REPORT RequestId: dce5596e-7da9-44c6-b40c-c6e0da44e2c3 Duration: 2.14 ms Billed Duration: 3 ms Memory Size: 128 MB Max...
No newer events at this moment. Auto retry paused. <a href="#">Resume</a>		