SHAHEROZ ALAM KHAN

Aim

To automate the process of building, testing, and deploying applications using a CI/CD pipeline on AWS, leveraging Visual Studio Code (VS Code) as the primary development environment to ensure efficient and reliable delivery of software changes.

Objectives

1. **Integrate VS Code with AWS Services**: Use Visual Studio Code to manage source code and directly integrate with AWS services like CodeCommit
2. **Automate Build and Deployment Processes**: Set up a CI/CD pipeline that automatically builds and deploys code changes from within the VS Code environment to AWS.
3. **Continuous Integration and Deployment**: Implement a pipeline to continuously test and deploy changes, ensuring the application is always in a deployable state.
4. **Scalability and Flexibility**: Utilize AWS services that can scale with the application's needs and integrate with various development tools.

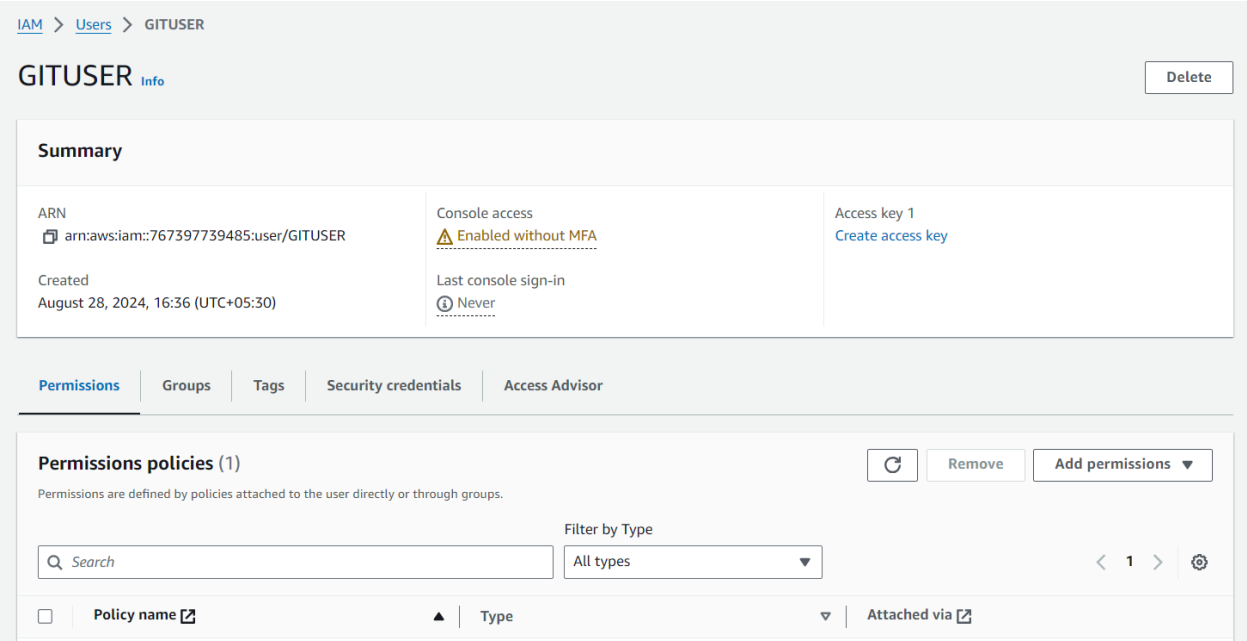
Prerequisites

1. **AWS Account**: A valid AWS account with appropriate permissions to create and manage AWS services.
2. **Visual Studio Code**: Installed VS Code with the AWS Toolkit extension for VS Code.
3. **AWS CLI**: Installed and configured AWS Command Line Interface (CLI) for managing AWS services from the terminal.
4. **AWS IAM Role**: An IAM user with programmatic access configured in AWS CLI, providing the necessary permissions for AWS services used in the pipeline.
5. **Git Installed**: Git must be installed and configured to manage version control in the VS Code environment.
6. **Code Repository**: A source code repository set up in AWS CodeCommit
7. **Build Specification File**: A `buildspec.yml` file or equivalent, which defines the build and test commands for AWS CodeBuild.

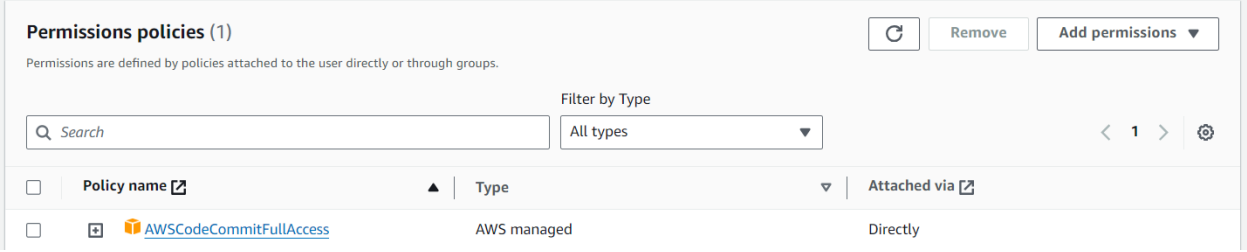
8. **Deployment Configuration**: Prepared deployment configurations for AWS CodeDeploy

Create and Configure IAM User:

- Set up an IAM user with appropriate permissions for AWS CodeCommit.



Attach policy: AWSCodeCommitFullAccess



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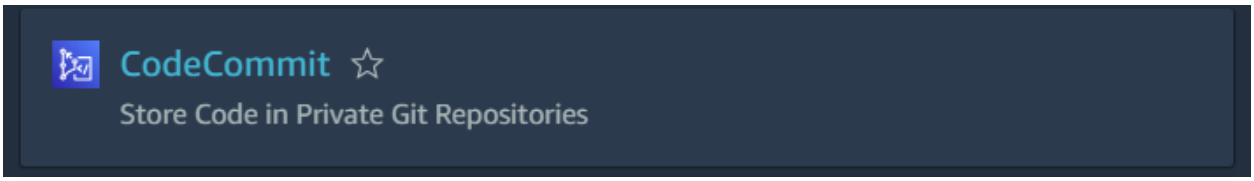
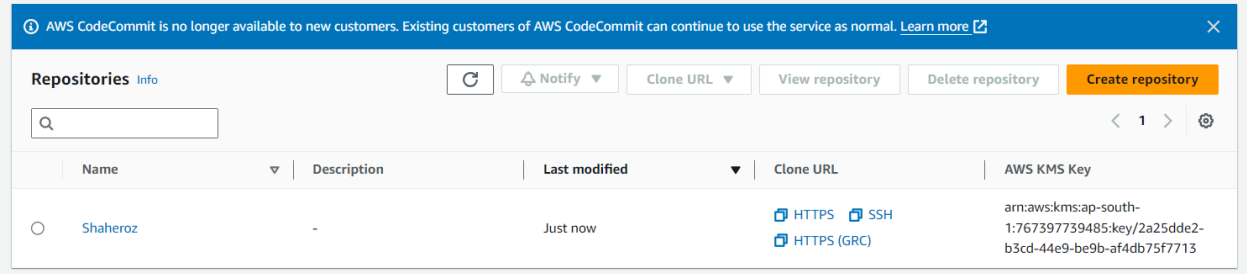
Setup AWS CodeCommit Repository:



Create CodeCommit Repository:

- In the AWS Management Console, navigate to **CodeCommit**.
- Click **Create repository**.
- Enter a repository name and optional description.
- Click **Create**.



Make a folder in your Local Machine

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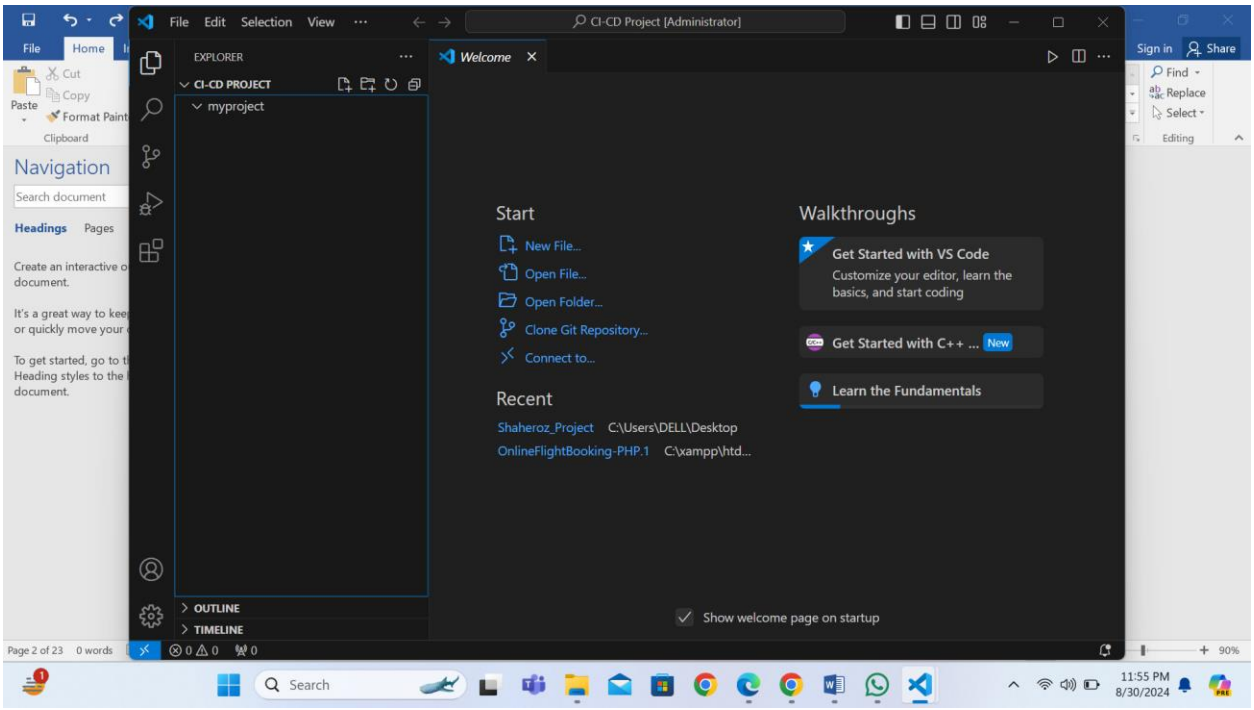
Open the folder in VS Code



Create another folder inside that folder i.e your project folder

Open the folder in interagted Terminal

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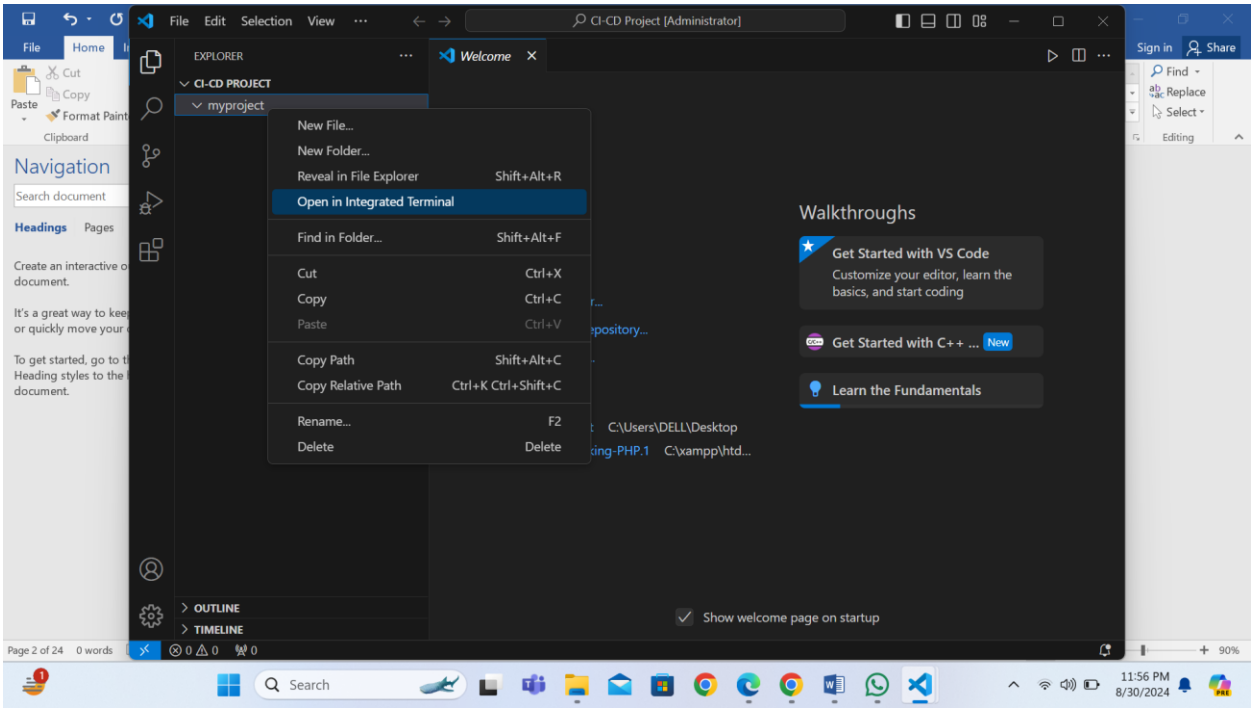
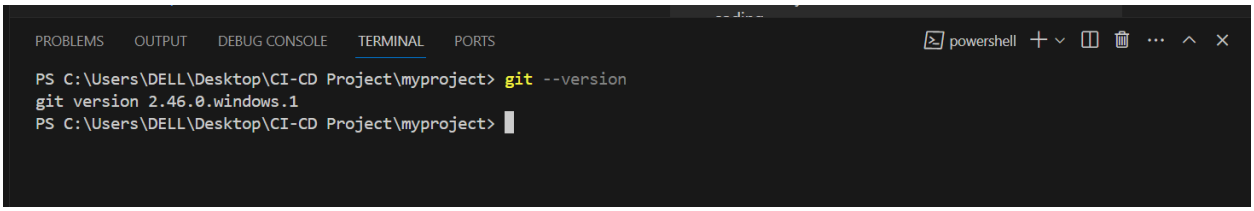


Check git version

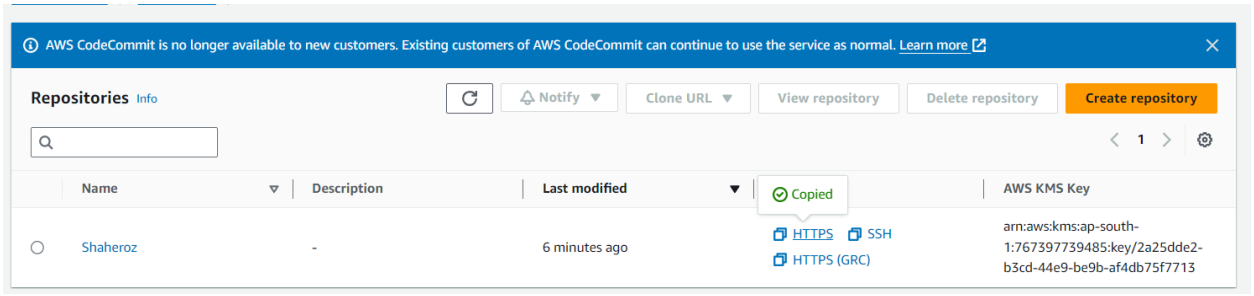
Git –version

If not downloaded make sure to download from official website



Clone Repository to Local Machine:

- In the CodeCommit console, open the repository you created.
- Click **Clone URL** and copy the HTTPS URL.



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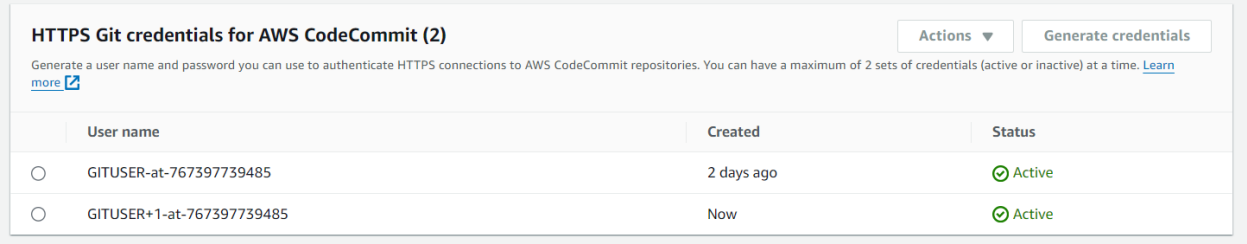
Open Visual Studio Code terminal and run:

git clone <CodeCommit-Repository-URL>

```
PS C:\Users\DELL\Desktop\CI-CD Project\myproject> git clone https://git-codecommit.ap-south-1.amazonaws.com/v1/repos/Shaheroz
Cloning into 'Shaheroz'...
warning: You appear to have cloned an empty repository.
PS C:\Users\DELL\Desktop\CI-CD Project\myproject> cd shaheroz
PS C:\Users\DELL\Desktop\CI-CD Project\myproject\shaheroz>
```

Enter your IAM user credentials when prompted.



