PROJECT 6: SETTING UP A CONTINUOUS DELIVERY PIPELINE WITH GIT, JENKINS, DOCKER, AND AWS ECS

- **Create a sample application with a Dockerfile:**

  ➔ Create a new directory for the application files.
  ➔ Create a new Dockerfile that specifies the application dependencies and configuration.

- **Configure Jenkins to build the Docker image, push it to a Docker registry, and deploy it to AWS ECS:**

  ➔ Install Jenkins on a separate server or locally.
  ➔ Install the necessary plugins for Docker and AWS ECS.
  ➔ Create a new Jenkins job and configure it to build the Docker image, push it to a Docker registry, and deploy it to AWS ECS.

- **Set up AWS ECS to run the Docker container and automatically scale the service based on traffic:**

  ➔ Create a new ECS cluster and task definition that specifies the Docker image to run.
  ➔ Create a new ECS service that runs the task definition and automatically scales based on traffic.
  ➔ Test the pipeline by making changes to the application code and verifying that the changes are automatically deployed to the production environment.

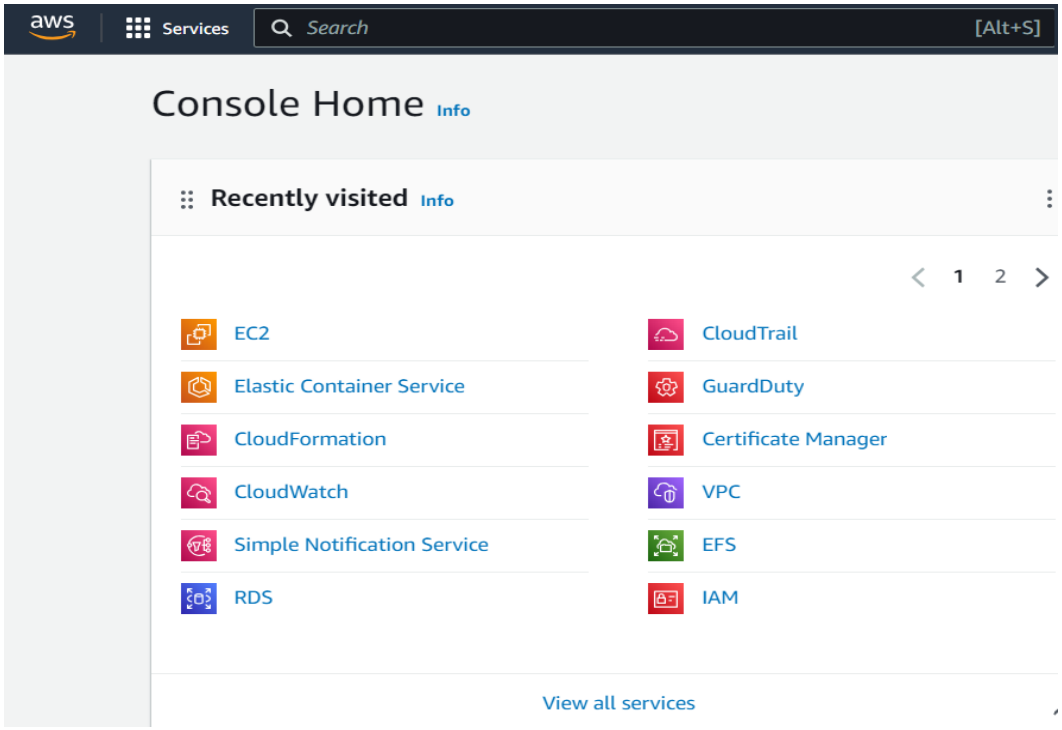
Project Requirements:

- Cloud : **AWS**
- Services : **Amazon EC2**
  Amazon ECS
- Source code : **Git & GitHub**
- CI / CD : **Jenkins**
- Containerization : **Docker**

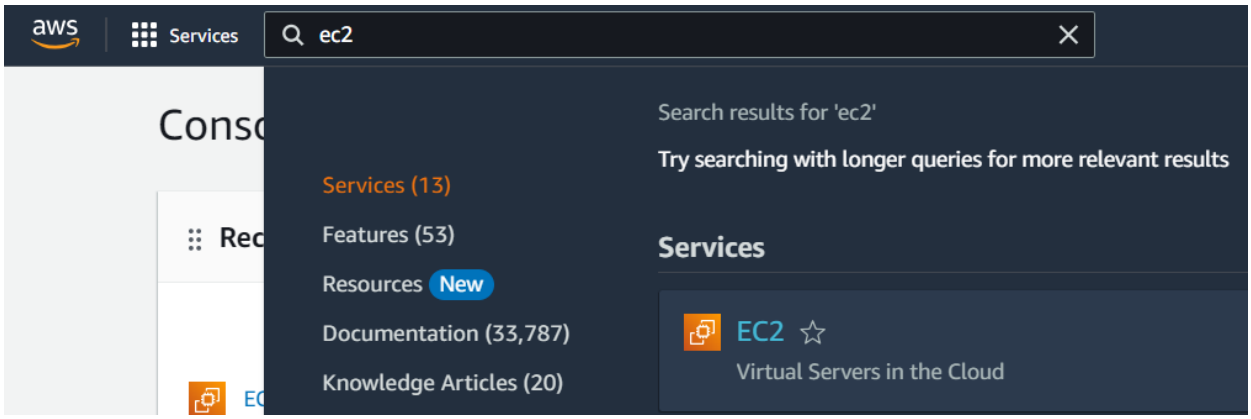
SOLUTION:

Step:1 – Creating an EC2 Instance:

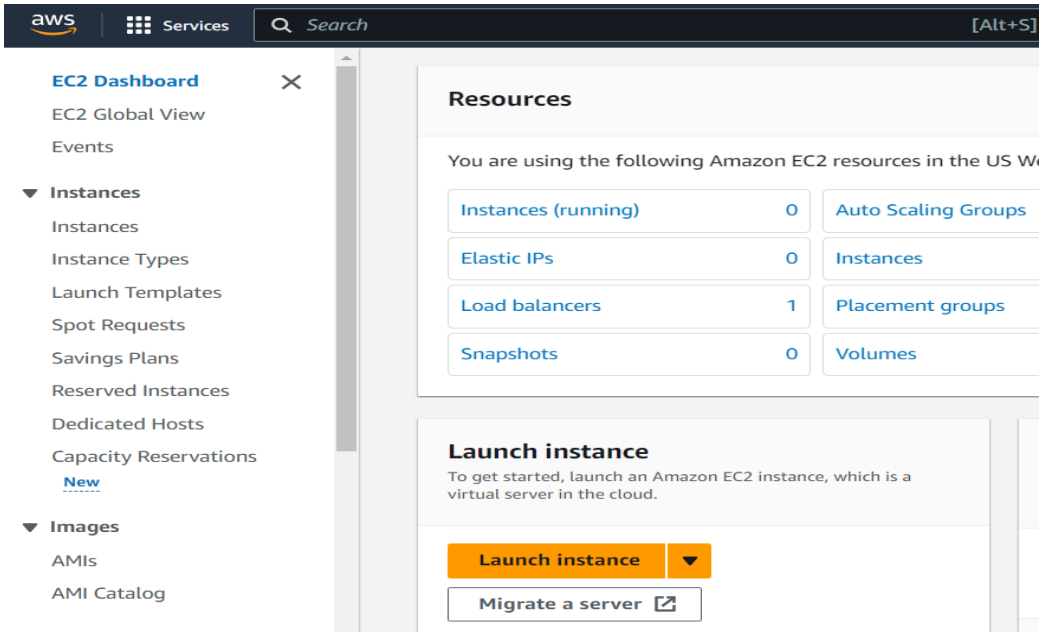
- First login into your AWS Management console:



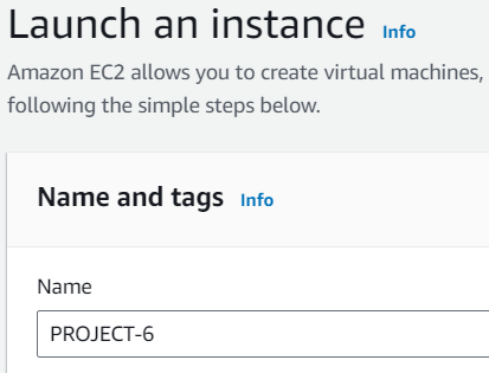
- Next under search panel search **EC2** & click that one:



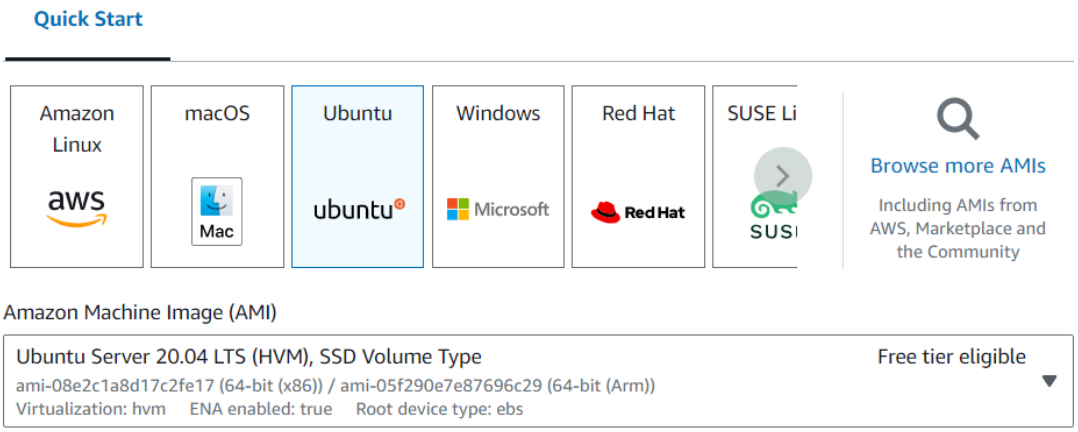
- Then EC2 Management console will appear, on that click **launch instances:**



- Then **naming the instances** according to the project:



- Then **selecting operating system [OS],** here I am selecting **Ubuntu 20.04 OS:**



- Then selecting the instance type: Here I am selecting **t2.micro** instance type which contains **1vpc, 1gb ram:**

Instance type

t2.micro Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Linux base pricing: 0.0124 USD per Hour
On-Demand Windows base pricing: 0.017 USD per Hour
On-Demand RHEL base pricing: 0.0724 USD per Hour
On-Demand SUSE base pricing: 0.0124 USD per Hour

Additional costs apply for AMIs with pre-installed software

- Then selecting the **keypair**, for secure login into your instances:

Key pair (login) Info

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

Key pair name - *required*

vockey

Create new key pair

- Then selecting the default **VPC & default subnet:**

Network settings Info

VPC - *required* Info

vpc-0faeefcc1359d13d0 (default)
172.31.0.0/16

Subnet Info

subnet-0582956f7d764a33a
VPC: vpc-0faeefcc1359d13d0 Owner: 293628418374 Availability Zone: us-west-2c
IP addresses available: 4091 CIDR: 172.31.0.0/20)

- Then naming the **security group & description**:

Security group name - *required*

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This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and ._-:/()#,@[]+=&;{}!$*

Description - *required* Info

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- Then adding the **ssh port under security group:**

Inbound Security Group Rules

Security group rule 1 (TCP, 22, 0.0.0.0/0) Remove

Type Info	Protocol Info	Port range Info
ssh	TCP	22

Source type Info	Source Info	Description - *optional* Info
Anywhere	Add CIDR, prefix list or security 0.0.0.0/0	e.g. SSH for admin desktop

- Then keeping the default storage and launching the instances:

Configure storage Info Advanced

1x 8 GiB gp2 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

0 x File systems Edit

Advanced details Info

Canonical, Ubuntu, 20.04 LTS, ...read more
ami-08e2c1a8d17c2fe17

Virtual server type (instance type)
t2.medium

Firewall (security group)
New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which

Cancel Launch instance

Review commands

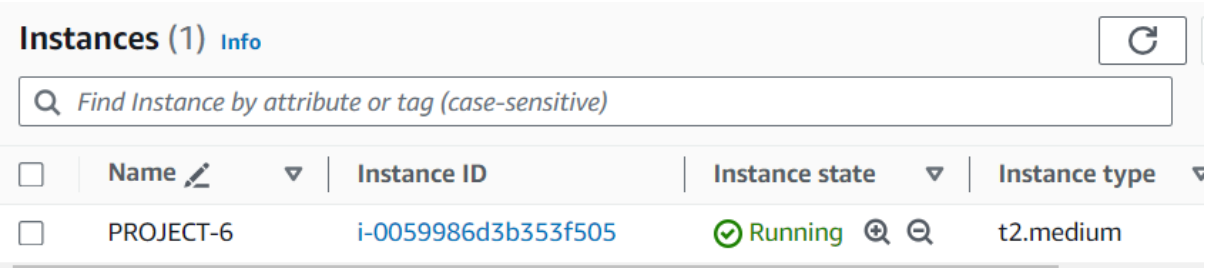
- Instance creating has been initiated:

EC2 > Instances > Launch an instance

Launching instance
Creating security group rules

21%

- The instance has been created successfully:



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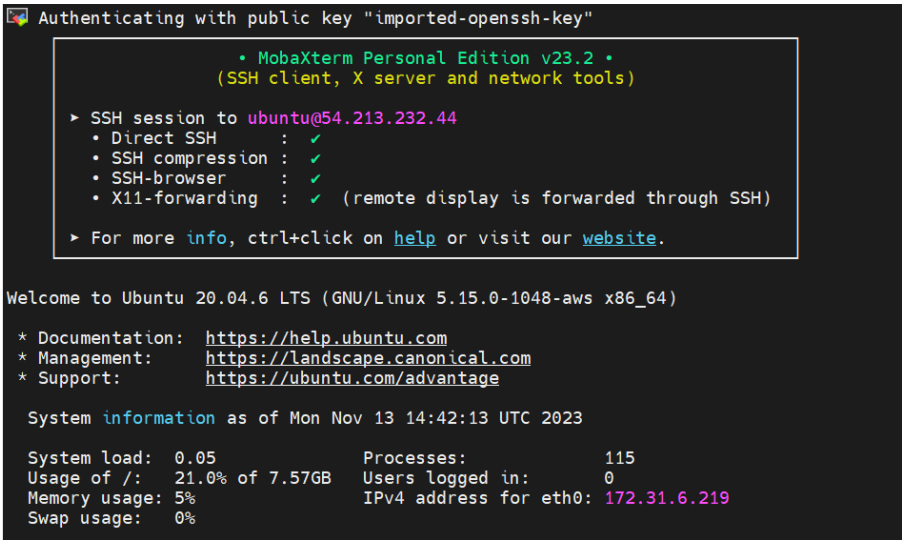
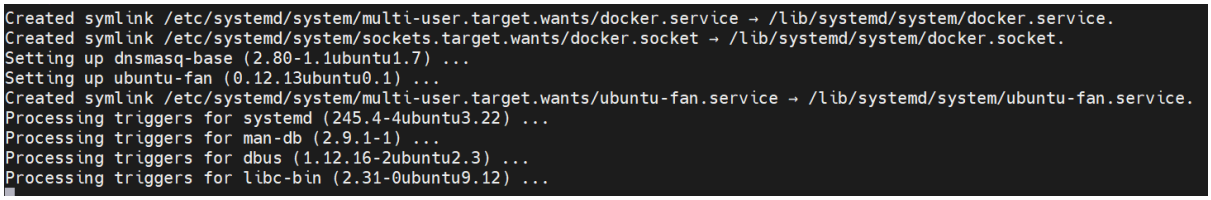
Step:2 – Installing docker on newly created instances:

- First connect the instance with putty or with instance connect:



- Installing docker on it with the command:

apt-get update
apt-get install -y docker.io



- Checking whether docker is installed or not by using the command:

  docker –version
  docker --info

```
root@ip-172-31-6-219:/home/ubuntu# docker --version
Docker version 24.0.5, build 24.0.5-0ubuntu1~20.04.1
root@ip-172-31-6-219:/home/ubuntu# docker info
Client:
 Version:    24.0.5
 Context:    default
 Debug Mode: false

Server:
 Containers: 0
  Running: 0
  Paused: 0
  Stopped: 0
```

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Step:3 – Creating application source code and dockerfile:

- Creating app.py which contains main application code:

Source code contains:

```
# app.py
from flask import Flask

app = Flask(__name__)

@app.route('/')
def hello():
    return '<b>Hello,</b><br><b>this python application runs
from Amazon ECS with the help of Jenkins CI/CD
Pipeline!!!</b>'

if __name__ == '__main__':
    app.run(debug=True, host='0.0.0.0')
```

```
root@ip-172-31-6-219:/home/ubuntu# vi app.py
root@ip-172-31-6-219:/home/ubuntu# ls
app.py
root@ip-172-31-6-219:/home/ubuntu#
```

- Then creating requirements.txt file for dependencies to support this application:

Requirements.txt contains:

```
Flask==2.0.1
Werkzeug==2.0.1
```

```
root@ip-172-31-6-219:/home/ubuntu# vi requirements.txt
root@ip-172-31-6-219:/home/ubuntu# ls
app.py  requirements.txt
root@ip-172-31-6-219:/home/ubuntu#
```

- Creating dockerfile for this application:

Dockerfile contains:

```
# Dockerfile
#choosing the base image:
FROM python:3.8-alpine

#choosing working directory for the application:
WORKDIR /app

#copying the requirements.txt file to app directory and
installing packages:
COPY requirements.txt .
RUN pip install --no-cache-dir -r requirements.txt

#copying the rest of application code to the working
directory:
COPY . .

#exposing the application:
```

```
EXPOSE 5000

#Executing the application after creating image:
CMD ["python", "app.py"]
```

```
root@ip-172-31-6-219:/home/ubuntu# vi dockerfile
root@ip-172-31-6-219:/home/ubuntu# ls
app.py  dockerfile  requirements.txt
root@ip-172-31-6-219:/home/ubuntu#
```

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Step:4 – Building a dockerimage and testing the application:

- Building the docker image from the dockerfile, with the command:

  docker build -t ravivarman46/python:app .

  I am building the docker image with my Docker hub id, so that it will be useful while pushing the image to the docker hub:

```
root@ip-172-31-6-219:/home/ubuntu# docker build -t ravivarman46/python:app .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

Sending build context to Docker daemon  15.36kB
Step 1/7 : FROM python:3.8-alpine
3.8-alpine: Pulling from library/python
96526aa774ef: Pull complete
430548f4d4bf: Pull complete
43f3c7ab6662: Pull complete
14d88fea9a04: Pull complete
be855da05668: Pull complete
```

Checking with the command: **docker images**

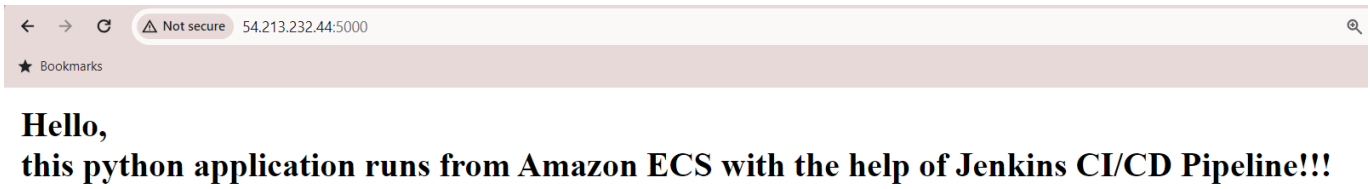
```
root@ip-172-31-6-219:/home/ubuntu# docker images
REPOSITORY            TAG          IMAGE ID       CREATED          SIZE
ravivarman46/python   app          6ca7d401e940   29 seconds ago   60.4MB
python                3.8-alpine   4bf70beea733   4 weeks ago      50MB
root@ip-172-31-6-219:/home/ubuntu#
```

- Testing the docker image by running it:

docker run -d -it -p 5000:5000 ravivarman46/python:app

```
root@ip-172-31-6-219:/home/ubuntu# docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
root@ip-172-31-6-219:/home/ubuntu# docker run -d -it -p 5000:5000 ravivarman46/python:app
2dc1cad850c34daf762bad10ac5d2e8d2047fb2282cb096b43ac8306984ce14e
root@ip-172-31-6-219:/home/ubuntu# docker ps
CONTAINER ID   IMAGE                     COMMAND           CREATED         STATUS         PORTS
NAMES
2dc1cad850c3   ravivarman46/python:app   "python app.py"   3 seconds ago   Up 2 seconds   0.0.0.0:5000->5000/tcp, :::5000->5000/tcp
interesting_mestorf
root@ip-172-31-6-219:/home/ubuntu#
```

- Checking the output from the browser by pasting the public ip along with port number:



The container created from docker image is working fine:

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Step: 5 – Pushing Docker image to docker hub:

- First logging into docker hub with docker hub credentials:

```
root@ip-172-31-6-219:/home/ubuntu# docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID,
to create one.
Username: ravivarman46
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
root@ip-172-31-6-219:/home/ubuntu#
```

- Pushing the docker image to docker hub with the command: **docker push ravivarman46/python:app**

```
root@ip-172-31-6-219:/home/ubuntu# docker push ravivarman46/python:app
The push refers to repository [docker.io/ravivarman46/python]
f8ad28457d31: Pushed
fd7883c8c44a: Pushed
b50bd2d52e3e: Pushed
a9a8ae30353a: Pushed
2b863a82abca: Layer already exists
9618769d4452: Layer already exists
cdea479ac6b8: Layer already exists
6f25d7d19389: Layer already exists
cc2447e1835a: Layer already exists
app: digest: sha256:ffcabbc627d42925e6ee5f486e4828d0ac2b990cd4bc6408fff4ecf1d1b1efeb size: 2200
root@ip-172-31-6-219:/home/ubuntu#
```

- Checking on docker hub:

ravivarman46 / **python**

Description

This repository does not have a description

Last pushed: 2 minutes ago

Tags

This repository contains 2 tag(s).

Tag	OS	Type	Pulled	Pushed
app		Image	---	2 minutes ago

****

Step: 6 – Pushing application code to Github:

- Creating repository under GitHub: https://github.com/Ravivarman16/use-case-project-6.git

Ravivarman16 / use-case-project-6 Type / to search

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

use-case-project-6 Public Pin Unwatch 1

main 1 branch 0 tags Go to file Add file Code

Ravivarman16 Initial commit d451172 now 1 commit

README.md Initial commit now

README.md

use-case-project-6

PROJECT 6: SETTING UP A CONTINUOUS DELIVERY PIPELINE WITH GIT, JENKINS, DOCKER, AND AWS ECS

- On the command line first initializing git in the current working directory:

```
root@ip-172-31-6-219:/home/ubuntu# pwd
/home/ubuntu
root@ip-172-31-6-219:/home/ubuntu# git init
Initialized empty Git repository in /home/ubuntu/.git/
root@ip-172-31-6-219:/home/ubuntu# git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .Xauthority
        .bash_logout
        .bashrc
        .cache/
        .profile
        .ssh/
        .sudo_as_admin_successful
        app.py
        dockerfile
        requirements.txt

nothing added to commit but untracked files present (use "git add" to track)
root@ip-172-31-6-219:/home/ubuntu#
```

- Then staging and commiting the required files for this project:

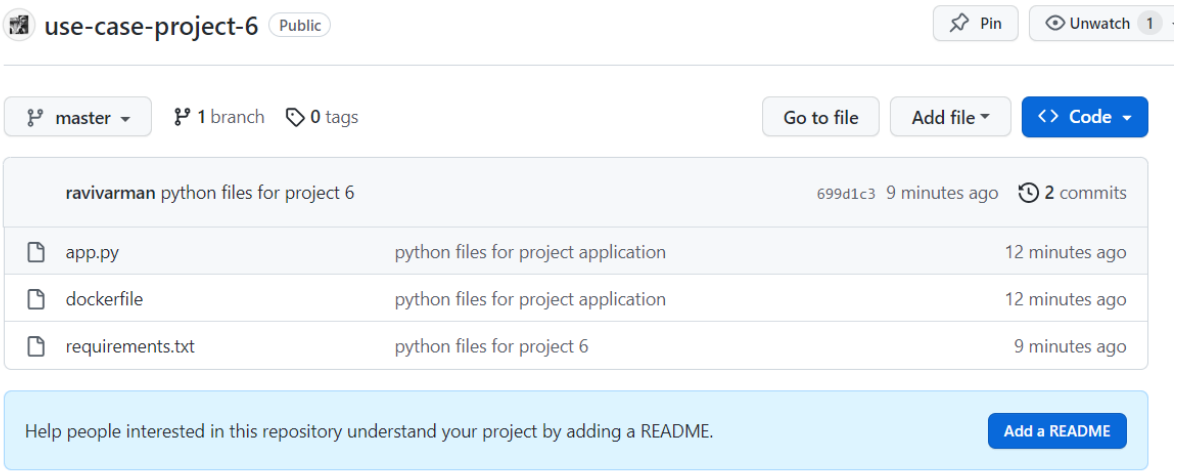
```
root@ip-172-31-6-219:/home/ubuntu# git add app.py requirements.txt dockerfile
root@ip-172-31-6-219:/home/ubuntu# git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   app.py
        new file:   dockerfile
        new file:   requirements.txt
```

```
root@ip-172-31-6-219:/home/ubuntu# git config user.name "ravivarman"
root@ip-172-31-6-219:/home/ubuntu# git config user.emailid "jravi1605@gmail.com"
root@ip-172-31-6-219:/home/ubuntu#
root@ip-172-31-6-219:/home/ubuntu# git commit -m "python files for project application"
[master (root-commit) 6d327b4] python files for project application
 Committer: ravivarman <root@ip-172-31-6-219.us-west-2.compute.internal>
```

- Then pushing it to the remote repository:

```
root@ip-172-31-6-219:/home/ubuntu# git remote add python https://github.com/Ravivarman16/use-case-project-6.git
root@ip-172-31-6-219:/home/ubuntu# git push python master
Username for 'https://github.com': Ravivarman16
Password for 'https://Ravivarman16@github.com':
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 2 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (8/8), 1017 bytes | 1017.00 KiB/s, done.
Total 8 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), done.
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:      https://github.com/Ravivarman16/use-case-project-6/pull/new/master
remote:
To https://github.com/Ravivarman16/use-case-project-6.git
 * [new branch]      master -> master
root@ip-172-31-6-219:/home/ubuntu#
```

- Checking it on remote repository:



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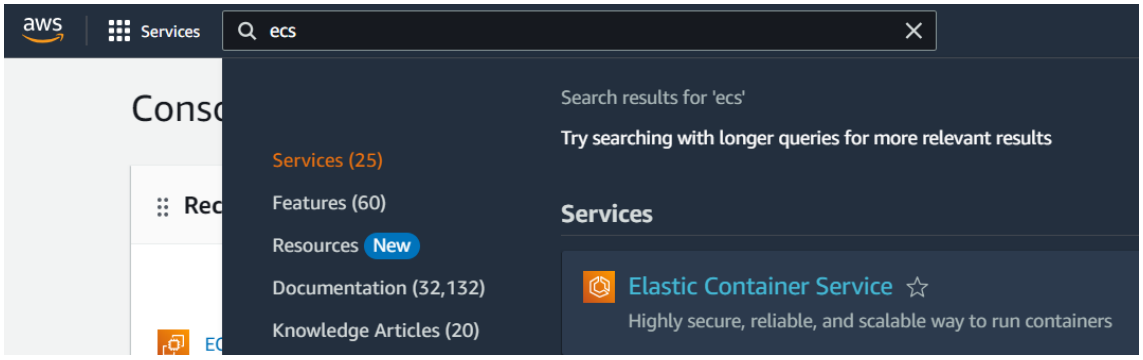
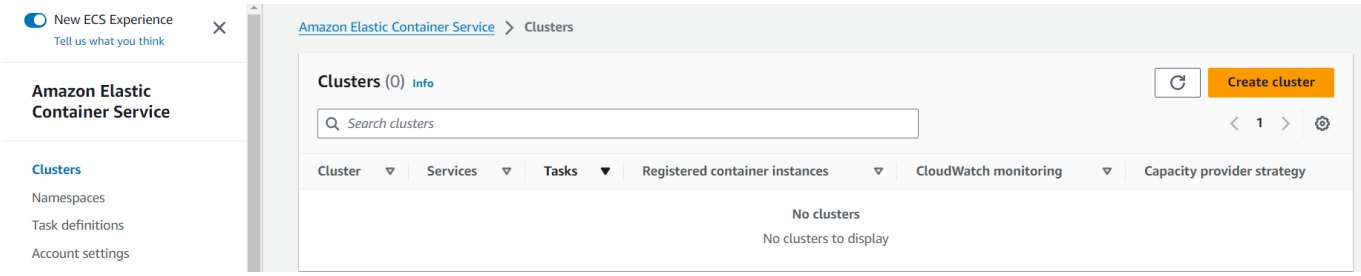
Step:7 – Deploying the docker image to Amazon ECS service:

<u>Creating a ECS Cluster:</u>

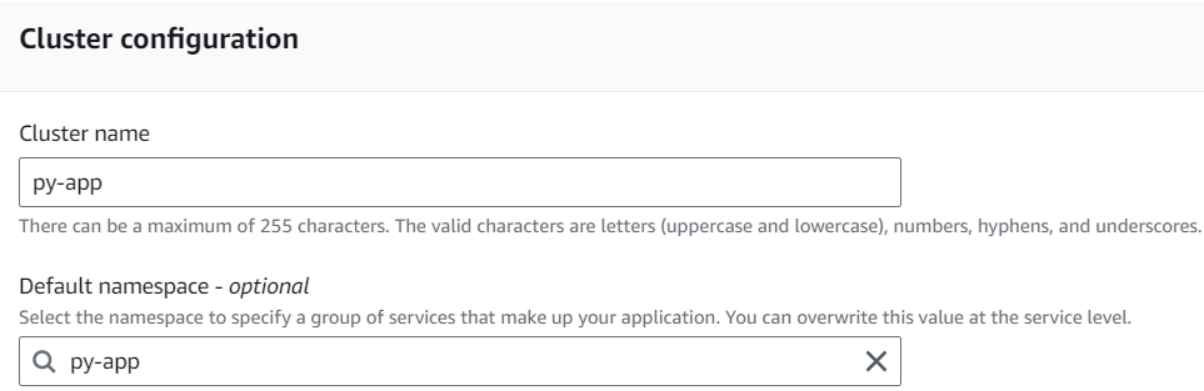
- On the AWS management console, under service panel search **ECS**, click that one:



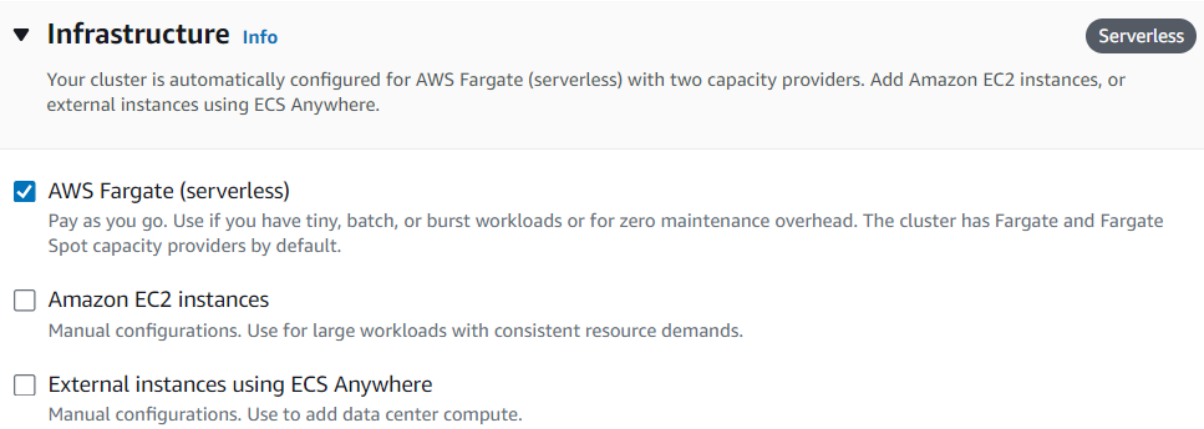
- Then we can able to see ECS management console, on left hand side we could able to the **cluster** option, click that to create a new cluster:



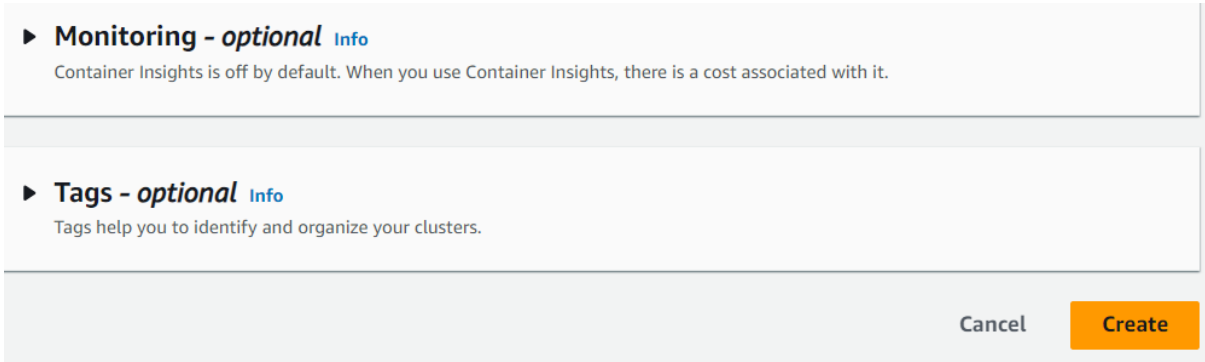
- Then **naming the cluster & creating namespaces**:



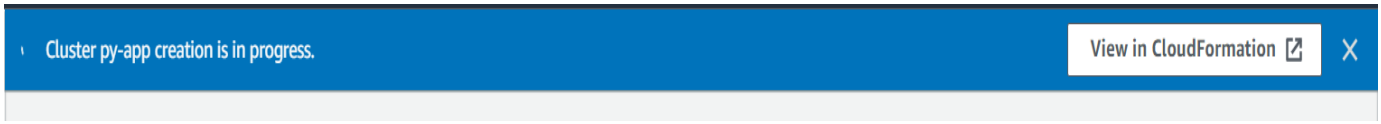
- Then under infrastructure, selecting **AWS Fargate** option, which is a serverless option:



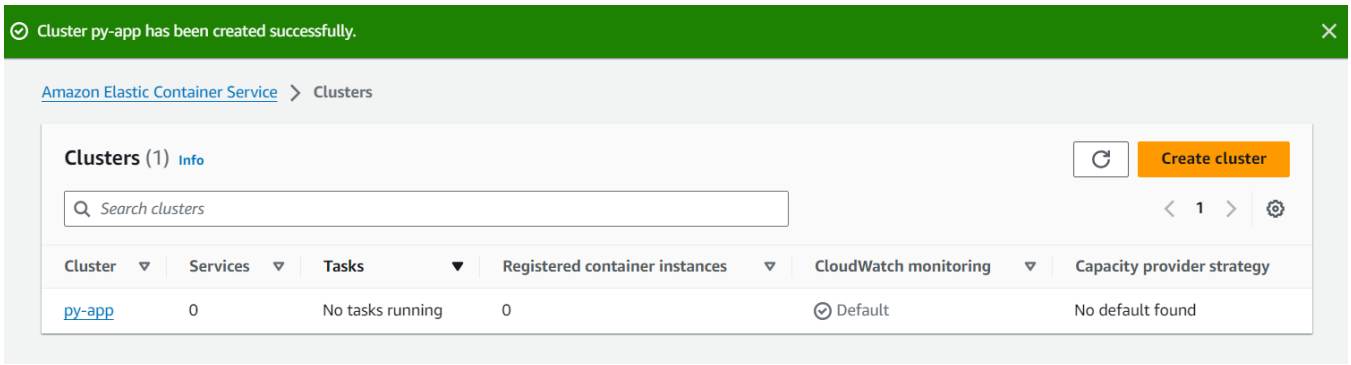
- Remaining options, I am keeping as the default, click create option:



- The cluster creation has been initiated:

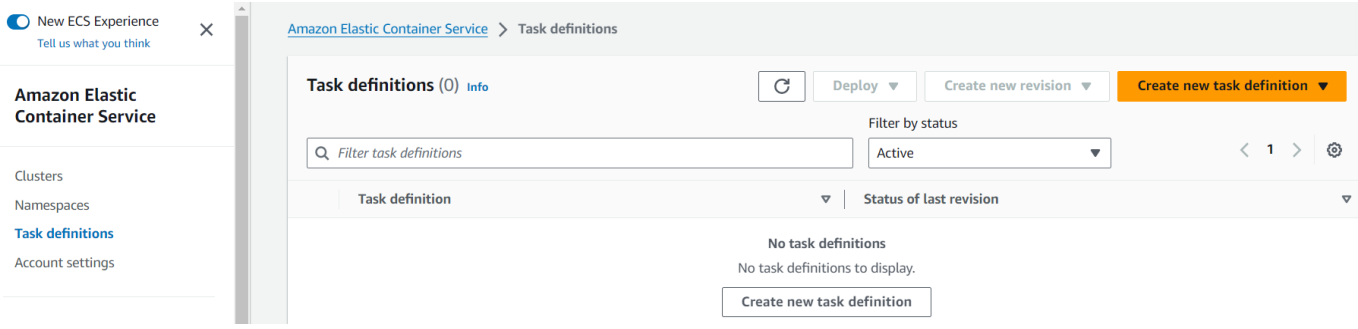


- The ECS Cluster has been created successfully:

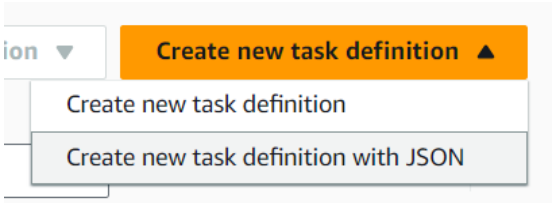


Creating task definition:

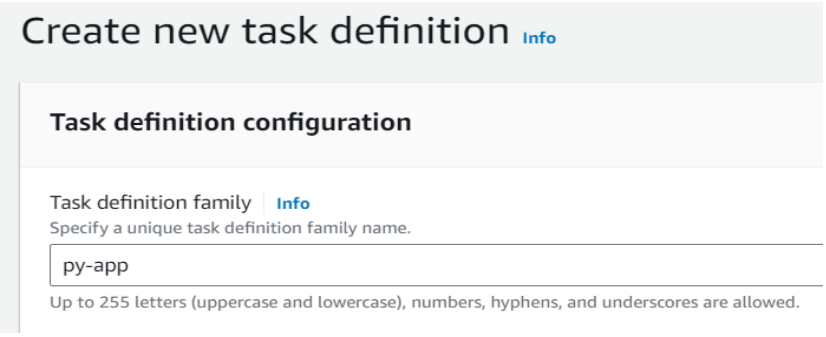
- On the left-hand side, we could able to see task definitions, click that one: We could able to see option to **create new task definition:**



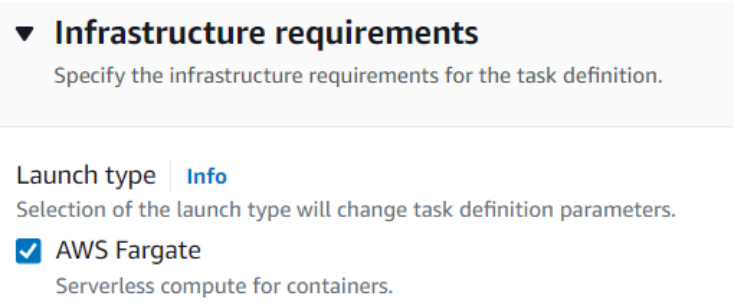
- After clicking create new task definition, we could able to see two options:
  ➔ **Create new task definition**
  ➔ **Create new task definition with JSON**, but here I am selecting first option:



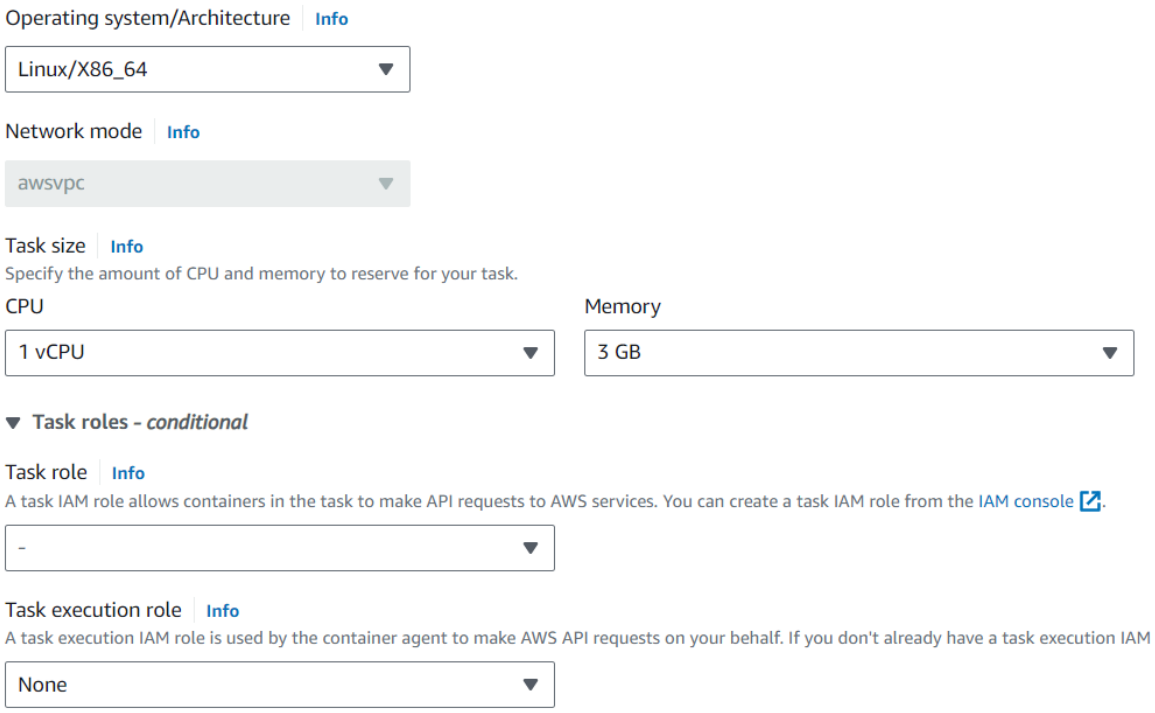
- Then naming the task definition:



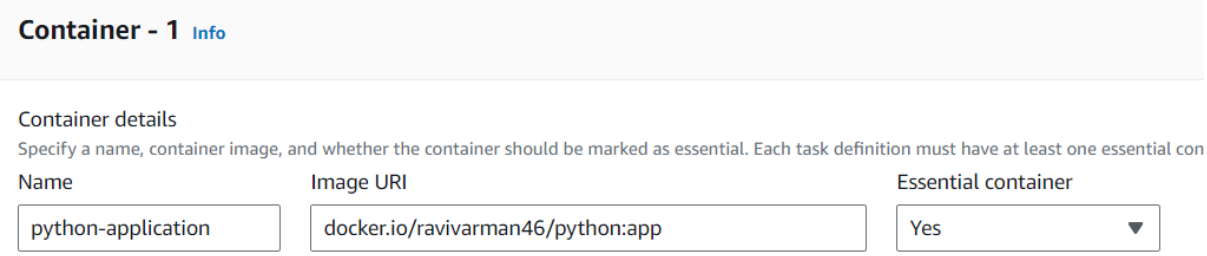
- Then selecting **AWS Fargate** under the infrastructure requirements option:



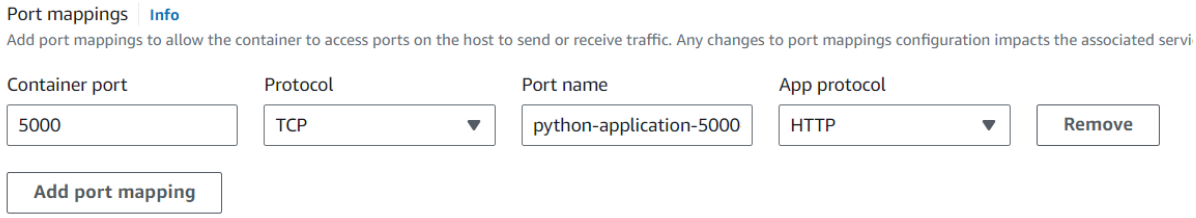
- Then **OS as Linux**, remaining options keeping as the default:



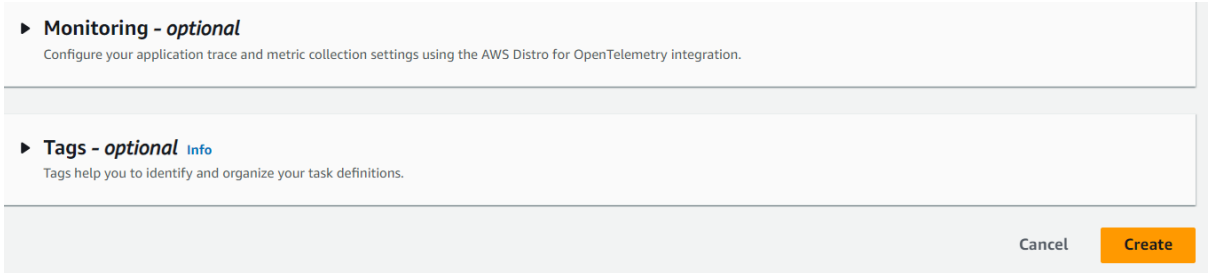
- Then naming the container, **inserting the registry URL**:



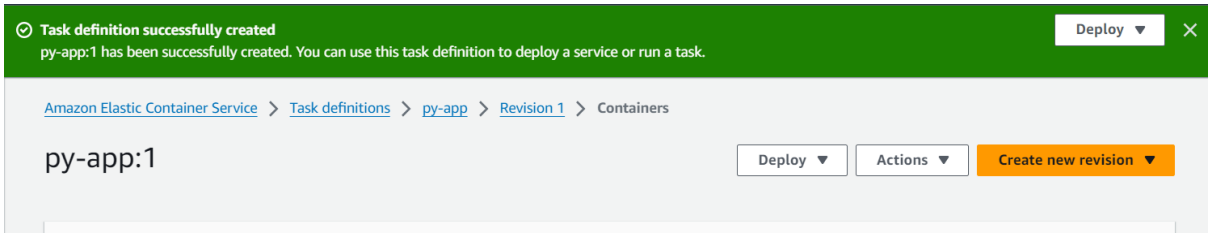
- Then under port mappings, mapping the application to the port **5000:**



- Keeping the remaining options as the default one, click create:



- The task definitions have been created successfully:



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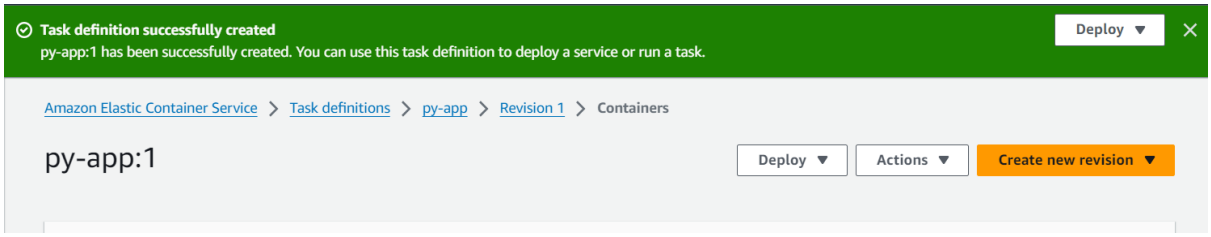
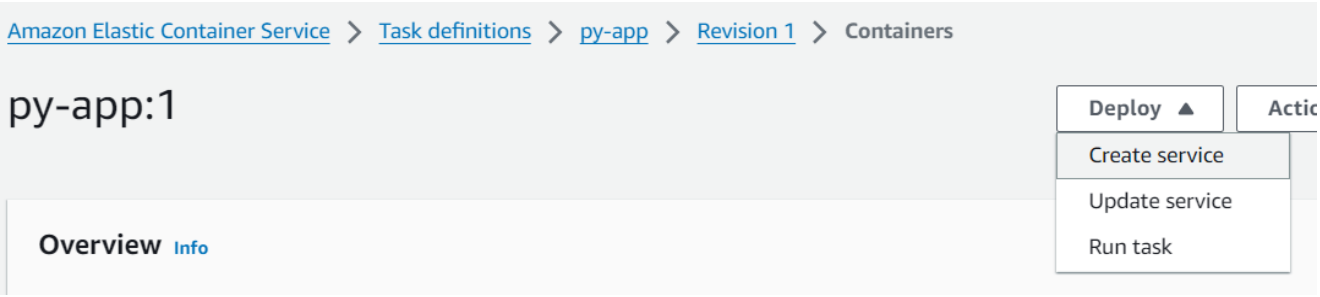
Deploying the task definitions as the service under the EC2 Cluster:

- Under the newly created task definitions, we could able to the **deploy option**, click that one:

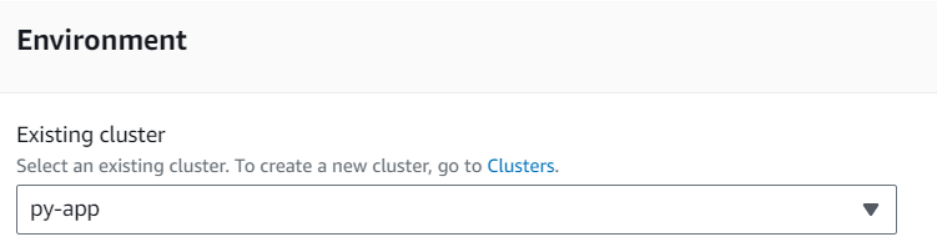


- Then we could able to see three options:
  ➔ **Create service**
  ➔ **Update service**
  ➔ **Run task**

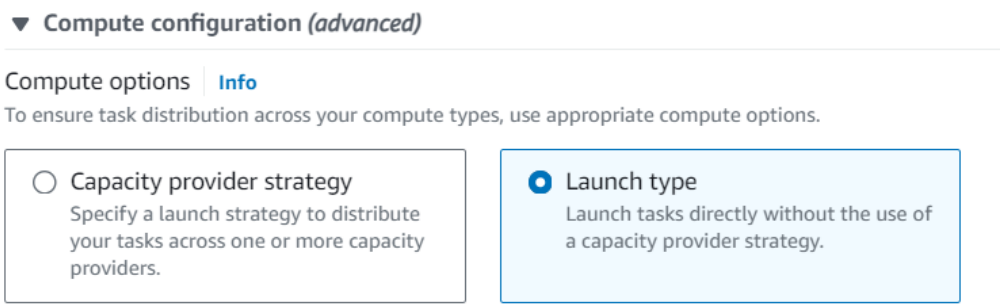
Here we need to create service to run a task: click **create service** option:



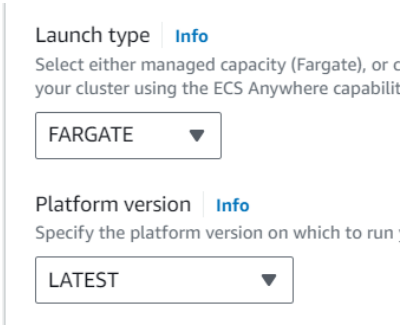
- Then choosing the **cluster:**



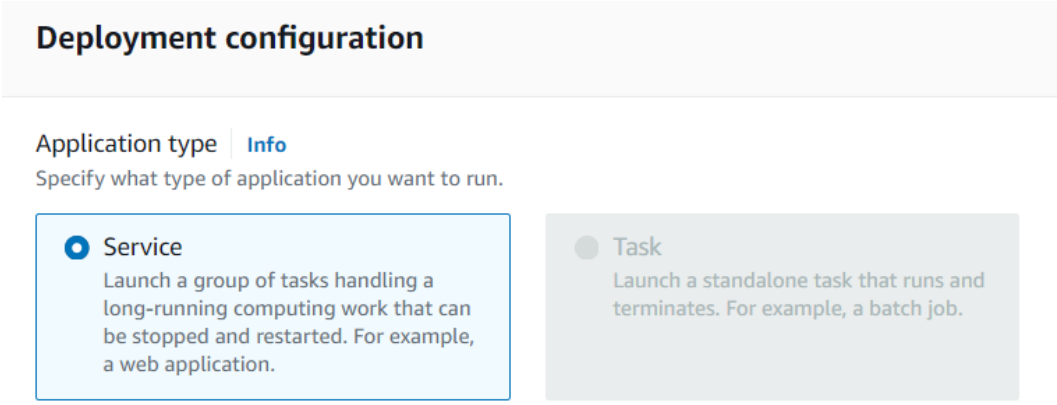
- Then selecting compute options: **launch type option**



- Under launch type selecting: **AWS Fargate** option:



- Then under deployment configuration: **selecting service option as the application type:**



- Then naming the service:

Task definition

Select an existing task definition. To create a new task definition, go to Task definitions.

Specify the revision manually

Manually input the revision instead of choosing from the 100 most recent revisions for the selected task definition family.

Family: py-app

Revision: 1

Service name

Assign a unique name for this service.

py-app

- Then under service type, keeping the default option:

Service type Info

Specify the service type that the service scheduler will follow.

Replica
Place and maintain a desired number of tasks across your cluster.

Daemon
Place and maintain one copy of your task on each container instance.

Desired tasks

Specify the number of tasks to launch.

1

Deployment options

- Then creating load balancer for this application deployment:

Load balancing - *optional*

Load balancer

Load balancer type Info

Configure a load balancer to distribute incoming traffic across the tasks running in your service.

None

- Then selecting the **application load balancer:**

Load balancer

Load balancer type Info

Configure a load balancer to distribute incoming traffic across the tasks running in your service.

Application Load Balancer

- Then **naming** application load balancer:

Application Load Balancer

Specify whether to create a new load balancer or choose an existing one.

Create a new load balancer

Use an existing load balancer

Load balancer name

Assign a unique name for the load balancer.

project-6-application

- Changing the port number from **80 to 5000 where the application will run:**

Listener Info

Specify the port and protocol that the load balancer will listen for connection requests on.

Create new listener

Use an existing listener

You need to select an existing load balancer.