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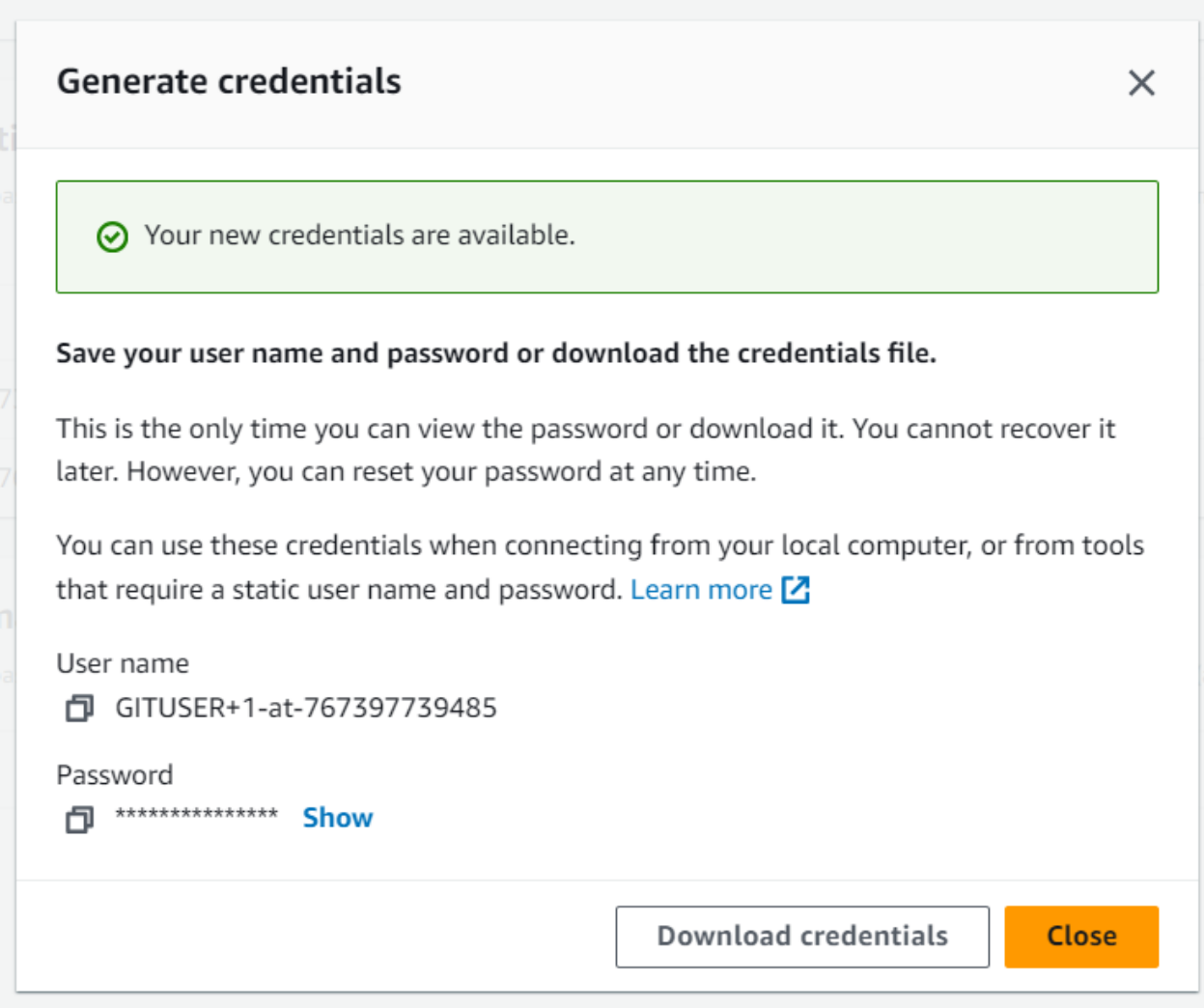

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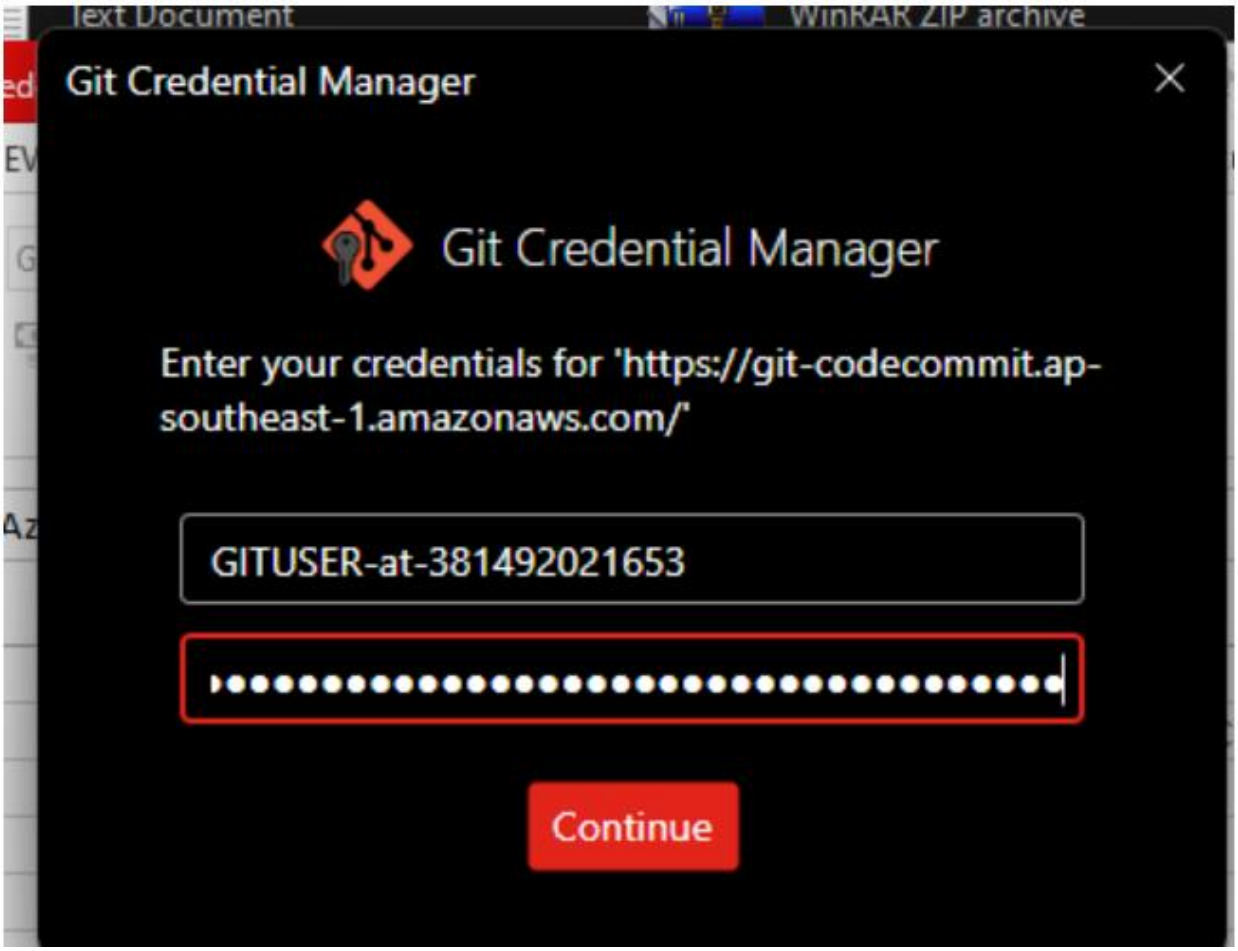

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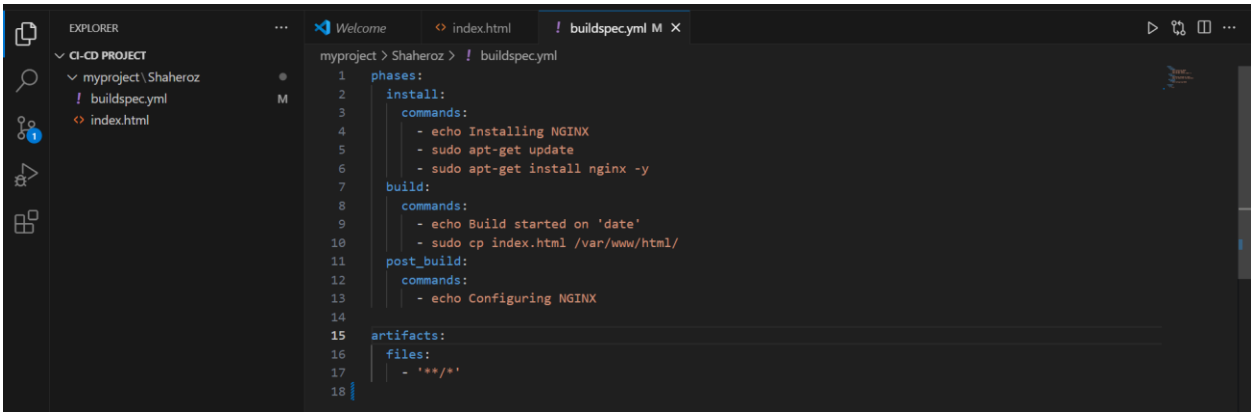
Create a file in the project folder name

buildspec.yml

version: 0.2

```
phases:
  install:
    commands:
      - echo Installing NGINX
      - sudo apt-get update
      - sudo apt-get install nginx -y
  build:
    commands:
      - echo Build started on 'date'
      - sudo cp index.html /var/www/html/
  post_build:
    commands:
      - echo Configuring NGINX

artifacts:
  files:
    - '**/*'
```



NOW push the file in AWS codecommit

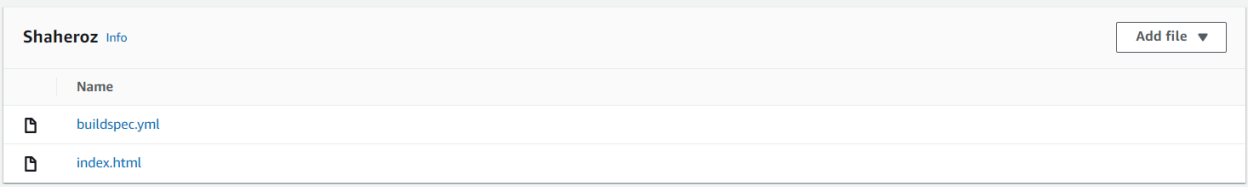
git add .

git commit –m “1st commit”

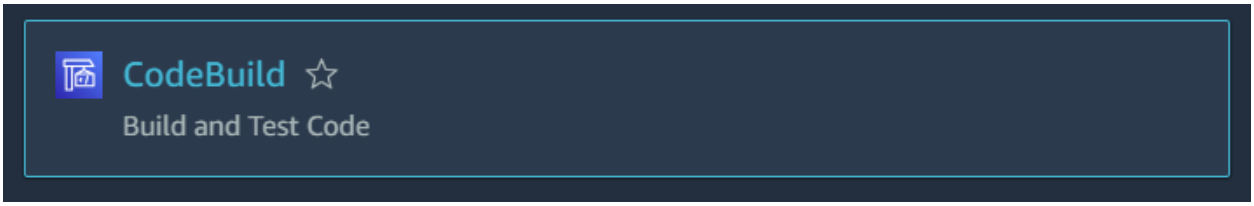
git push origin master

```
PS C:\Users\DELL\Desktop\CI-CD Project\myproject\shaheroz> git add .
PS C:\Users\DELL\Desktop\CI-CD Project\myproject\shaheroz> git commit -m "1st commit"
[master (root-commit) 53af46e] 1st commit
 2 files changed, 18 insertions(+)
 create mode 100644 buildspec.yml
 create mode 100644 index.html
PS C:\Users\DELL\Desktop\CI-CD Project\myproject\shaheroz> git push origin master
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (4/4), 455 bytes | 151.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Validating objects: 100%
To https://git-codecommit.ap-south-1.amazonaws.com/v1/repos/Shaheroz
 * [new branch]      master -> master
PS C:\Users\DELL\Desktop\CI-CD Project\myproject\shaheroz>
```

Now the file is in your aws codecommit repositry

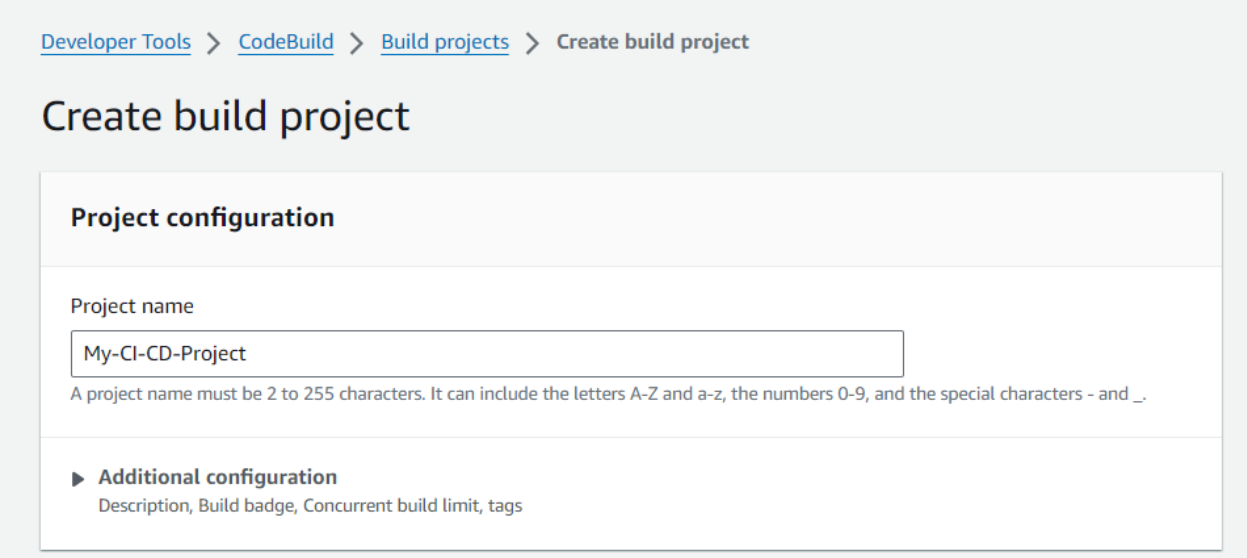


Configure AWS CodeBuild

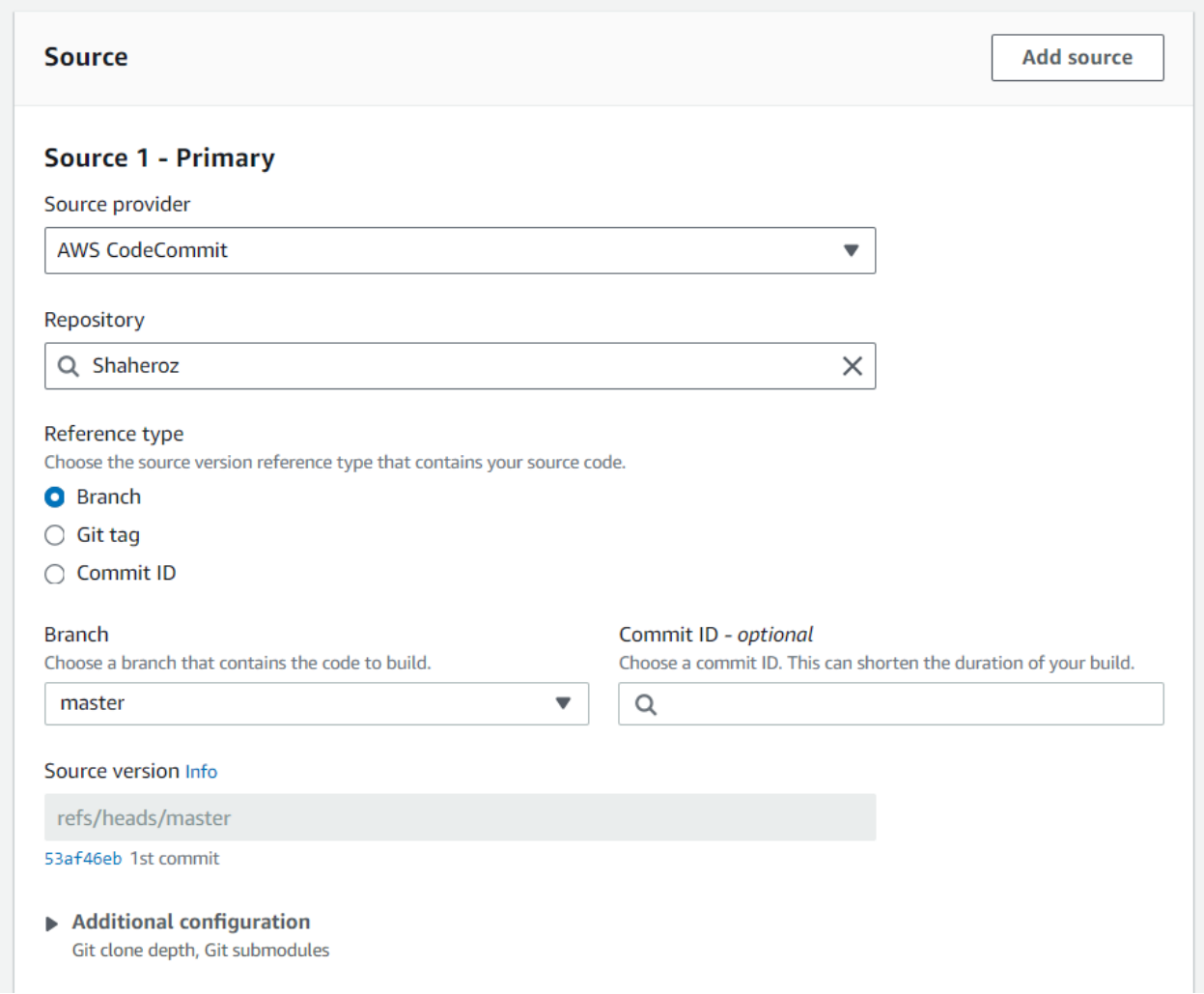


- In the AWS Management Console, go to **CodeBuild**.
- Click **Create build project**.

Enter a project name and description.

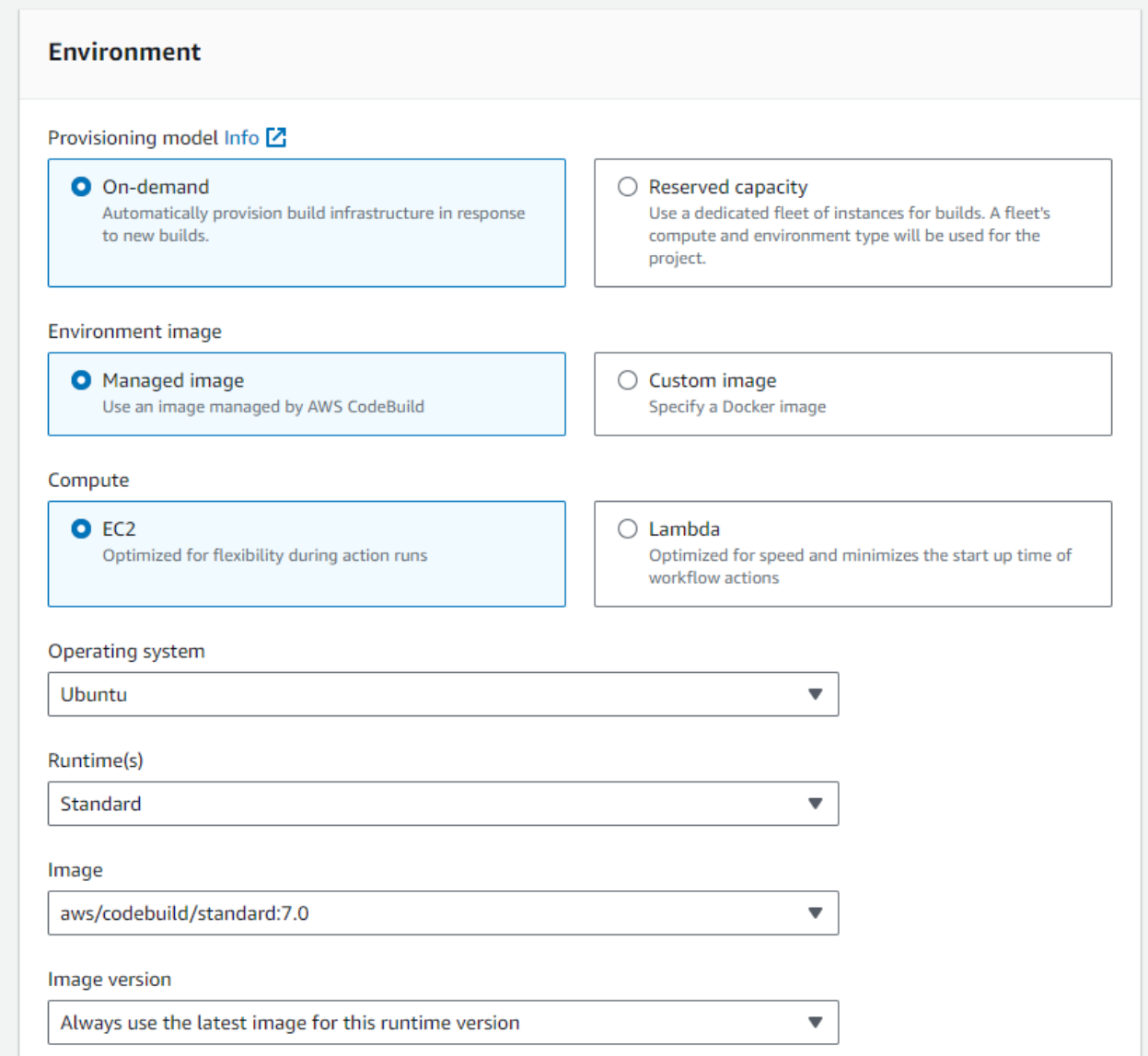


Choose **CodeCommit** as the source provider and select your repository and branch.

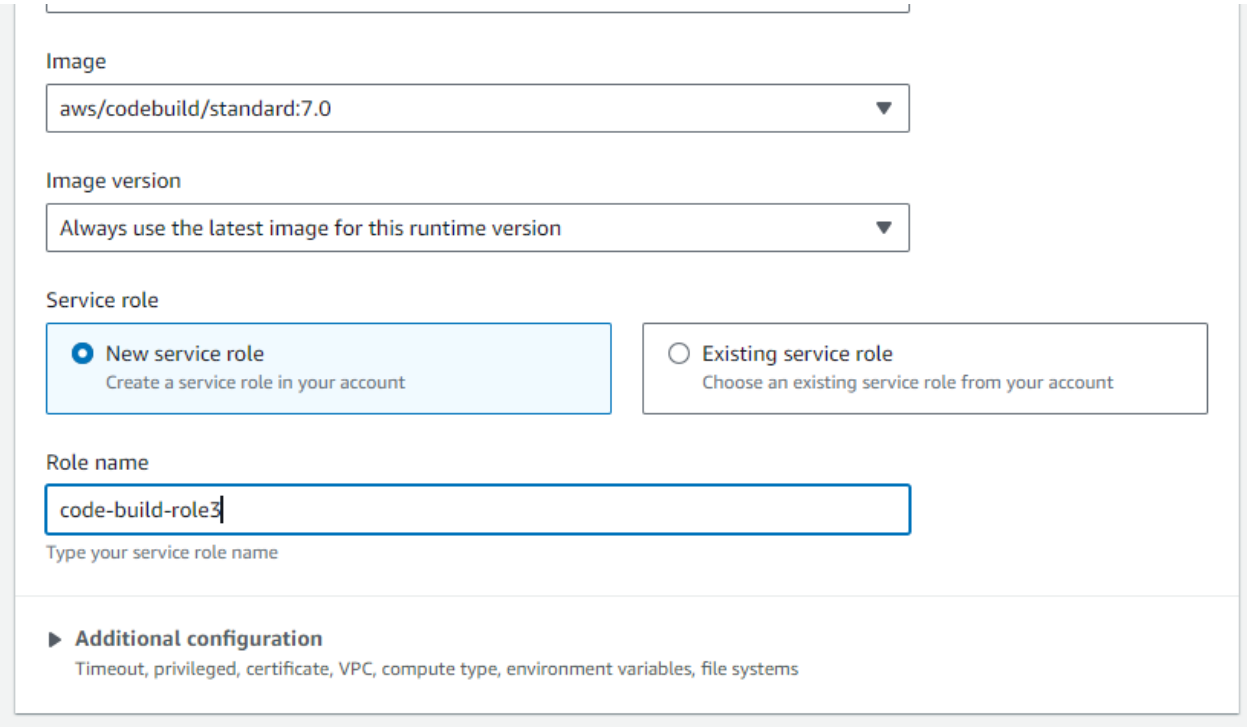


In environment go with by default

And choose operating system “**Ubuntu”**



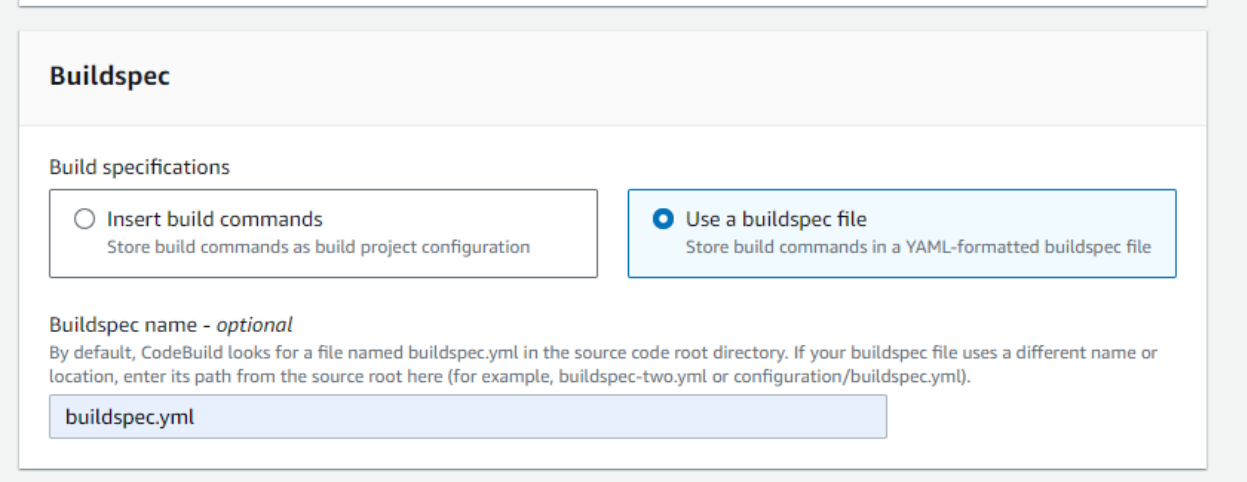
Only enter the role name aws create it by self with necessary policy



Buildspec

Choose : Use a buildspec file

Enter the file name



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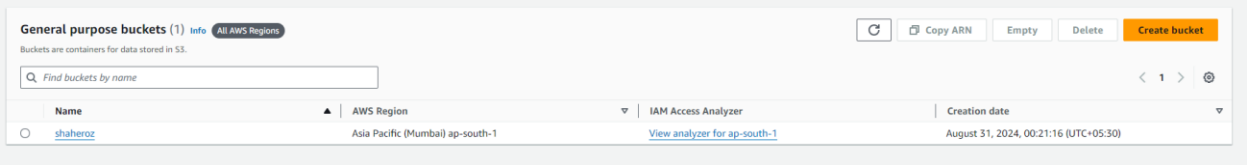
Create simple s3 bucket (eithout versioning and all)