Port

5000

Protocol

HTTP

- Then naming the target group:

Target group | Info

Specify whether to create a new target group or choose an existing one that the load balancer will use to route requests to the tasks in your service.

- (●) Create new target group
- ( ) Use an existing target group
  You need to select an existing load balancer.

Target group name

project-6

Protocol

HTTP

Health check protocol

HTTP

Health check path | Info

/

- Then keeping default option for the rest, click **create** option:

▸ **Service auto scaling - *optional***

Automatically adjust your service's desired count up and down within a specified range in response to CloudWatch alarms. You can modify your service auto scaling configuration at any time to meet the needs of your application.

▸ **Tags - *optional*** Info

Tags help you to identify and organize your resources.

Cancel | Create

- The task definition has been updated successfully; deployment has been initiated. It would take some time for the deployment:

Task definition successfully created

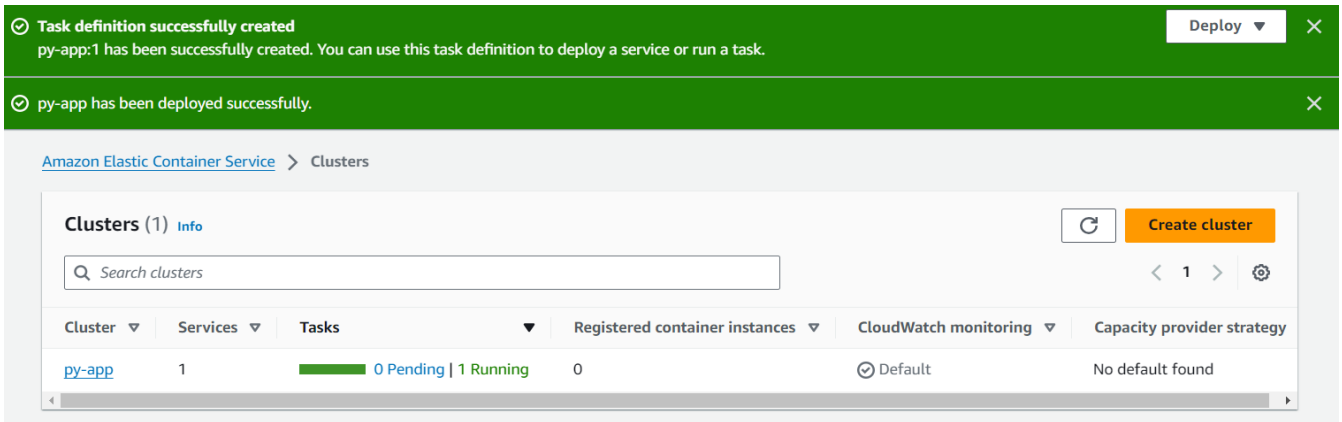
py-app:1 has been successfully created. You can use this task definition to deploy a service or run a task.

Deploy ▾ ×

py-app deployment is in progress. It takes a few minutes.

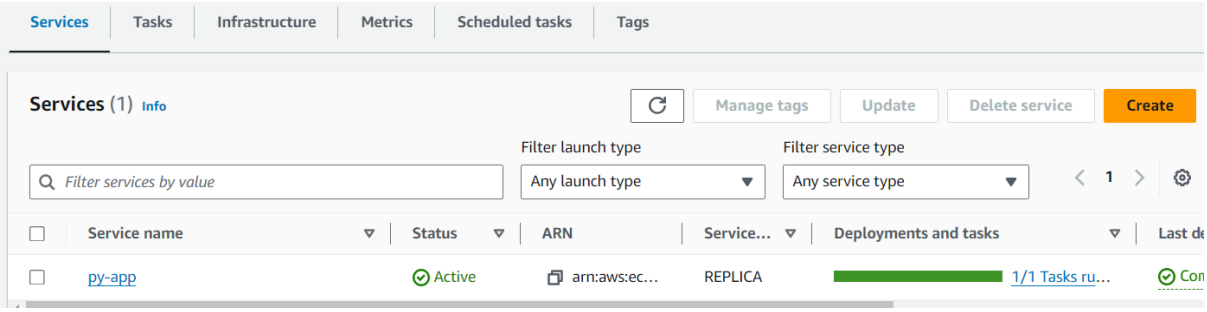
View in CloudFormation ×

- After few minutes we could able to see the application is deployed successfully:

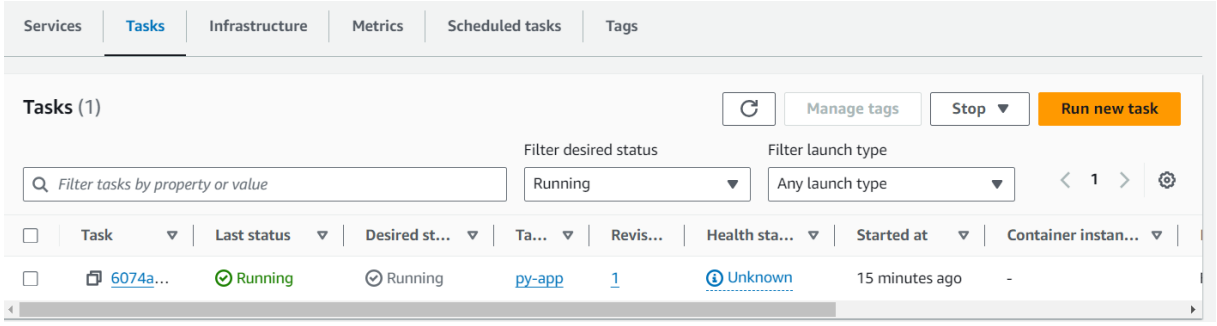


- Click the created cluster, **to know about services & tasks:**

Services:



Tasks:

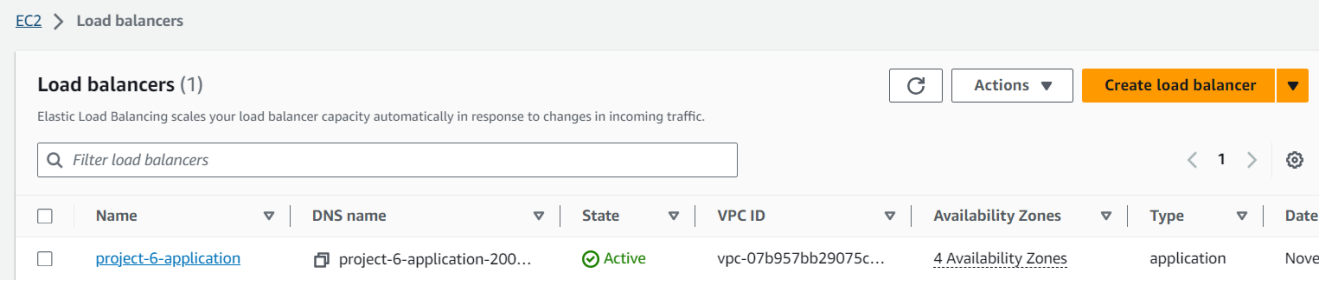


- Click the task to know about the ip address & etc:

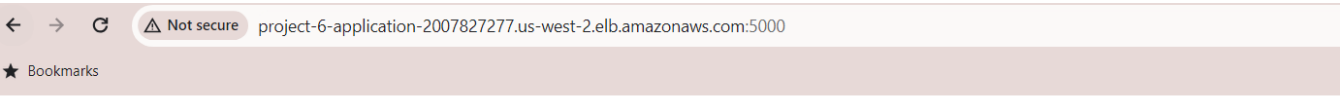
- Copy the public ip address and paste it on the browser along with the port number:

Hello,
this python application runs from Amazon ECS with the help of Jenkins CI/CD Pipeline!!!

- Copy and paste the **load balancer dns** on the browser along with port number:



The load balancer output:



Hello,
this python application runs from Amazon ECS with the help of Jenkins CI/CD Pipeline!!!

****

Step:8 – Automating the deployment process by using Jenkins:

<u>Installing Jenkins & AWS CLI:</u>

- Script to install Jenkins:

```
sudo apt-get update
sudo apt-get install -y openjdk-11-jre
sudo apt-get update

sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
  https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key

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

sudo apt-get update
sudo apt-get install jenkins -y
```

```
root@ip-172-31-29-145:/home/ubuntu# ls
app.py  dockerfile  requirements.txt
root@ip-172-31-29-145:/home/ubuntu# vi jenkins.sh
root@ip-172-31-29-145:/home/ubuntu# ls
app.py  dockerfile  jenkins.sh  requirements.txt
root@ip-172-31-29-145:/home/ubuntu# chmod 777 jenkins.sh
root@ip-172-31-29-145:/home/ubuntu# ./jenkins.sh
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu focal-security InRelease
```

- Checking **Jenkins**:

```
root@ip-172-31-29-145:/home/ubuntu# jenkins --version
2.414.3
root@ip-172-31-29-145:/home/ubuntu# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
     Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
     Active: active (running) since Mon 2023-11-13 17:49:19 UTC; 27s ago
   Main PID: 7629 (java)
      Tasks: 50 (limit: 4671)
```

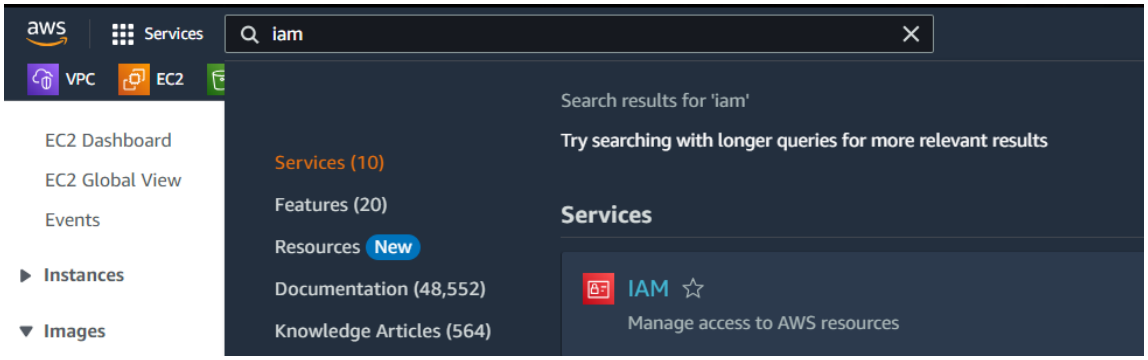
- Command to install **aws cli**: **apt-get install -y awscli**

```
root@ip-172-31-29-145:/home/ubuntu# aws --version
aws-cli/1.18.69 Python/3.8.10 Linux/5.15.0-1048-aws botocore/1.16.19
root@ip-172-31-29-145:/home/ubuntu#
```

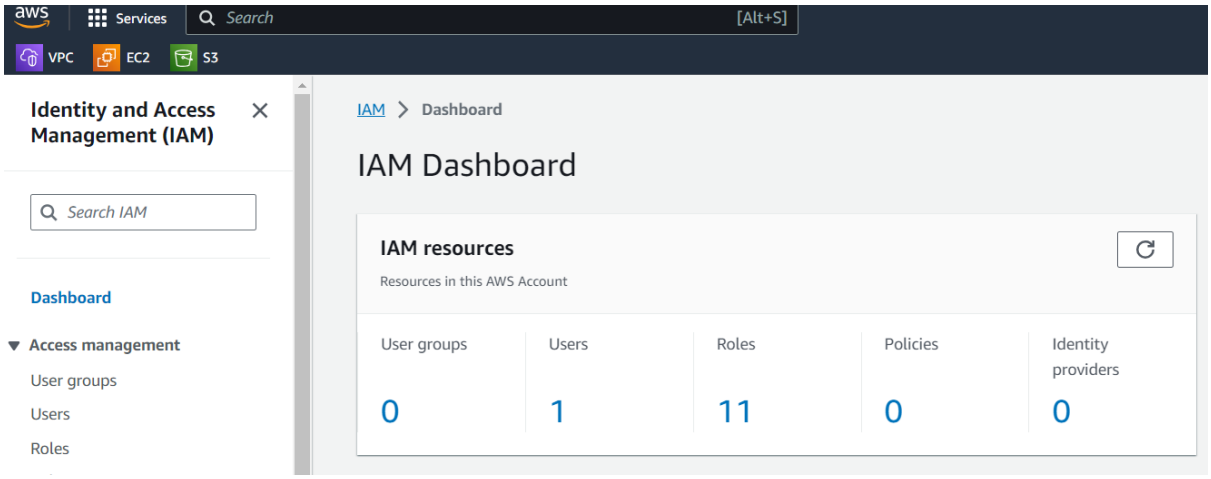
****

Creating an IAM User:

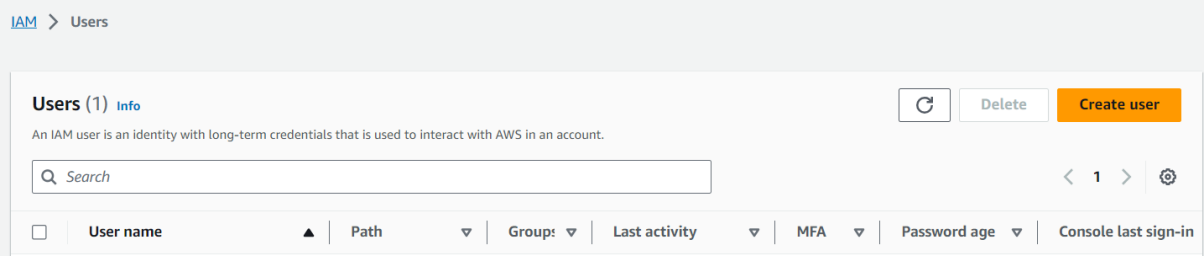
- On the search panel, search IAM, and click that one:



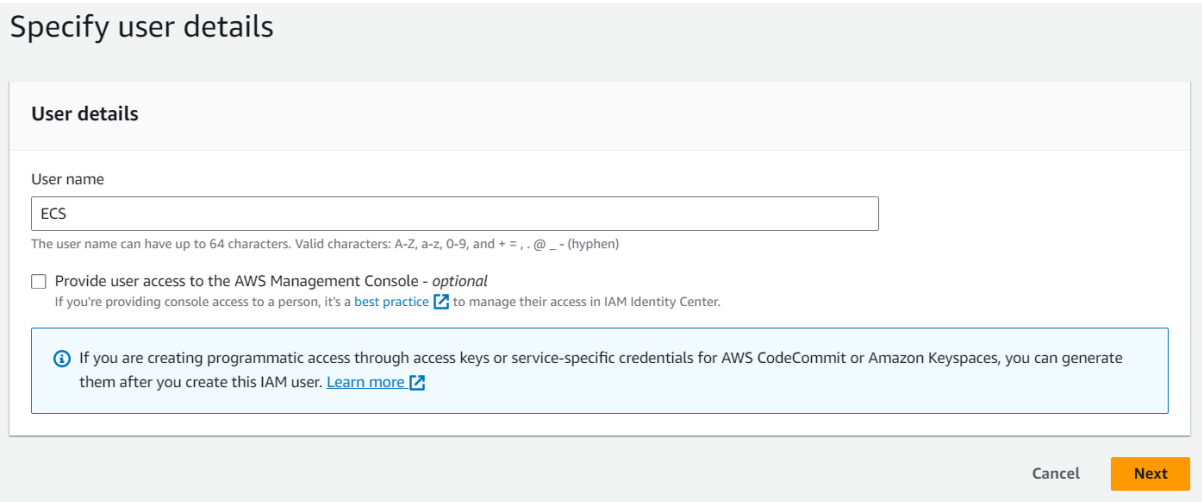
- Then click the user:



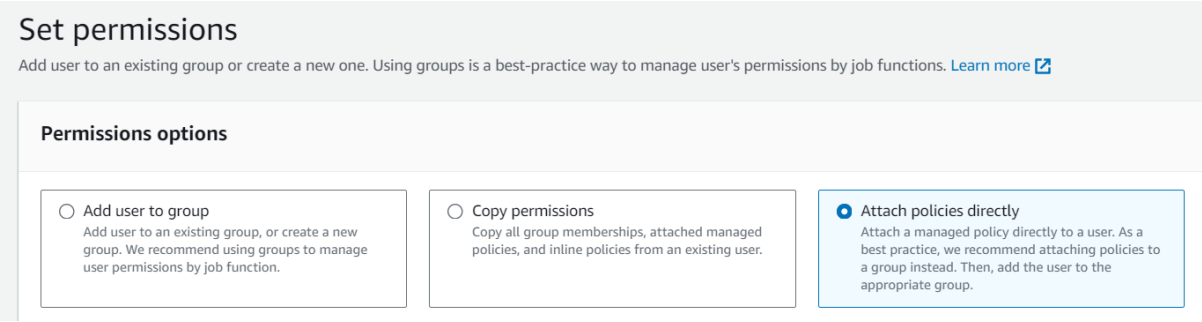
- Then click create user option on left side:



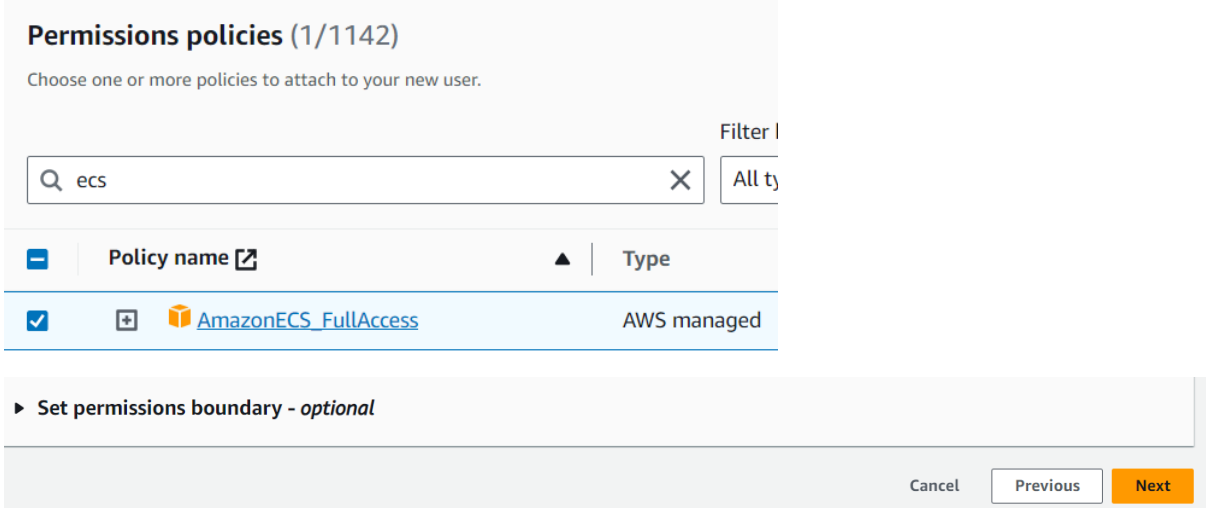
- Then name the IAM user, click next:



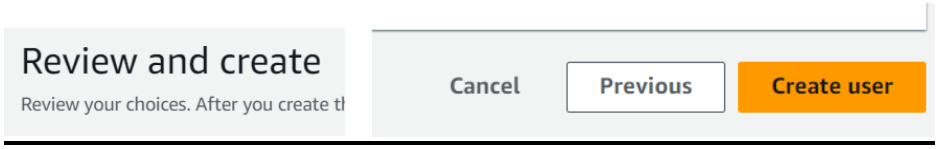
- Then select attach policies directly option:



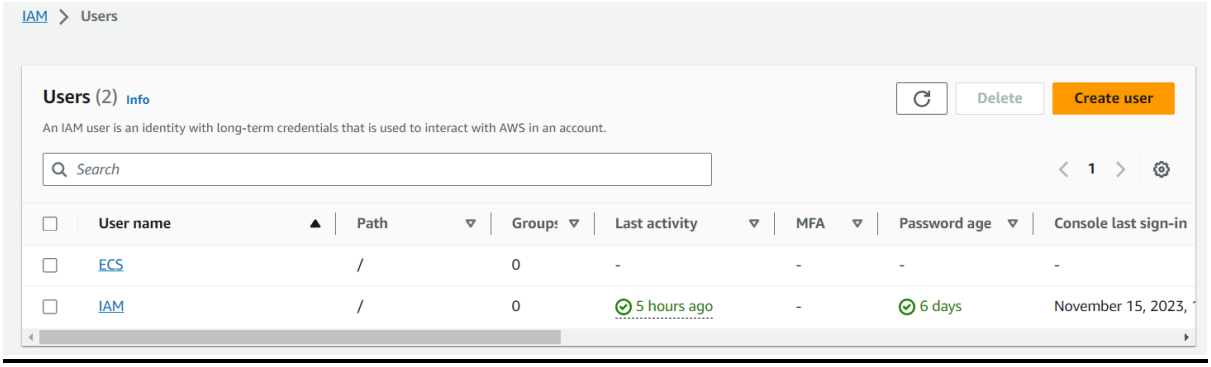
- Then select policy **AmazonECS_FullAccess**, scroll down & click next:



- Then review & create page, just review the configurations click create user option:



- The IAM user has been created successfully:



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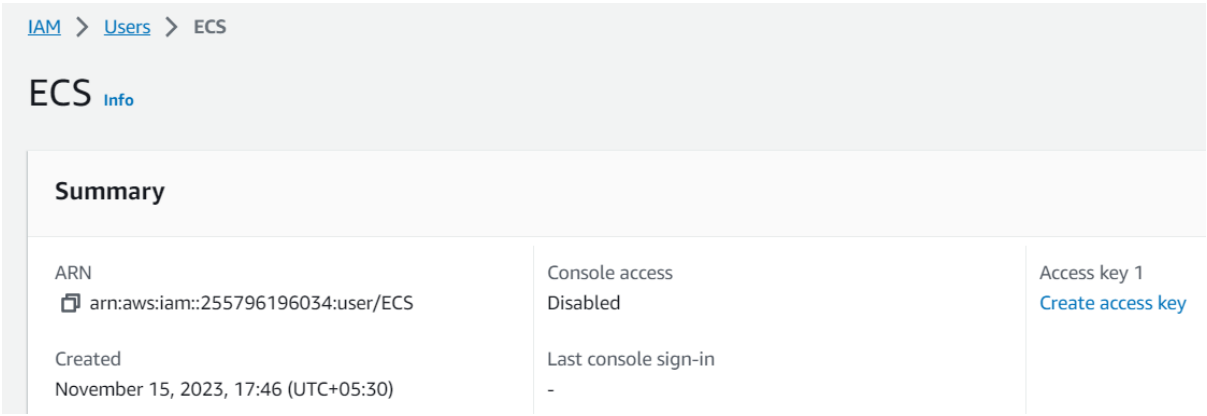
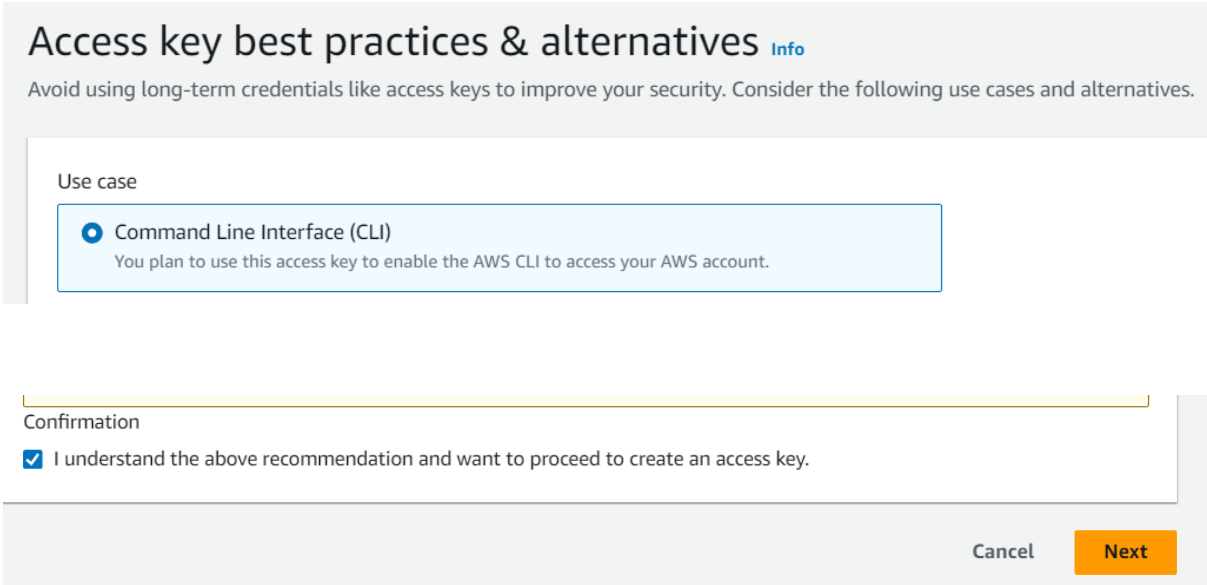
Creating access key & secret access key for the IAM user:

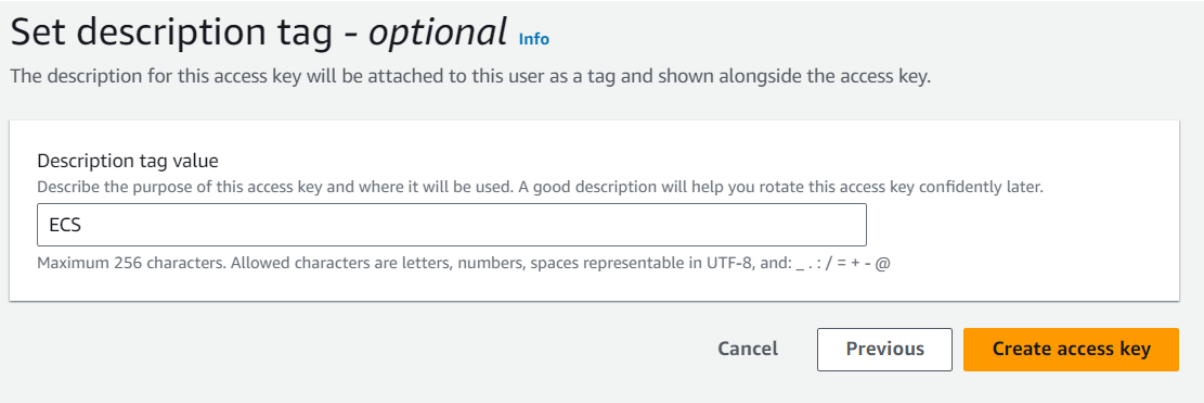
- Click the newly create IAM User, we could able to see create access key option. Click that one:



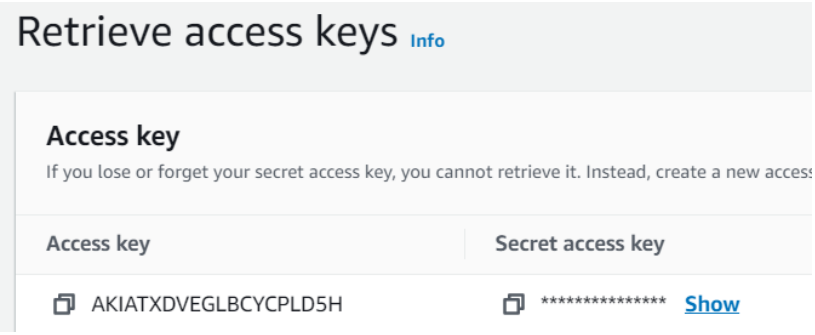
- Select the use-case option for creating access key, then acknowledge & click next:



- Then give the description, click create access key option:



- The access key & secret key has been created for the **IAM user: ECS**



****

Configuring AWS Cli credentials:

- Configuring the aws credentials with the help of the command as the **Jenkins user,** with the help of the command: **aws configure:**

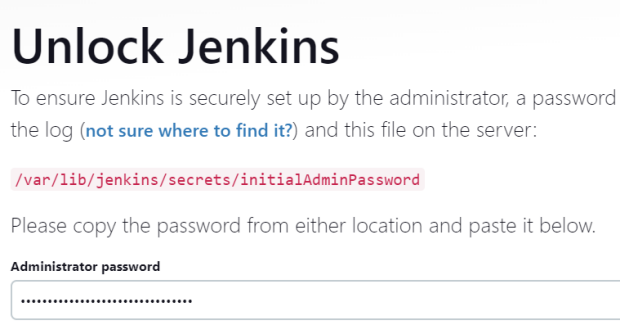
```
root@ip-172-31-29-145:/home/ubuntu# su jenkins
jenkins@ip-172-31-29-145:/home/ubuntu$ aws configure
AWS Access Key ID [None]: ASIAUIXM6DFDJZL3ETHX
AWS Secret Access Key [None]: CtwFRhcJAAM8YwTk+tteM6PkNfM9D2V7hWd5RIub
Default region name [None]: us-west-2
Default output format [None]: json
jenkins@ip-172-31-29-145:/home/ubuntu$
```

****

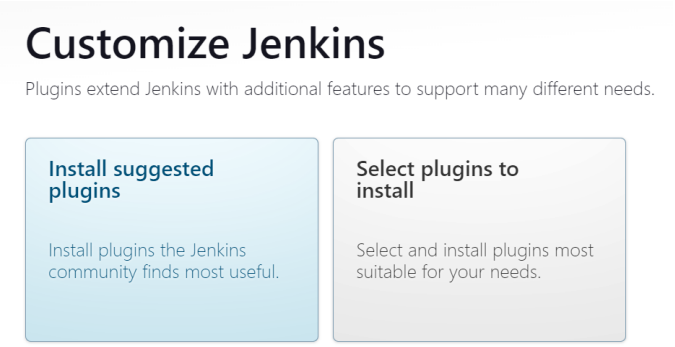
Configuring Jenkins GUI:

- Getting the initial admin password by using the command and paste on the browser & click continue:

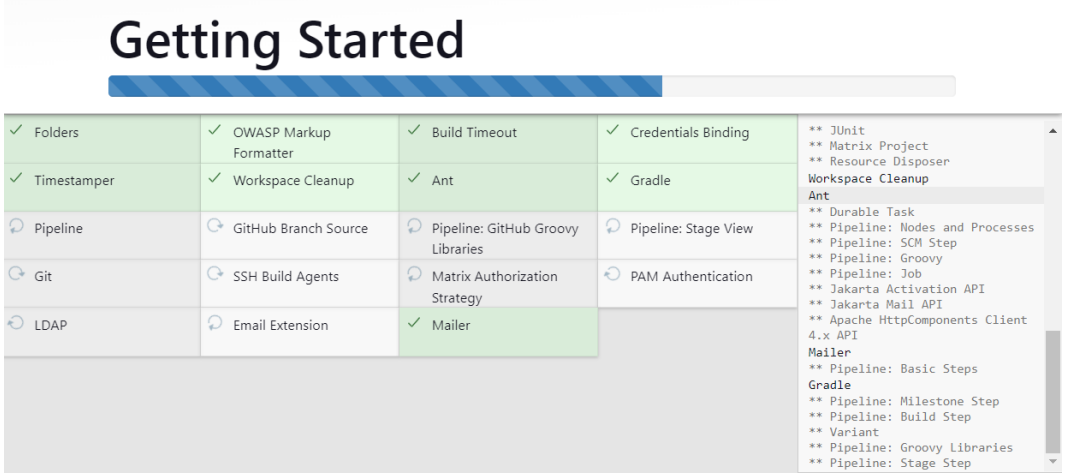
```
root@ip-172-31-29-145:/home/ubuntu# cat /var/lib/jenkins/secrets/initialAdminPassword
c6c0ffa23d9849efa6b9cb2192d47bd3
root@ip-172-31-29-145:/home/ubuntu#
```



- Then select the option to install plugins, here I am selecting **install suggested plugins option:**

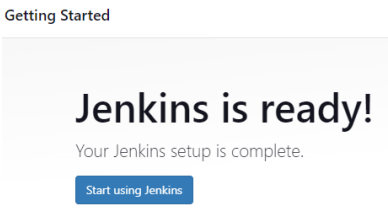


- Once selecting the option, the plugins will start to download and install:

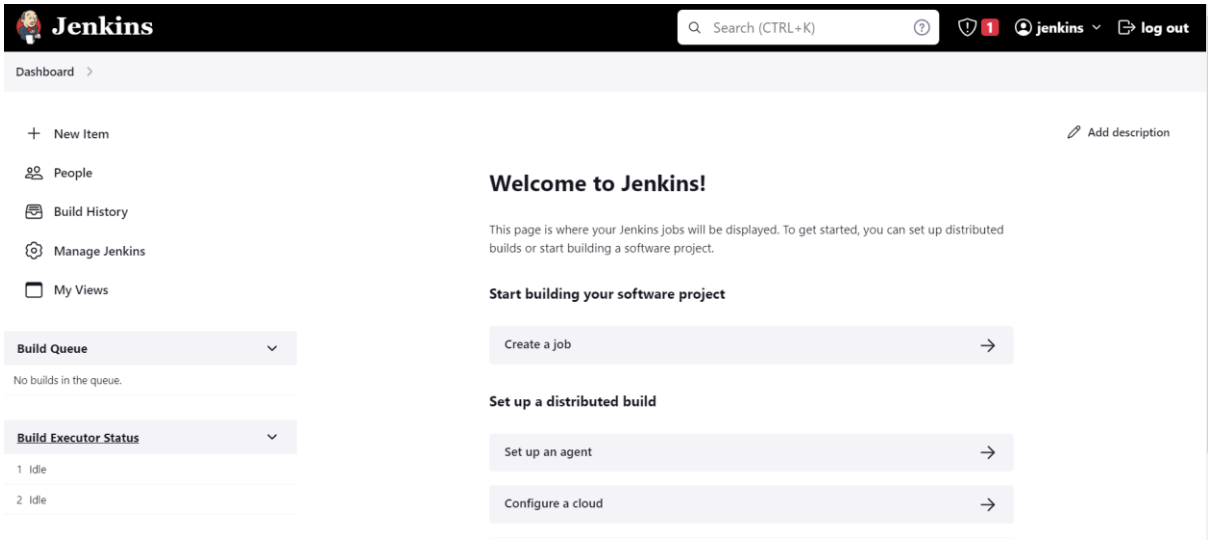


- Then setting up the user credentials on the Jenkins for login purpose:

- Then click save and continue option: we could able to see the Jenkins is ready, **click the start using Jenkins:**



- The Jenkins dashboard is ready:

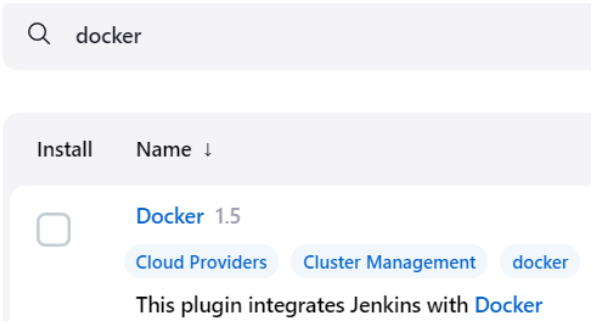


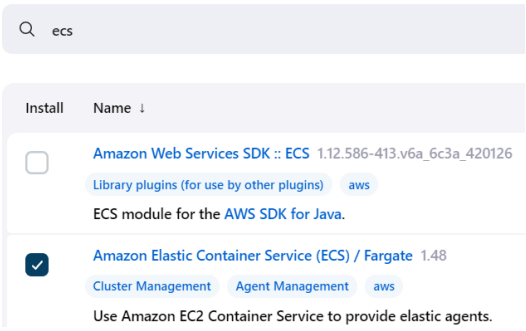
****

Installing the necessary plugins:

- On the dashboard we could able to see manage Jenkins option, under that we could able to see plugins click that one:

- For the project we need two plugins, they are available on available plugins option:
  ➔ Docker plugin
  ➔ Amazon elastic container service



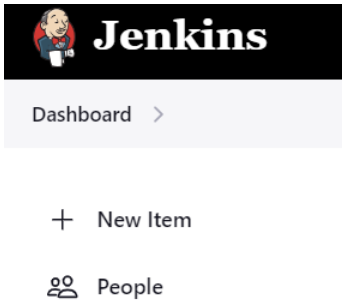


Then we need to create a Jenkins job for automating purpose.

****

Creating a Jenkins job:

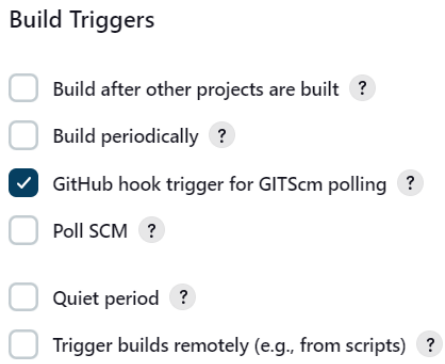
- On Jenkins dashboard, we could able to **new item** click that one:



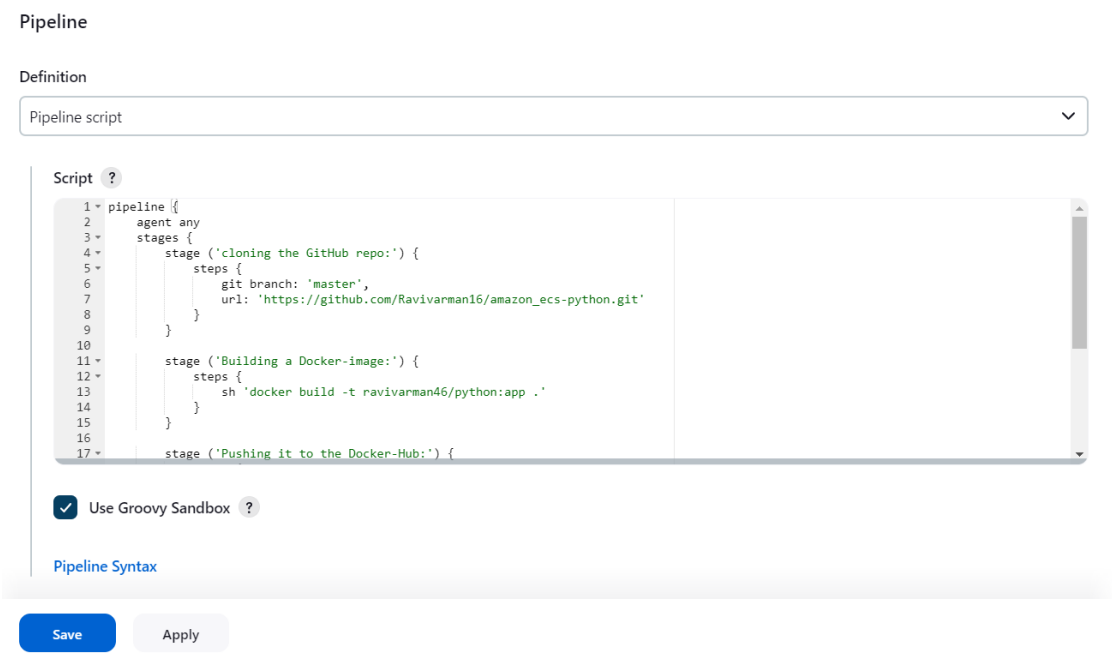
- Then **name the job and select the pipeline type**, click okay:

- Then give the description according the project:

- Then select the option Github hook trigger under build triggers for automated trigger purpose:



- Then under pipeline, just we need to enter the script: after entering the script click apply & save option:



- **Pipeline script contains:** 4 stages

  ➔ **1st stage:** cloning the code from GitHub.
  ➔ **2nd stage:** building the docker image from dockerfile.
  ➔ **3rd stage:** pushing the created docker image to docker hub.
  ➔ **4th stage:** deploying the newly created docker image to Amazon ECS Cluster.