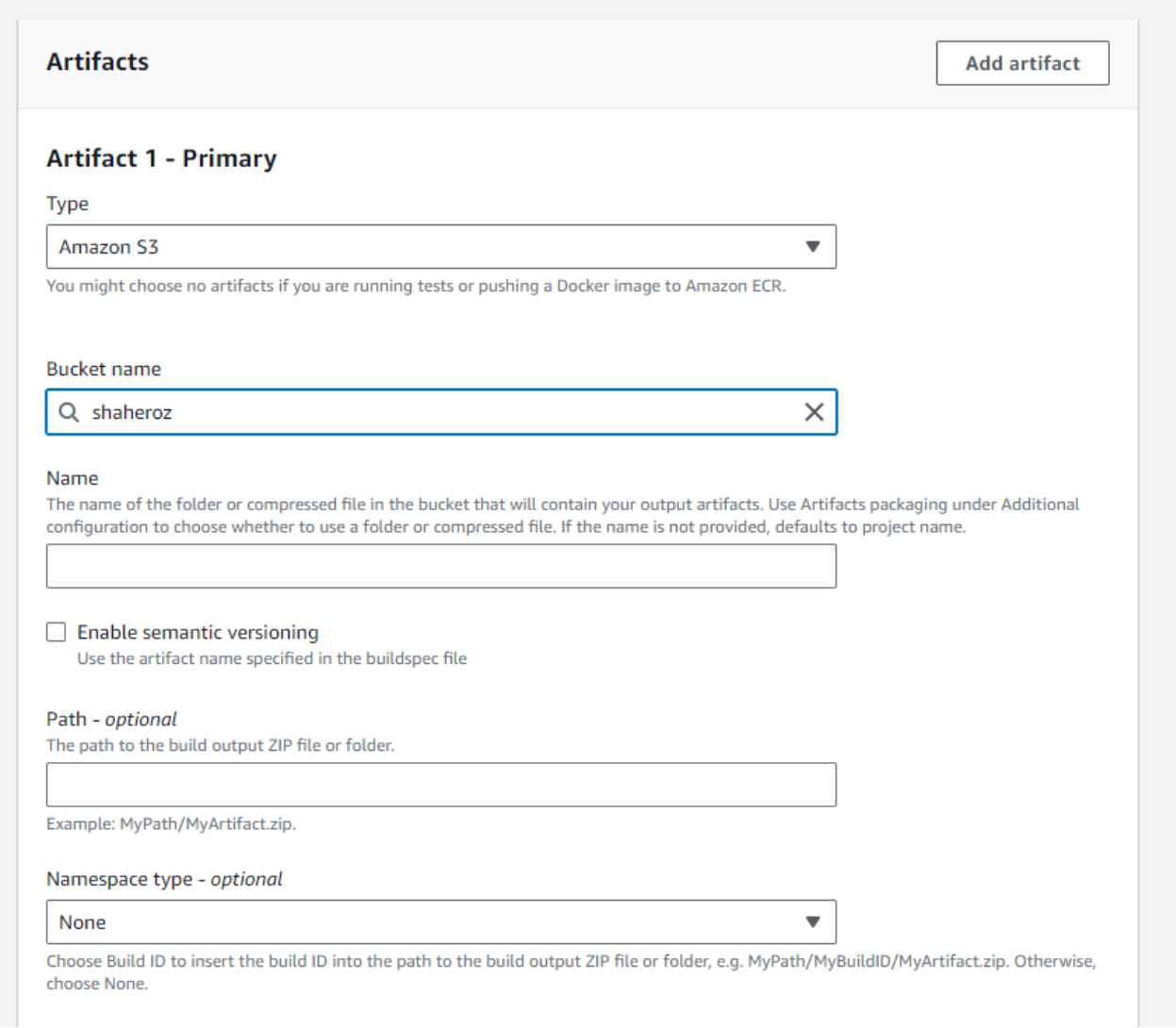
To save artifact



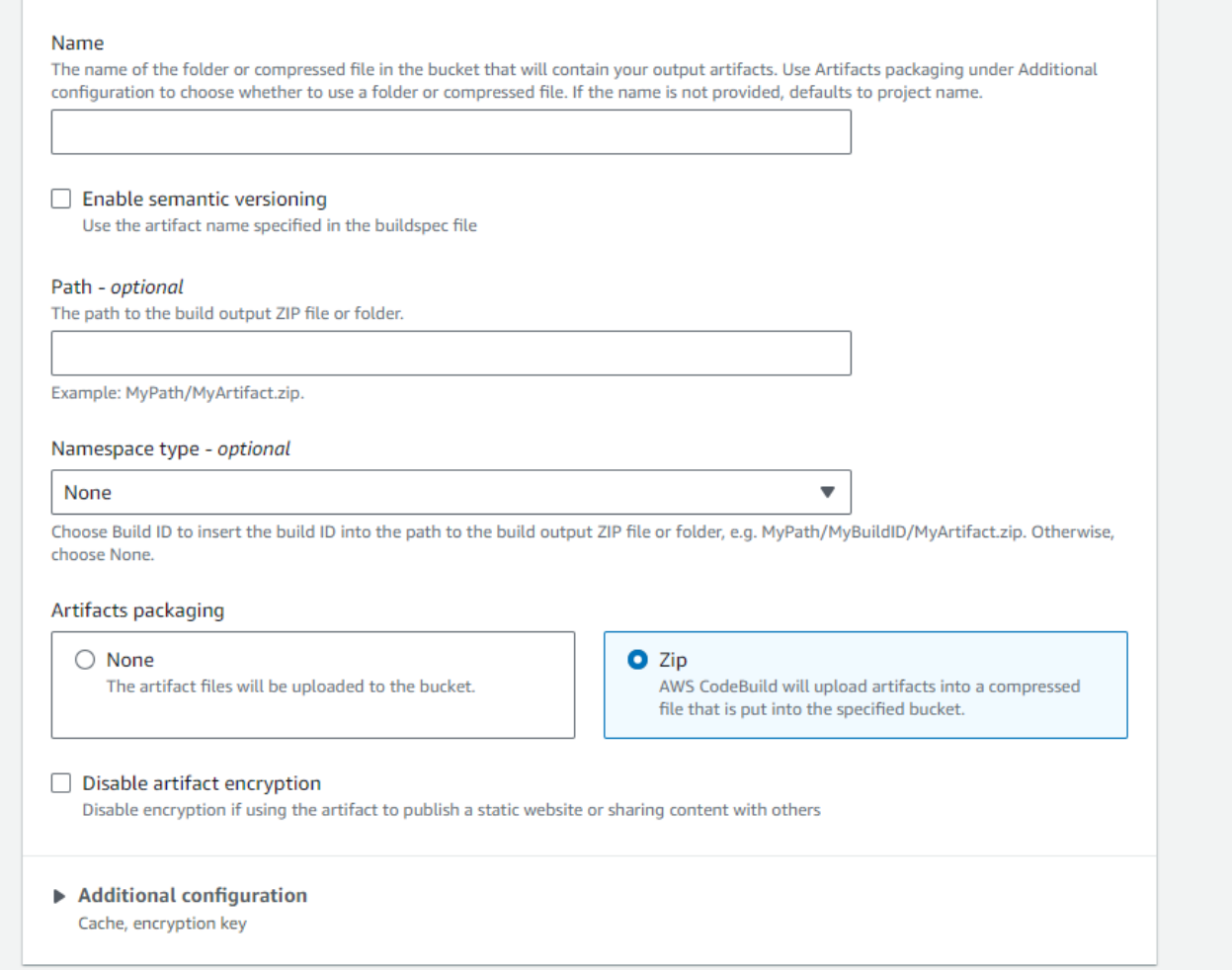
In artifact choose type Amazon S3

Seletect the bucket

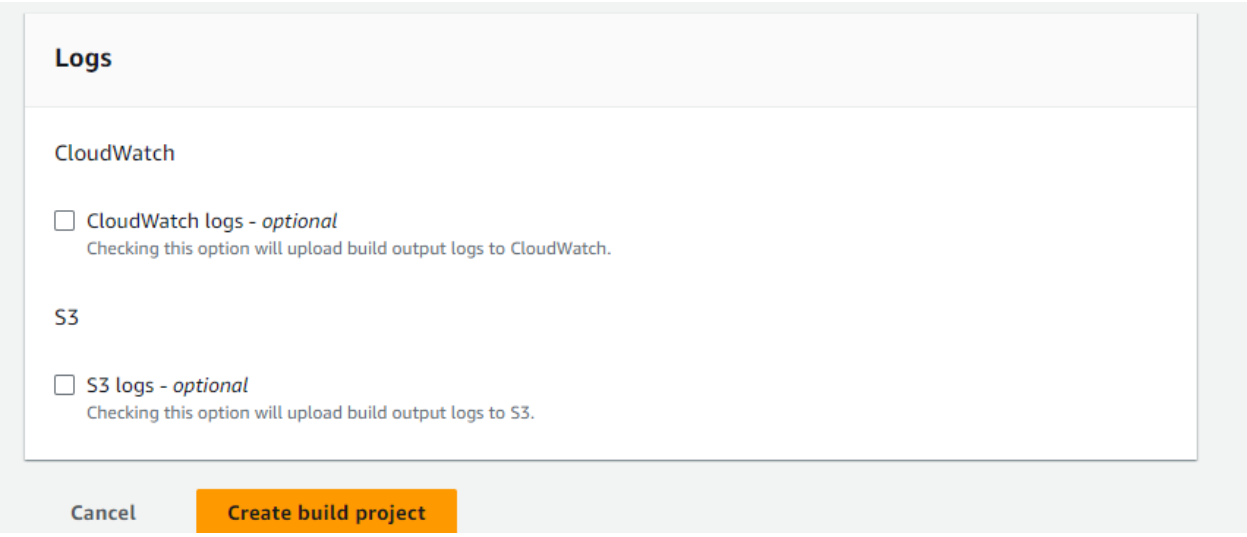
Remaining is by default



Select Artifact packing **.zip**



Click **Create build project**.



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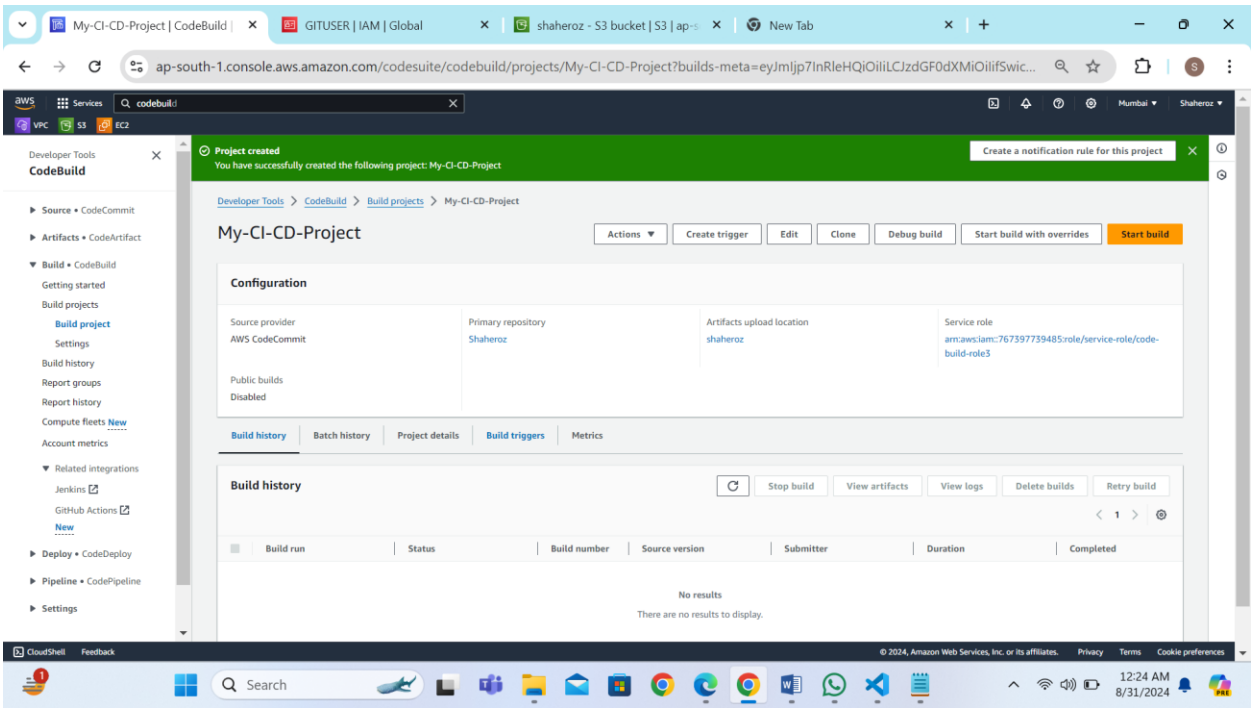
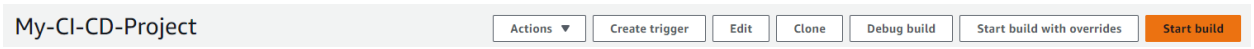
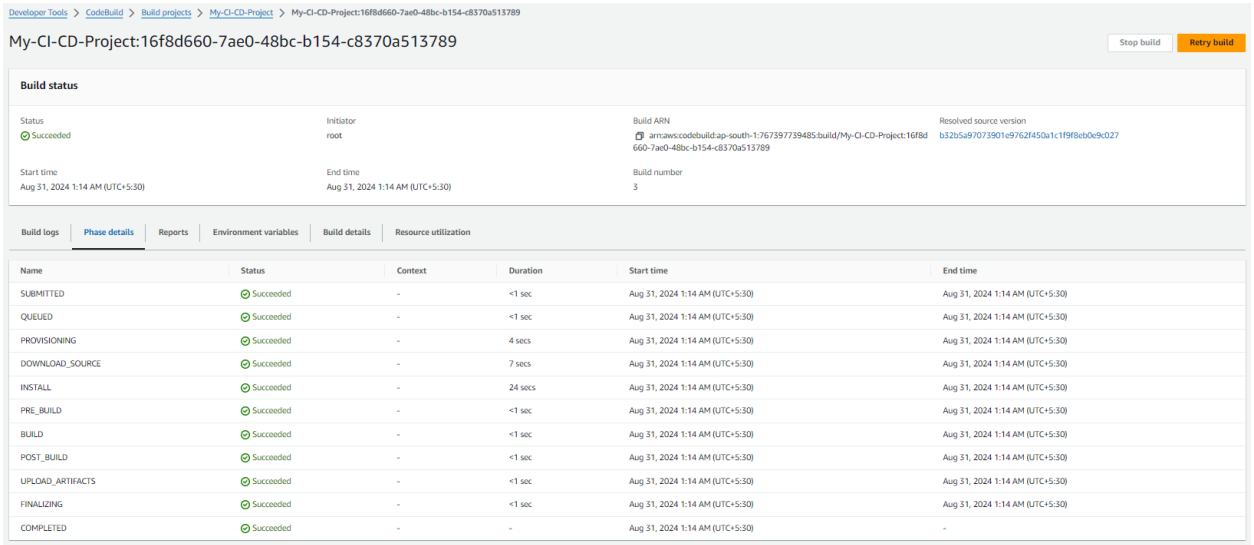
Now the code build is ready



Click on start build



All the phases of code build must be succesfull



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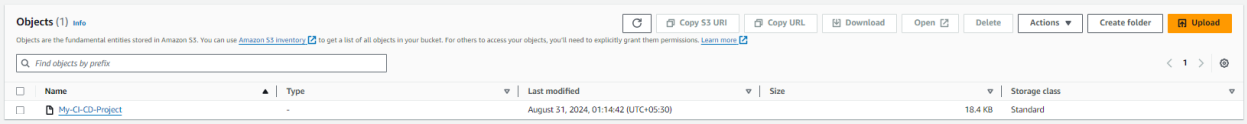
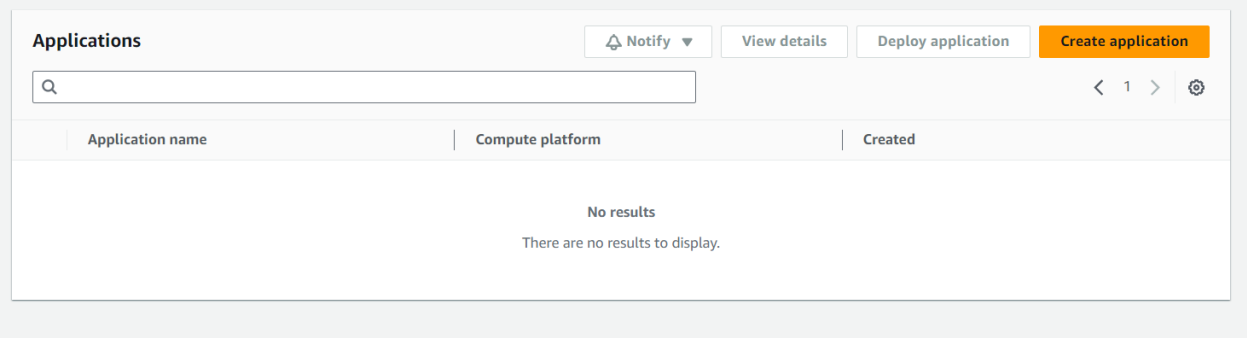
Now the artifact file is stord in s3 bucket



Set Up AWS CodeDeploy:



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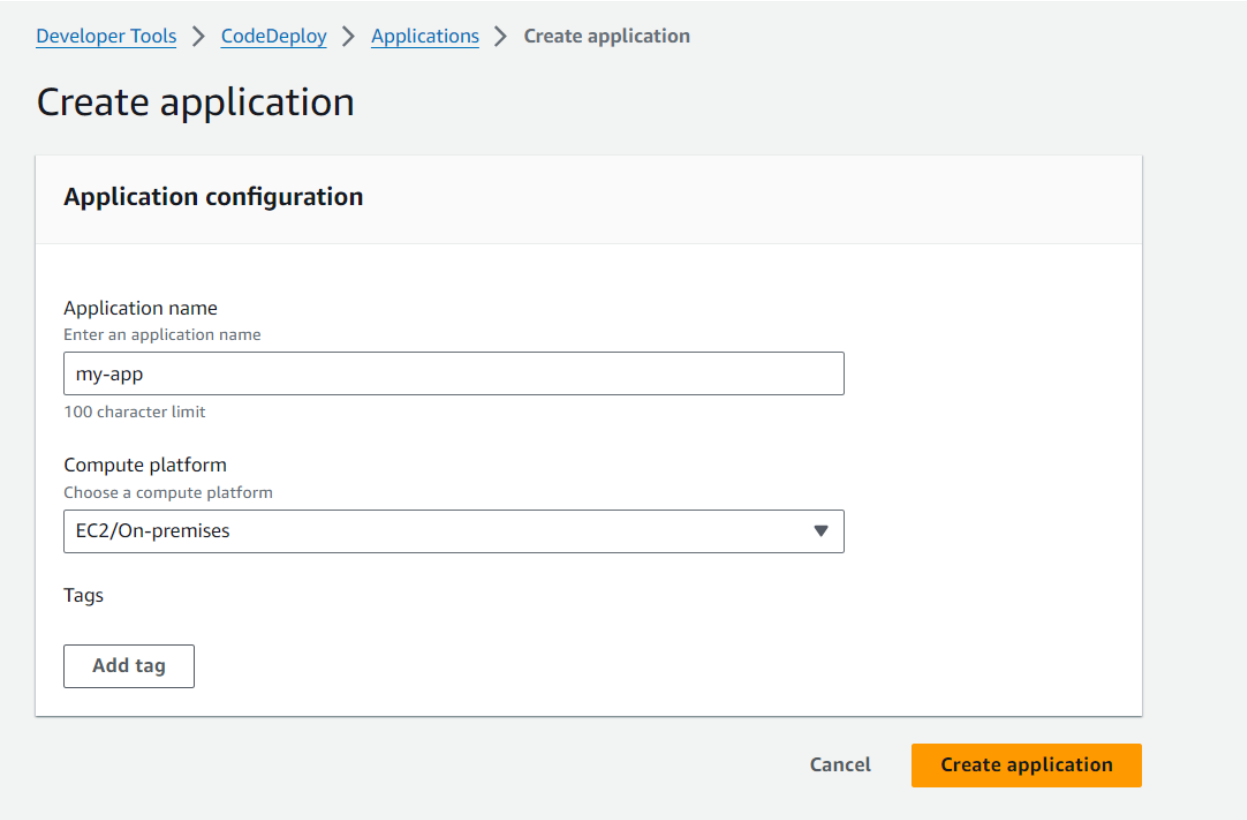
Create an Application in CodeDeploy:

- Go to the AWS Management Console and open **CodeDeploy**.
- Click **Create application**.
- Enter an application name (e.g., `MyAppDeploy`).
- Choose the **Compute platform** (e.g., EC2/On-premises).



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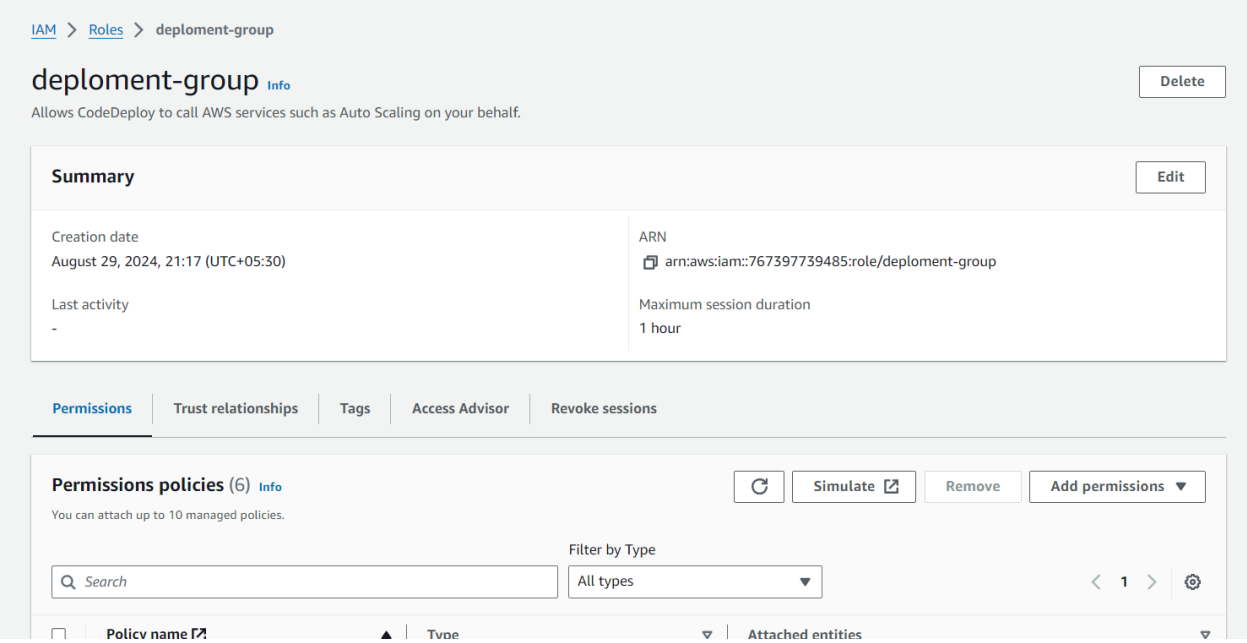
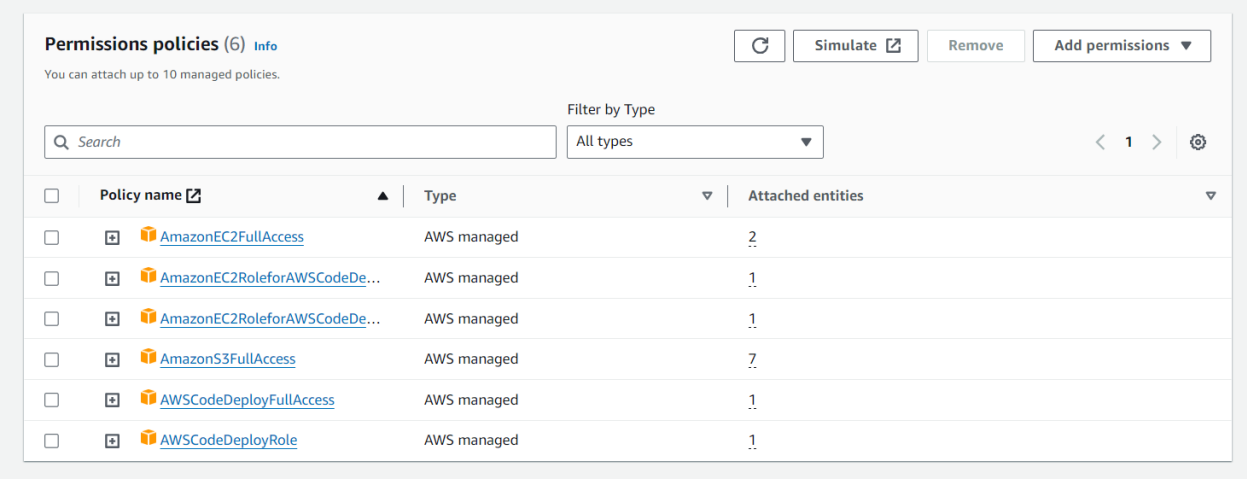
Create IAM role deployment group

Aws service>codedeploy



Attach these policies



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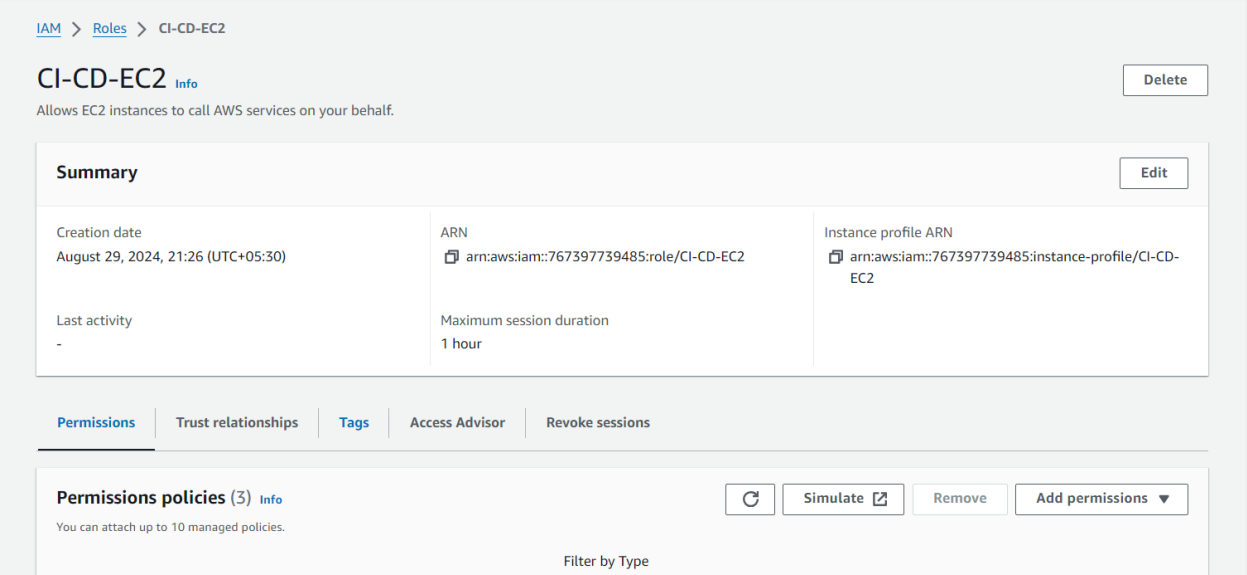
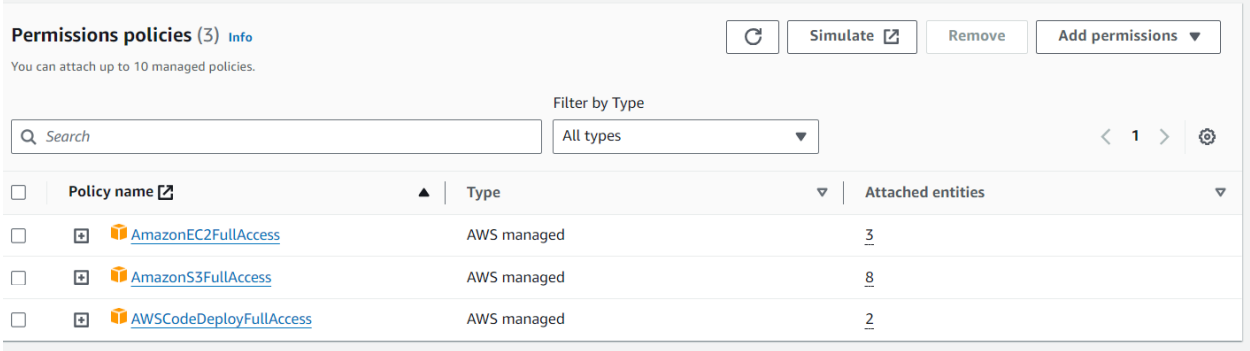
Create IAM role for EC2 (server)

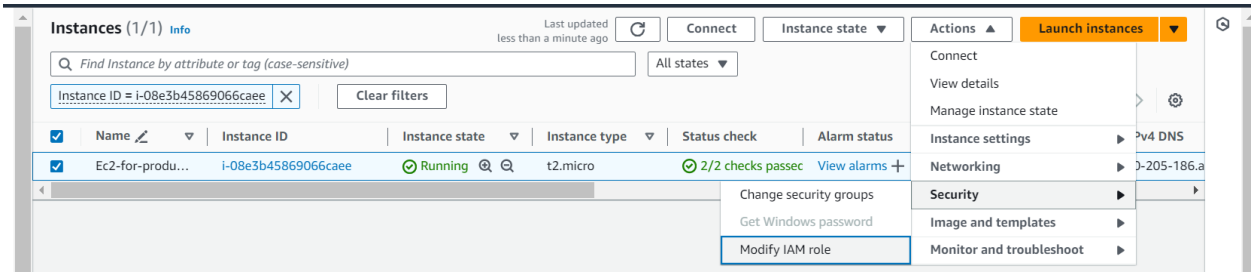
Aws service > EC2



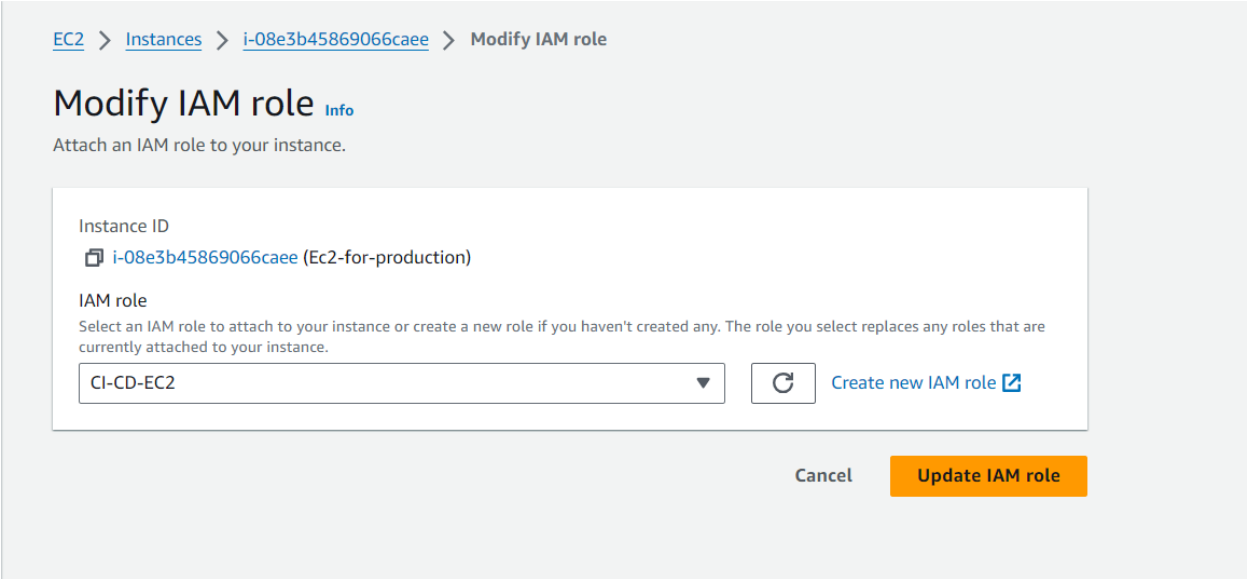
Attach these polices



Lauch a ec2 instace Ubuntu 22.04 (Allow SSH, HTTP AND HTTPS)



And update the IAM role



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Connect the ec2

And create a file with .sh extension

Paste the below content

#!/bin/bash

This installs the CodeDeploy agent and its prerequisites on Ubuntu 22.04.

sudo apt-get update

sudo apt-get install ruby-full ruby-webrick wget -y

cd /tmp

wget https://aws-codedeploy-ap-southeast-1.s3.ap-southeast-1.amazonaws.com/releases/codedeploy-agent_1.3.2-1902_all.deb

mkdir codedeploy-agent_1.3.2-1902_ubuntu22

dpkg-deb -R codedeploy-agent_1.3.2-1902_all.deb codedeploy-agent_1.3.2-1902_ubuntu22

sed 's/Depends:.*/Depends:ruby3.0/' -i ./codedeploy-agent_1.3.2-1902_ubuntu22/DEBIAN/control

dpkg-deb -b codedeploy-agent_1.3.2-1902_ubuntu22/

sudo dpkg -i codedeploy-agent_1.3.2-1902_ubuntu22.deb

systemctl list-units --type=service | grep codedeploy

sudo service codedeploy-agent status

```
root@ip-172-31-46-226:/home/ubuntu# vi install.sh

root@ip-172-31-46-226:/home/ubuntu# cat install.sh
#!/bin/bash
# This installs the CodeDeploy agent and its prerequisites on Ubuntu 22.04.
sudo apt-get update
sudo apt-get install ruby-full ruby-webrick wget -y
cd /tmp
wget https://aws-codedeploy-ap-southeast-1.s3.ap-southeast-1.amazonaws.com/releases/codedeploy-agent_1.3.2-1902_all.deb
mkdir codedeploy-agent_1.3.2-1902_ubuntu22
dpkg-deb -R codedeploy-agent_1.3.2-1902_all.deb codedeploy-agent_1.3.2-1902_ubuntu22
sed 's/Depends:.*/Depends:ruby3.0/' -i ./codedeploy-agent_1.3.2-1902_ubuntu22/DEBIAN/control
dpkg-deb -b codedeploy-agent_1.3.2-1902_ubuntu22/
sudo dpkg -i codedeploy-agent_1.3.2-1902_ubuntu22.deb
systemctl list-units --type=service | grep codedeploy
sudo service codedeploy-agent status
root@ip-172-31-46-226:/home/ubuntu# bash install.sh
```

- Run that file” bash install.sh”

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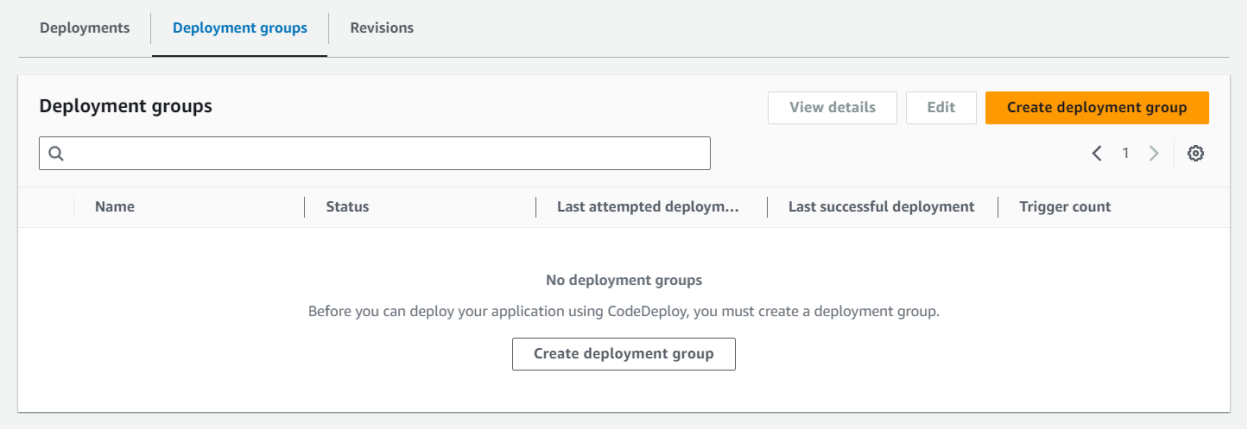
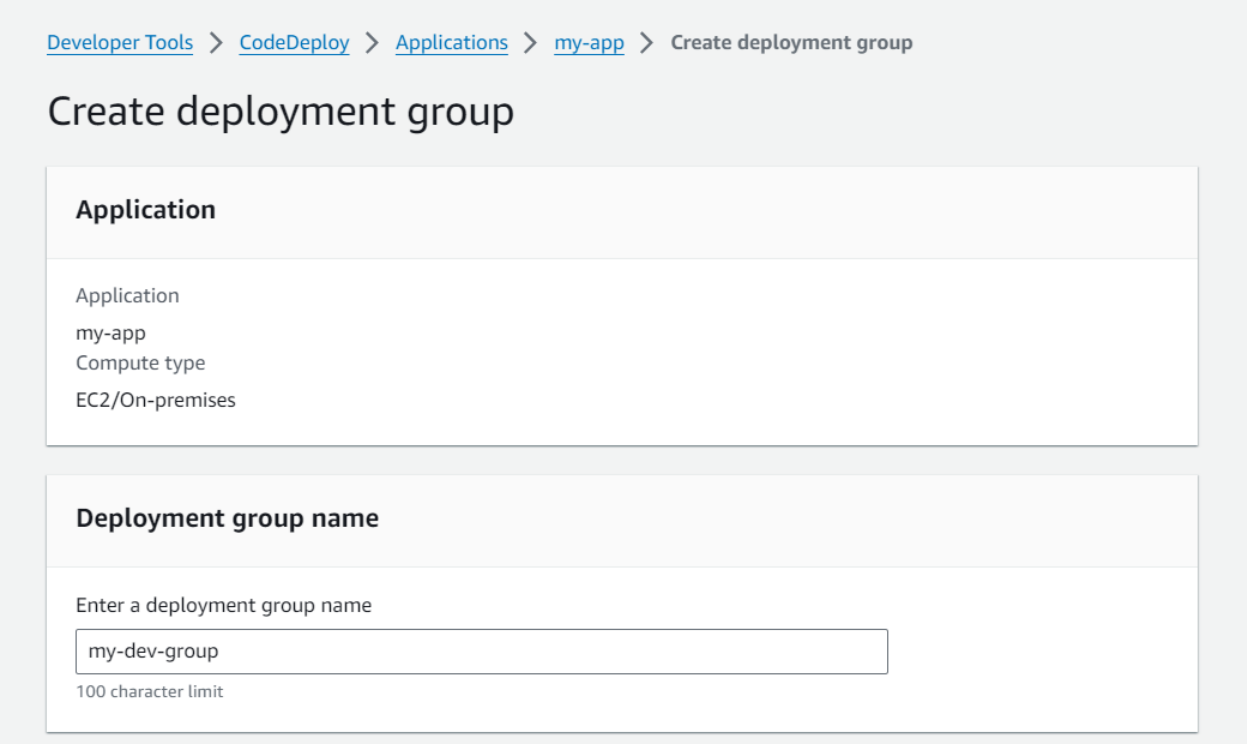
Create a Deployment Group:

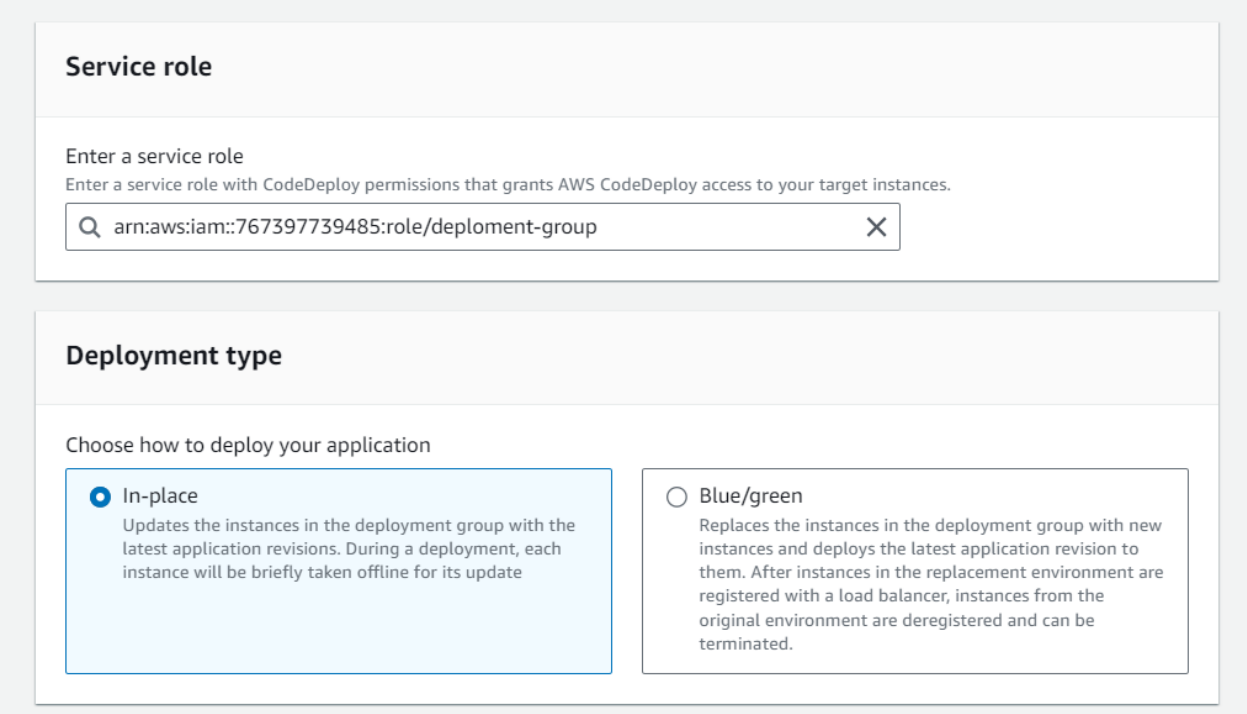
- Under your newly created application, click **Create deployment group**.



Enter a deployment group name (e.g., `MyAppDeployGroup`).

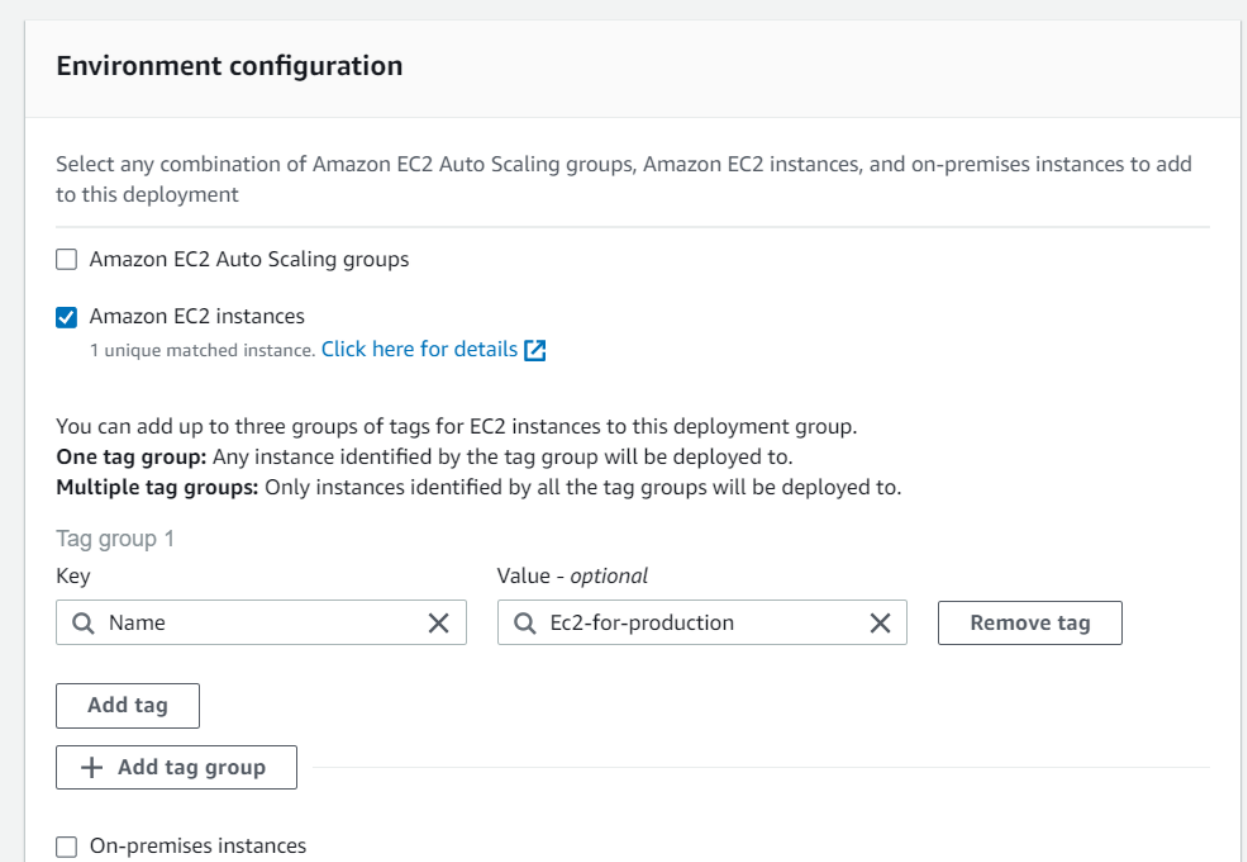


Service Role: Choose IAM role that created for deployment group



For EC2, specify the target EC2 instances by tags

Click **Create deployment group**.



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Create a Deployment Configuration File

Create a folder name script inside colone repository

And make two in script folder name install_nginx.sh and start_nginx.sh

And create a appspec.yml file in direct colone repository

Content of script folder:

under scripts

start_nginx.sh

```
#!/bin/bash

sudo service nginx start
```

---

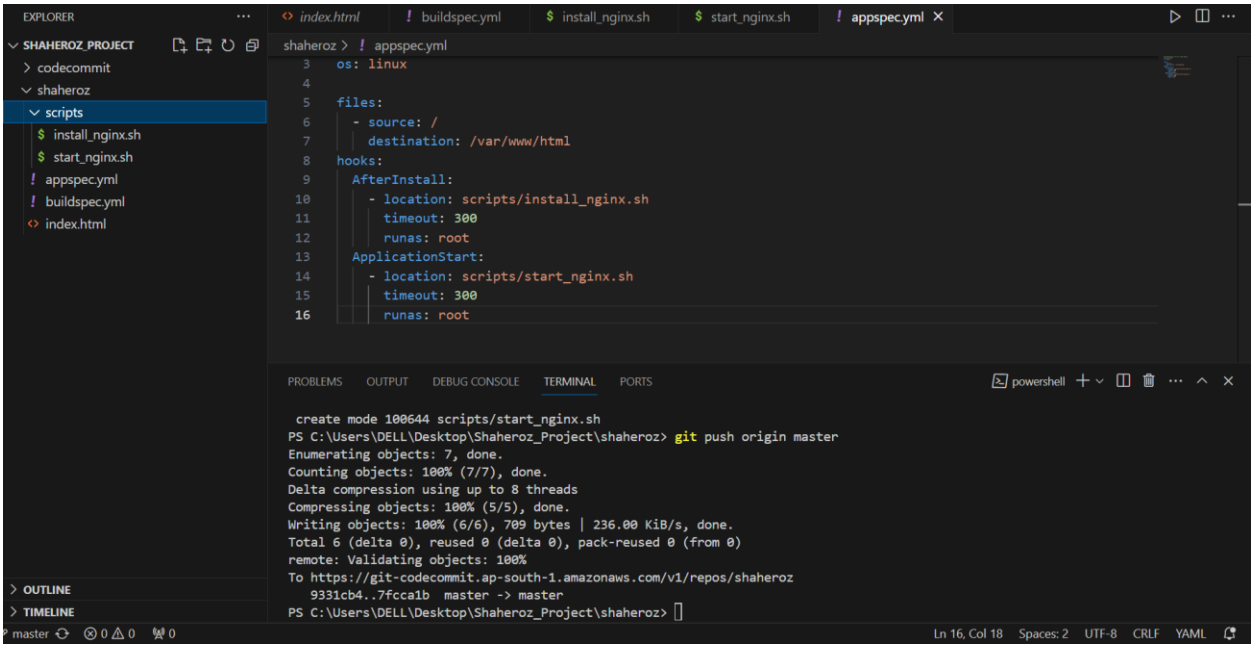
install_nginx.sh

```
#!/bin/bash

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

Content of appspec.yml file

```
#configuration file for code deploy
version: 0.0
os: linux

files:
  - source: /
    destination: /var/www/html
hooks:
  AfterInstall:
    - location: scripts/install_nginx.sh
      timeout: 300
```