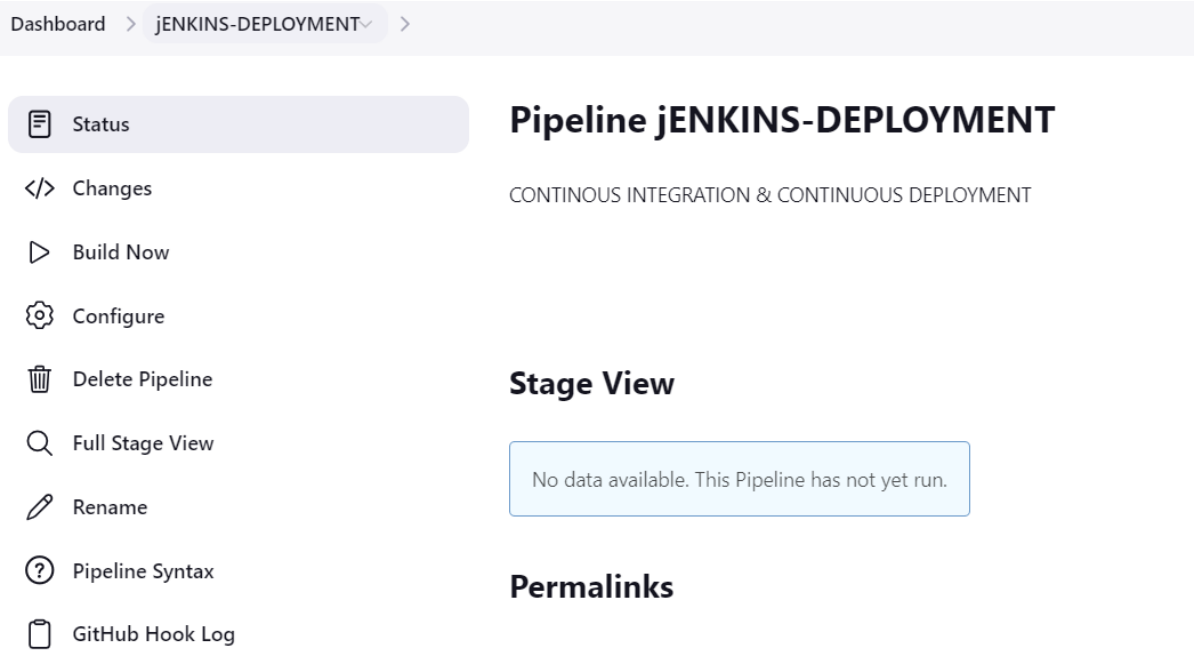
```
pipeline {
    agent any
    stages {
        stage ('cloning the GitHub repo:') {
            steps {
                git branch: 'master',
                url:
'https://github.com/Ravivarman16/amazon_ecs-python.git'
            }
        }

        stage ('Building a Docker-image:') {
            steps {
                sh 'docker build -t ravivarman46/python:app
.'
            }
        }

        stage ('Pushing it to the Docker-Hub:') {
            steps {
                sh ' docker login -u ravivarman46 -p
dckr_pat_4RpB6x_mUNVKrFCLk2W5pqBnywE '
                sh ' docker push ravivarman46/python:app '
            }
        }

        stage ('deploying to ecs') {
            steps {
                sh 'aws ecs update-service --cluster py-app
--service py-app --force-new-deployment'
            }
        }
    }
}
```

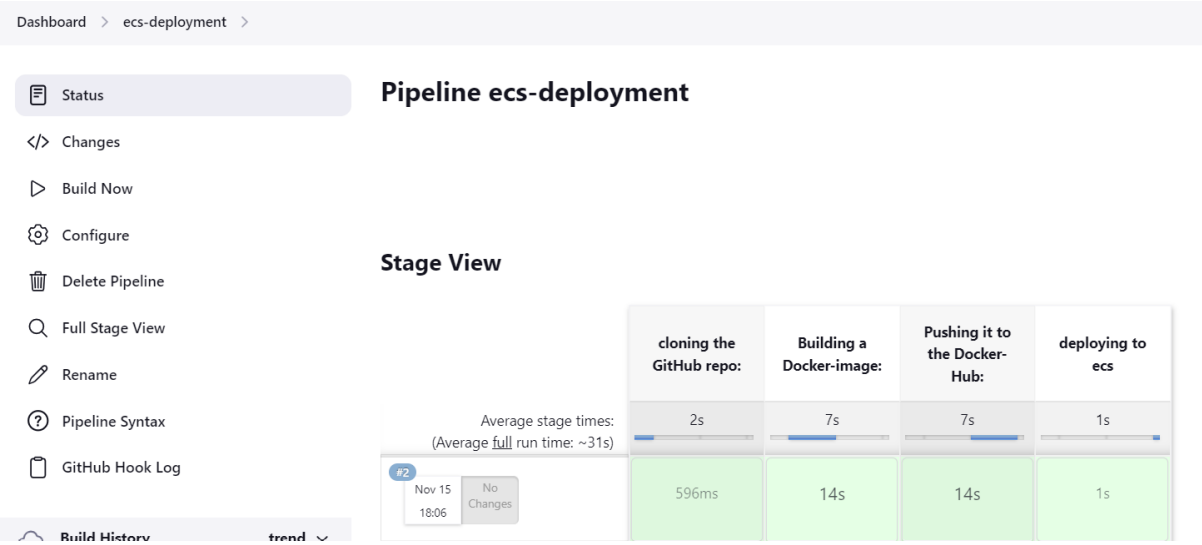
➔ We could able to see the Jenkins job is ready:



- Before executing the pipeline, on the command line use this command for Jenkins to execute the docker daemon:

```
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# chmod 777 /var/run/docker.sock
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6#
```

- Now click build now option on the Jenkins pipeline, we could able to see the pipeline execute successfully:



Console Output

```
Started by user jenkins
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/ecs-deployment
```

```
    }
}
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

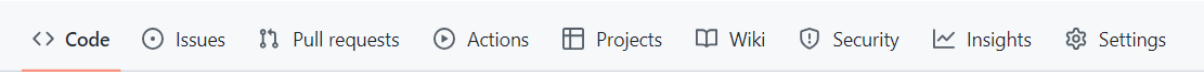
- Let us check the output from the browser:

Hello,
this python application runs from Amazon ECS with the help of Jenkins CI/CD Pipeline!!!

****

Setting GitHub hook trigger for automated deployment:

- On the GitHub repository, we could able to see the **settings** option, click that one:



- On the left side, we could able to see **webhook** option click that one:

- Then **click add webhook option** on the right side:

Webhooks

Add webhook

Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide.

- Then we need to enter the **Jenkins URL along with github-webhook** option on the **payload URL:**

Payload URL *

http://13.234.117.106:8080/github-webhook/

Content type

application/x-www-form-urlencoded

- Then select the events according to your preferences, here I am selecting **send me everything** option. Then click add webhook option:

Which events would you like to trigger this webhook?

- ○ Just the push event.
- ◉ Send me **everything**.
- ○ Let me select individual events.

☑ Active

We will deliver event details when this hook is triggered.

Update webhook | Delete webhook

- Then on the Jenkins side, click **manage Jenkins**, under that click **system:**

Manage Jenkins

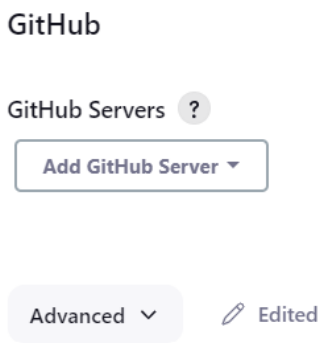
Building on the built-in node can be a security issue. You

System Configuration

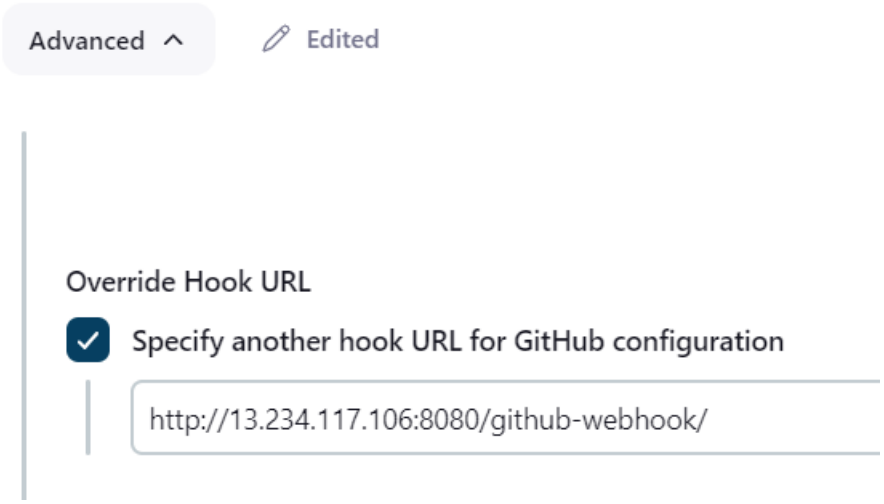
System

Configure global settings and paths.

- Then on the middle of the screen we could able to find out GitHub option: on that we could able to advanced option, click that one:



- On the advanced option, we could able to see **override hook URL** option click that one: then enter **Jenkins URL along with github-webhook &** click apply save:



- Then make a change in the application code, and save it.

```
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# vi app.py
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6#
```

```python
# app.py
from flask import Flask

app = Flask(__name__)

@app.route('/')
def hello():
    return '<b>Hello,</b><br><b>Project 6: Setting up a Continuous Delivery Pipeline with Git, Jenkins, Docker, and AWS ECS!!!</b>'

if __name__ == '__main__':
    app.run(debug=True, host='0.0.0.0')
```

- Checking the **git status:**

```
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# git status
On branch master
Your branch is up to date with 'origin/master'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   app.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        jenkins.sh
```

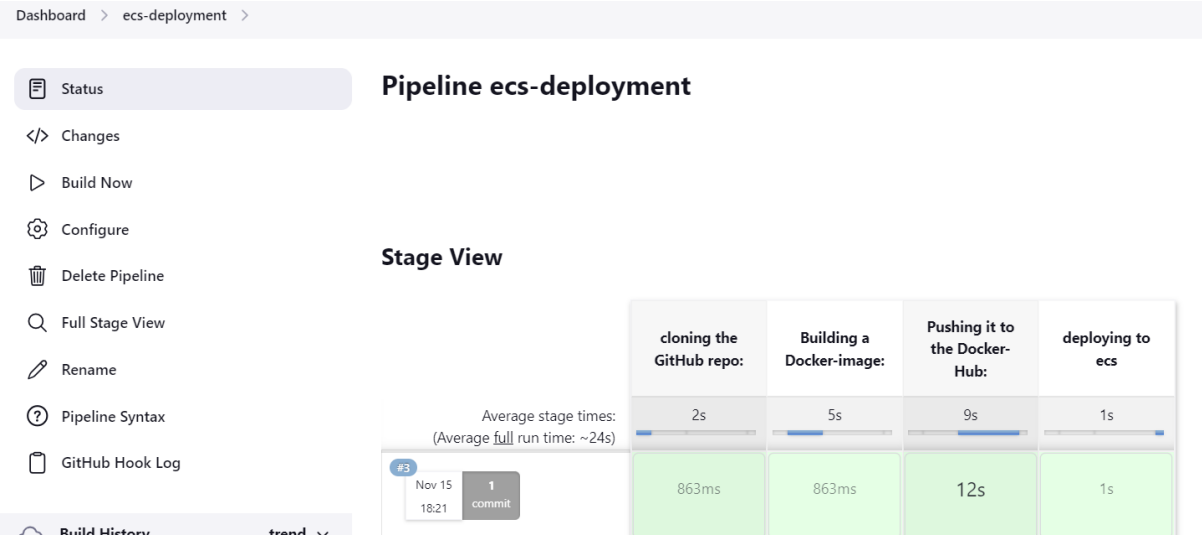
- Then **staging it and commiting it.**

```
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# git add .
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# git commit -m "updated app.py"
[master b814550] updated app.py
 Committer: root <root@ip-172-31-47-53.ap-south-1.compute.internal>
```

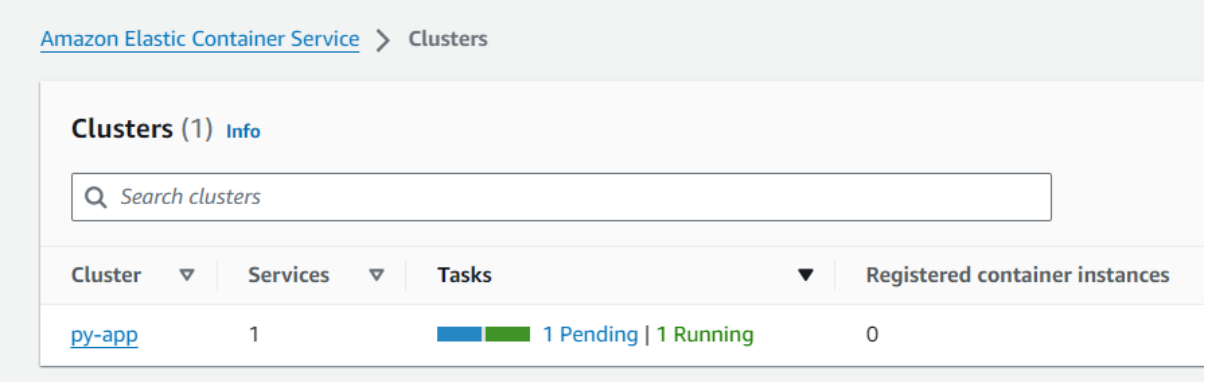
- Then **pushing it to the remote repo:**

```
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6# git push origin master
Username for 'https://github.com': Ravivarman46
Password for 'https://Ravivarman46@github.com':
Enumerating objects: 6, done.
Counting objects: 100% (6/6), done.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 717 bytes | 717.00 KiB/s, done.
Total 4 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/Ravivarman16/use-case-project-6.git
   699d1c3..b814550  master -> master
root@ip-172-31-47-53:/home/ubuntu/use-case-project-6#
```

- The Jenkins job got triggered automatically, when there is a code change in GitHub:

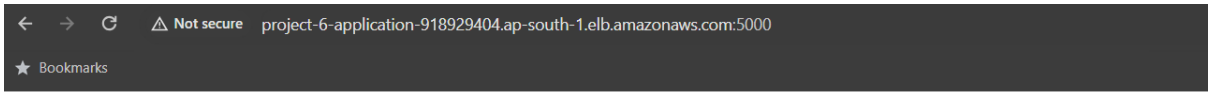


- On the AWS ECS Cluster we could see its updating the service:



- Checking the output on the browser:

Hello,
Project 6: Setting up a Continuous Delivery Pipeline with Git, Jenkins, Docker, and AWS ECS!!!



Hello,
Project 6: Setting up a Continuous Delivery Pipeline with Git, Jenkins, Docker, and AWS ECS!!!

****

The application has deployed successfully to the AWS ECS Cluster

Reference: https://github.com/Ravivarman16/use-case-project-6.git