```
    runas: root
ApplicationStart:
  - location: scripts/start_nginx.sh
    timeout: 300
    runas: root
```



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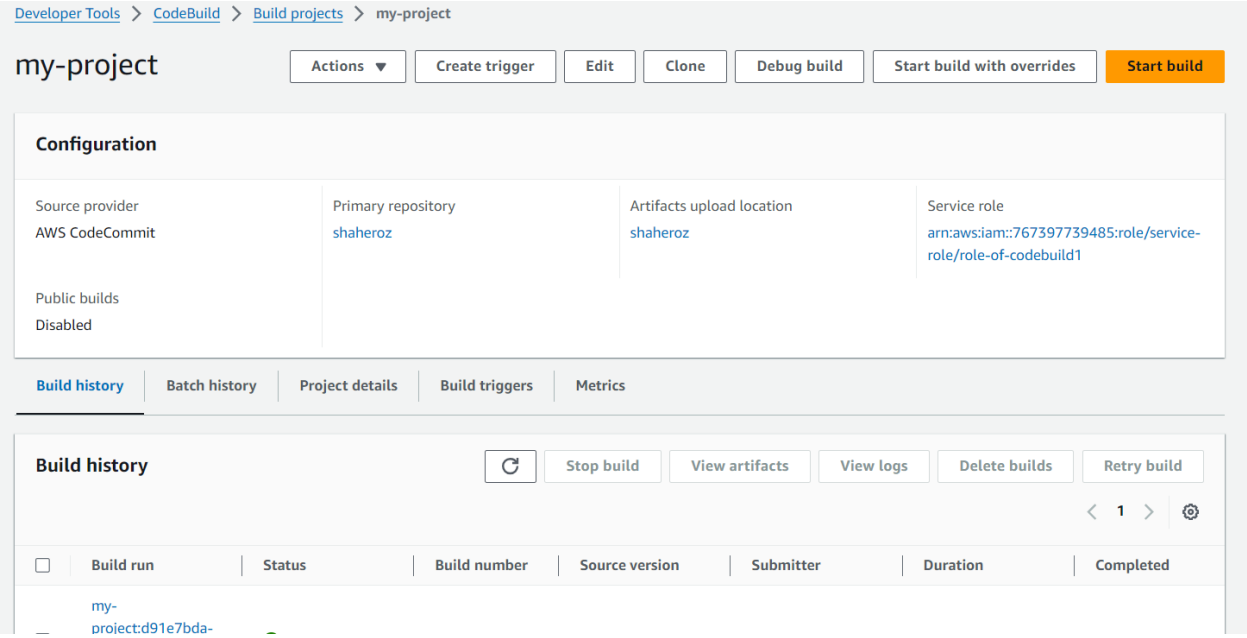
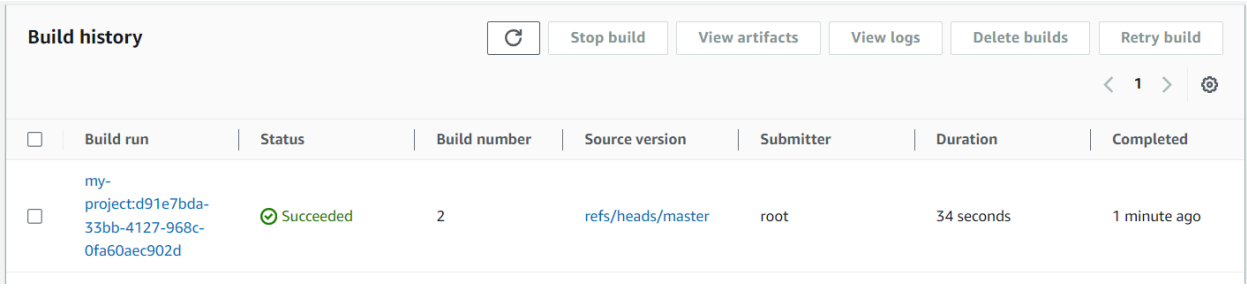
Now click on start build in codebuild>aplliaction

All the phases should be successfull





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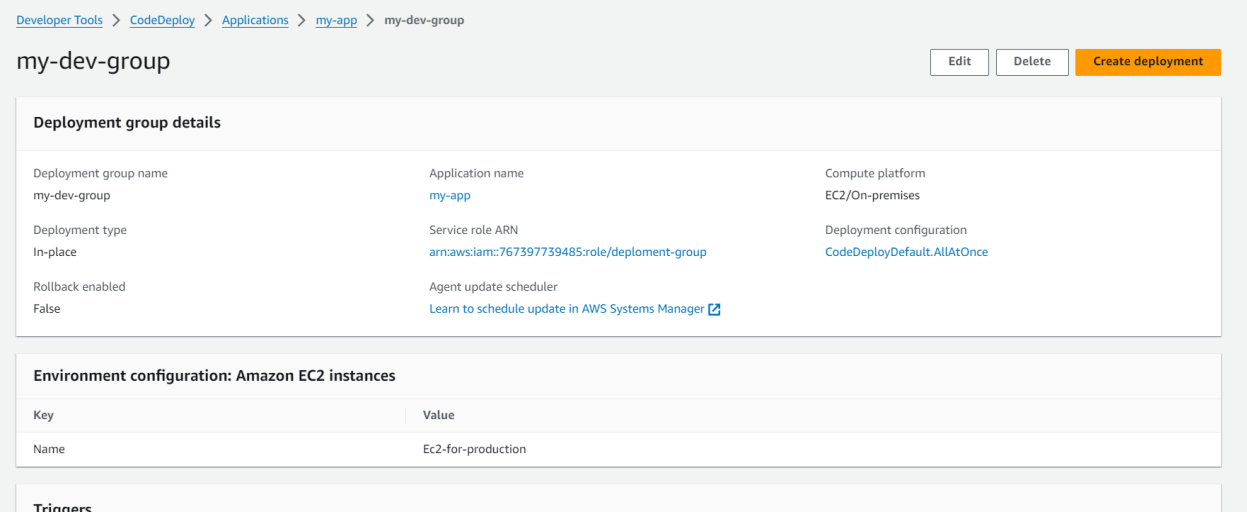
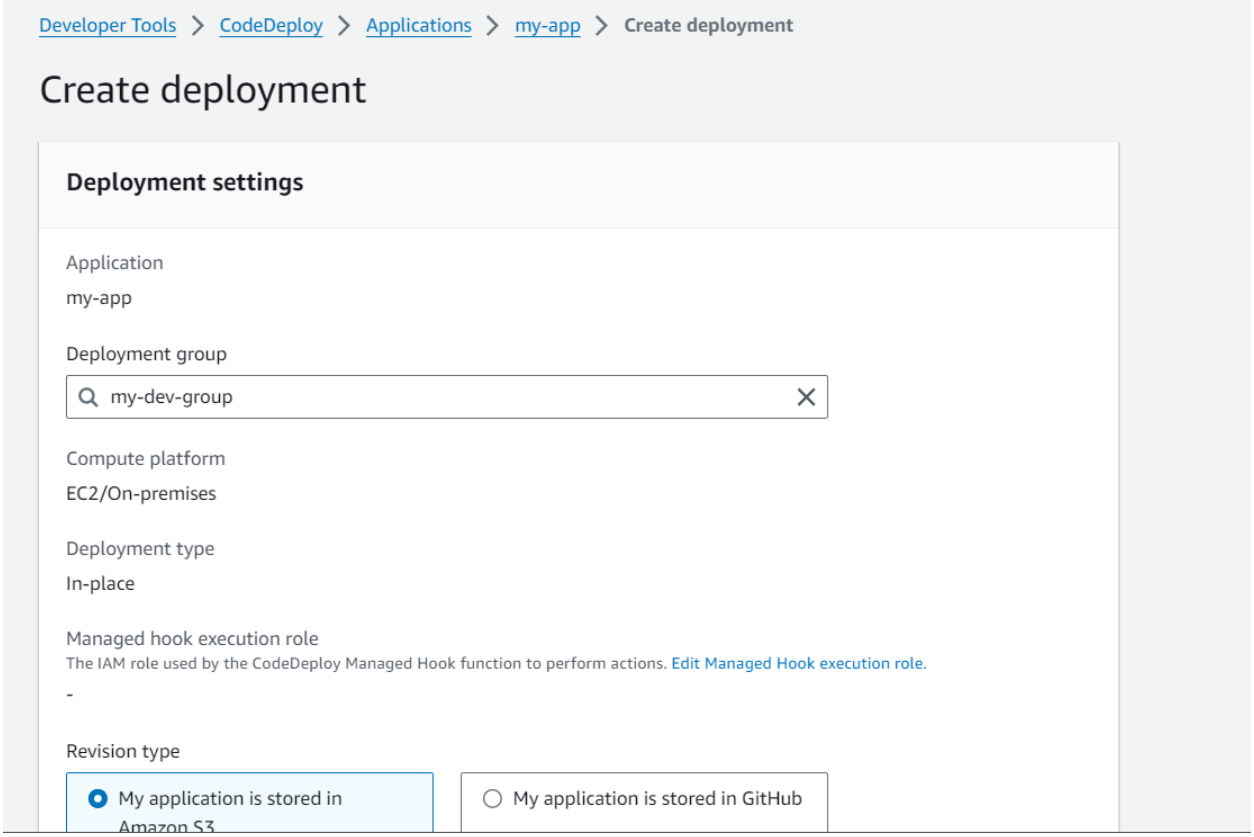
Create deployment inside the deployment group of codebuild application

Click on create deployment



Enter the for deployment

Choose s3 in revision type



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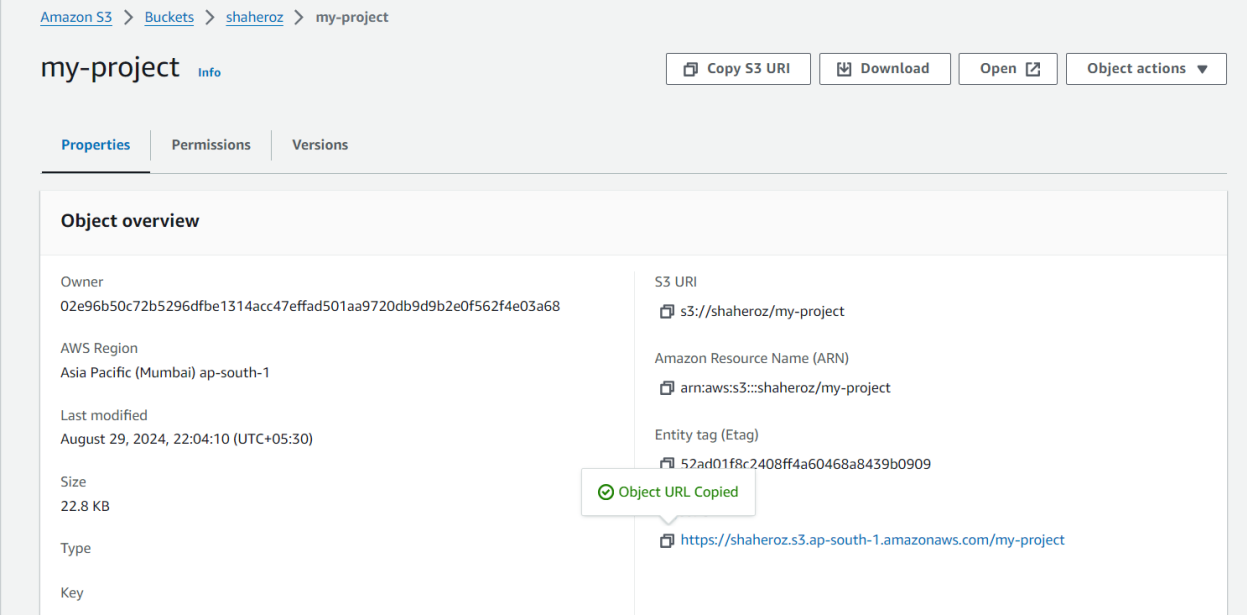
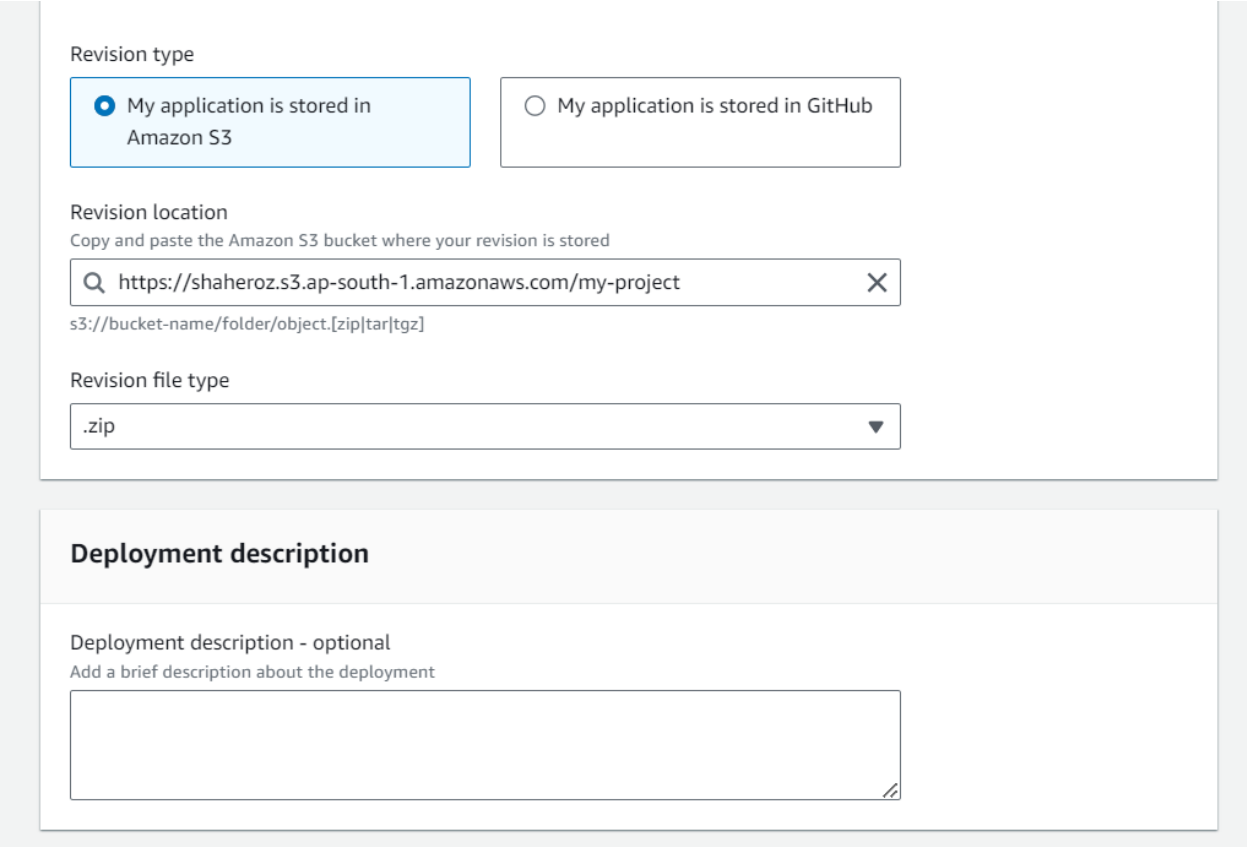
Copy the uri of artifact (object)



In revision location enter the uri of artifact

And chose file type .zip



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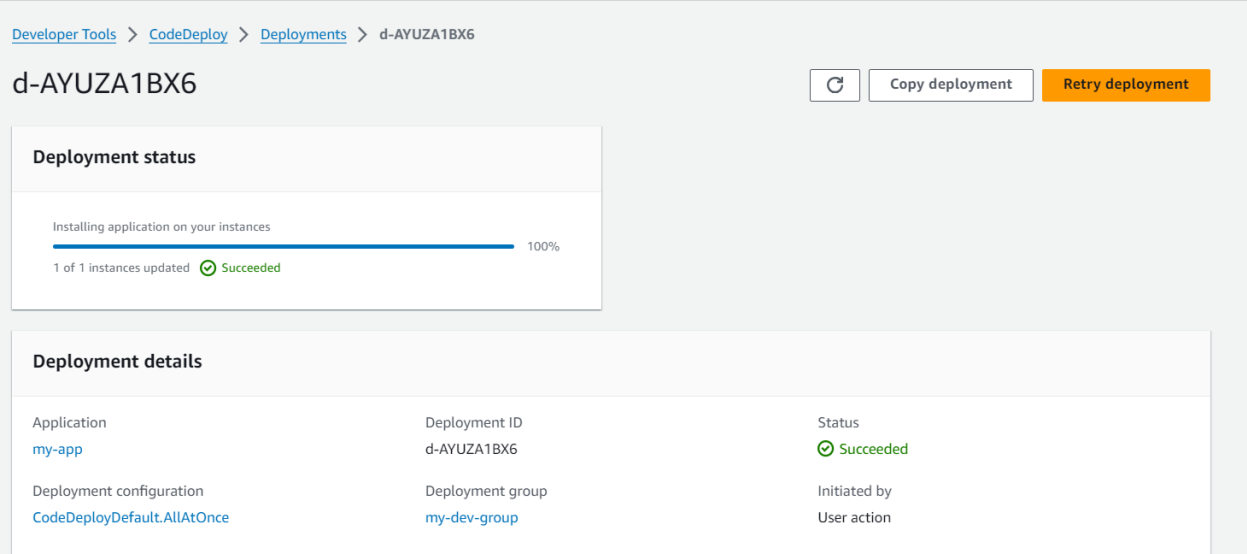
Deployment status should 1 of 1 updated



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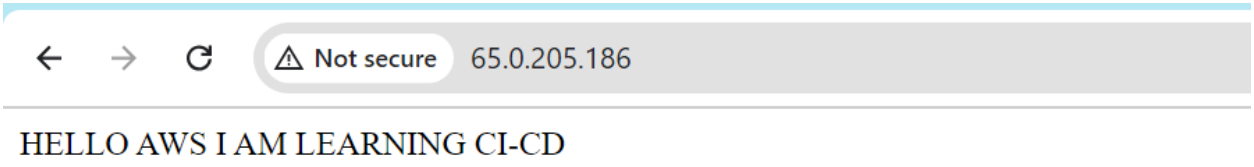
Now check with the public of ec2 that you application deployed



HELLO AWS I AM LEARNING CI-CD

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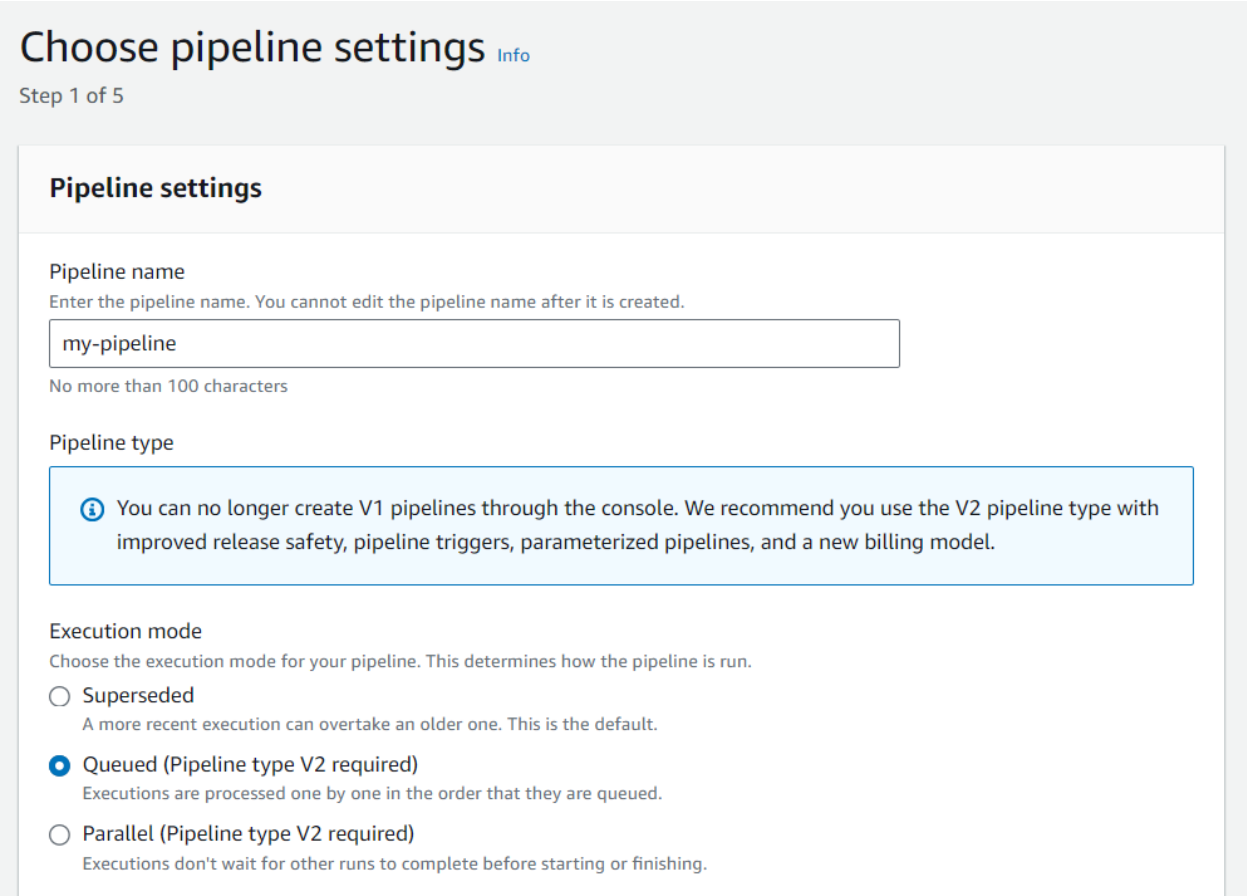
Create a CI/CD Pipeline in AWS CodePipeline

1. **Create a New Pipeline**:
    - Go to the AWS Management Console and open **CodePipeline**.
    - Click **Create pipeline**.
    - Enter a pipeline name (e.g., `MyAppPipeline`).
    - Select execution mode (queued (pipeline type v2 required))



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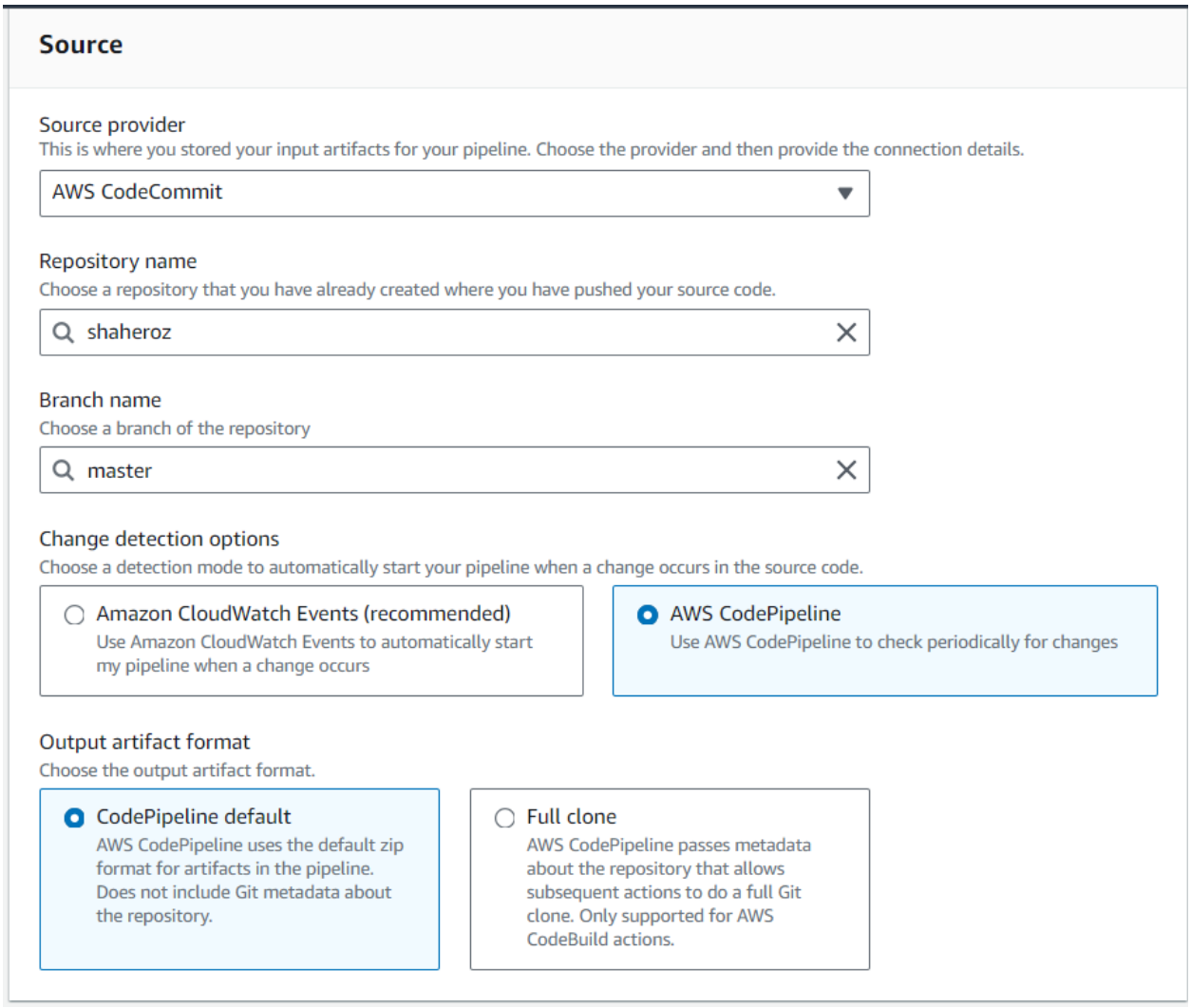
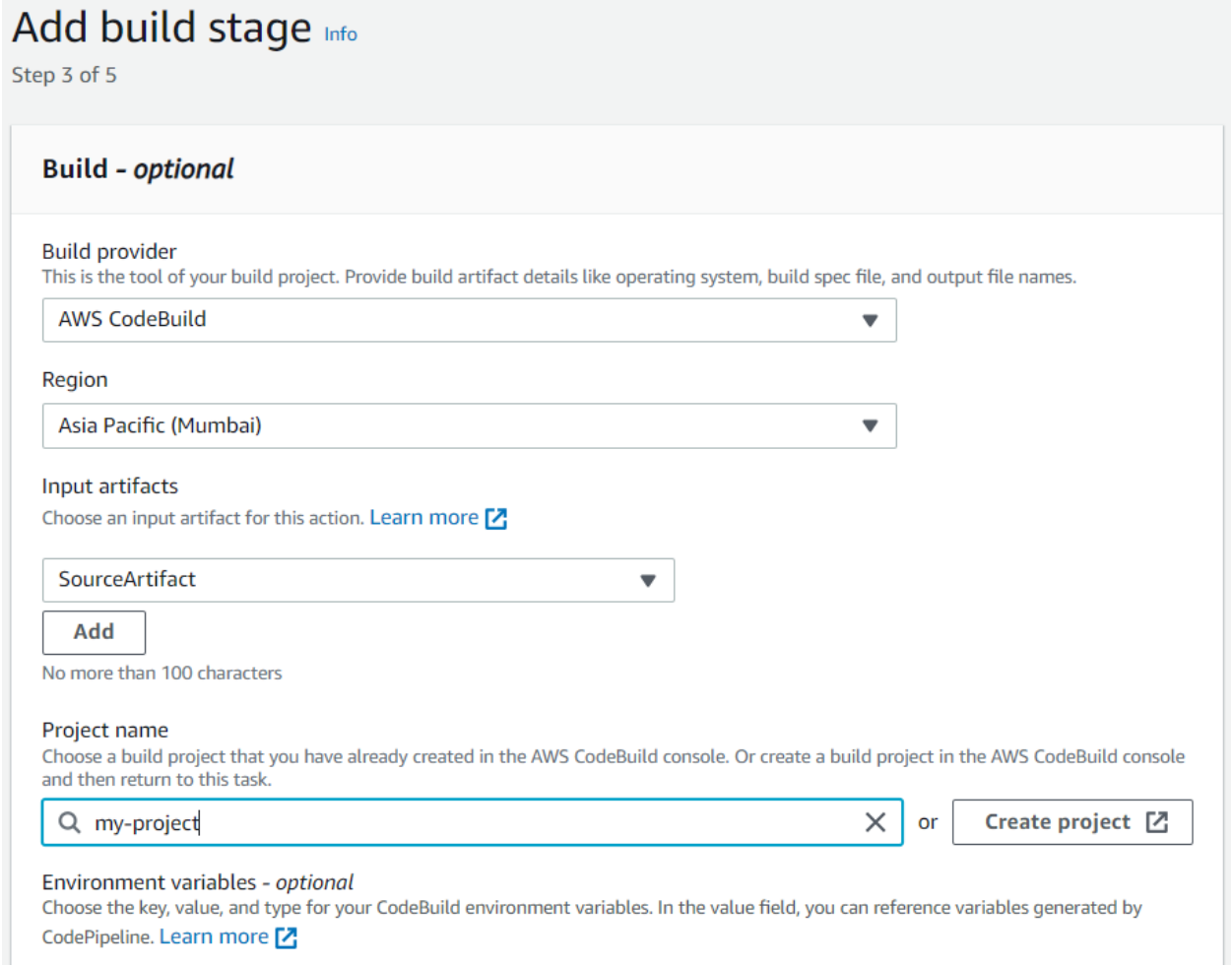
Source Stage:

- Select the source provider CodeCommit
- Choose the repository and branch.
- Detection option AWS CodePipeline



Build Stage:

- Select **AWS CodeBuild**.
- Input artifact (source artifact)
- Choose the build project created earlier (`MyAppBuild`)



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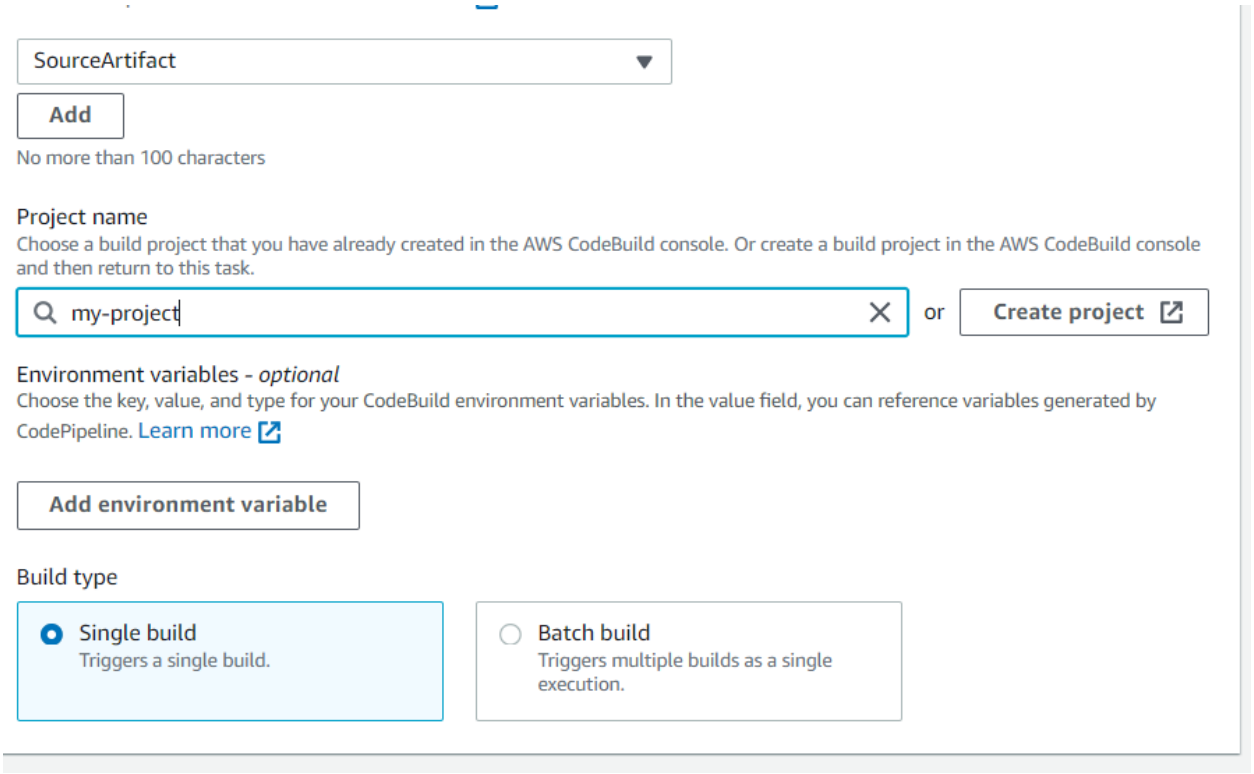
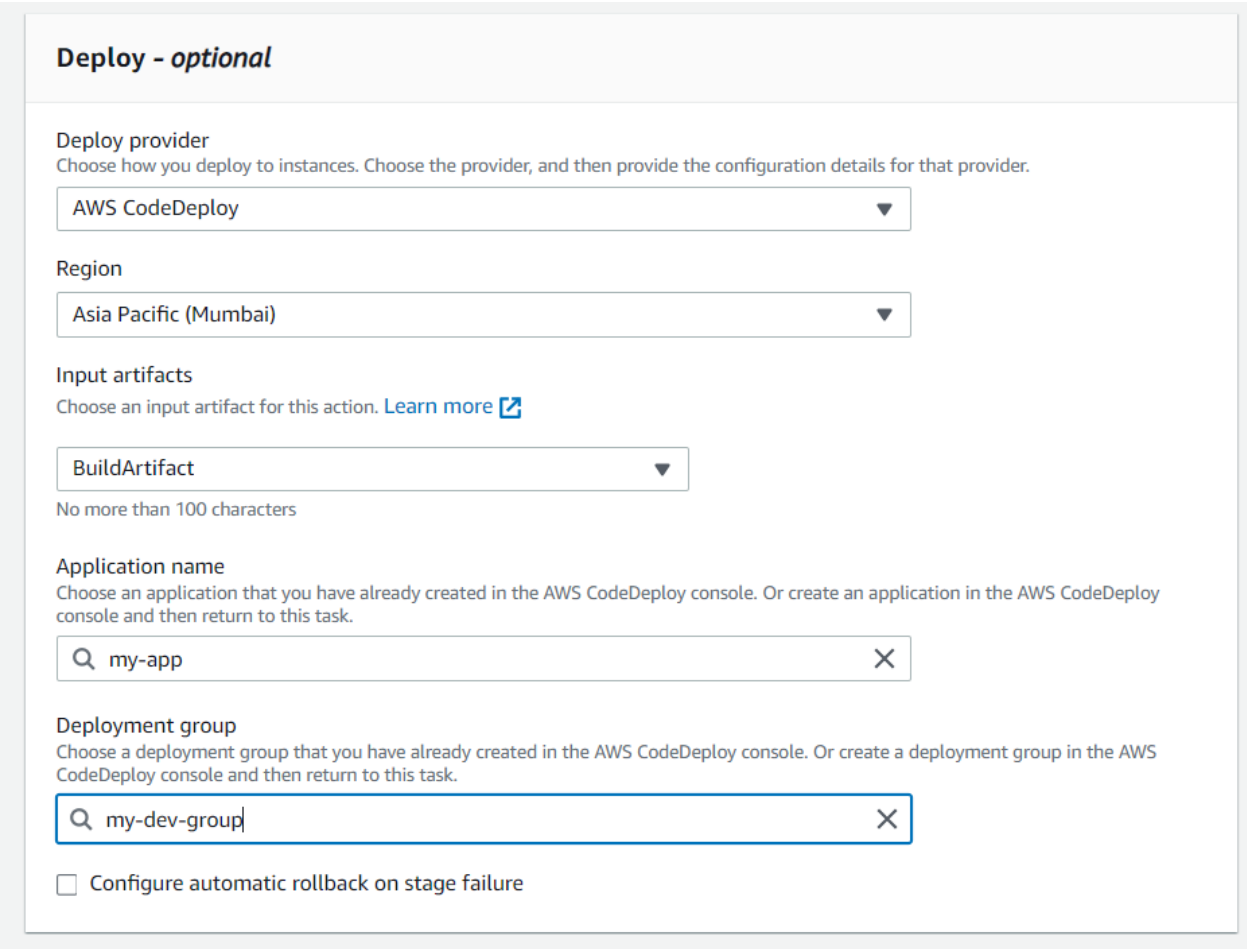
Build type (Single build)

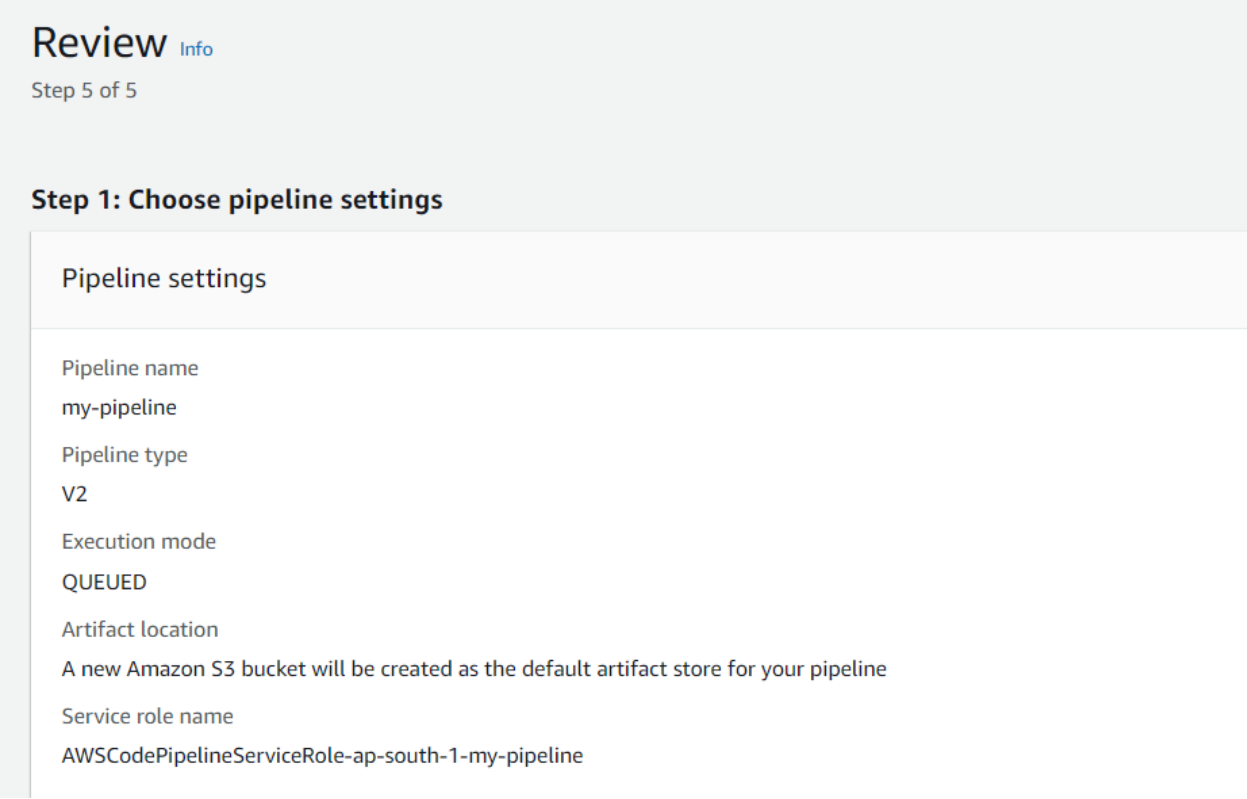


Deploy Stage:

- If using CodeDeploy, select **AWS CodeDeploy**.
- Choose the application and deployment group created earlier

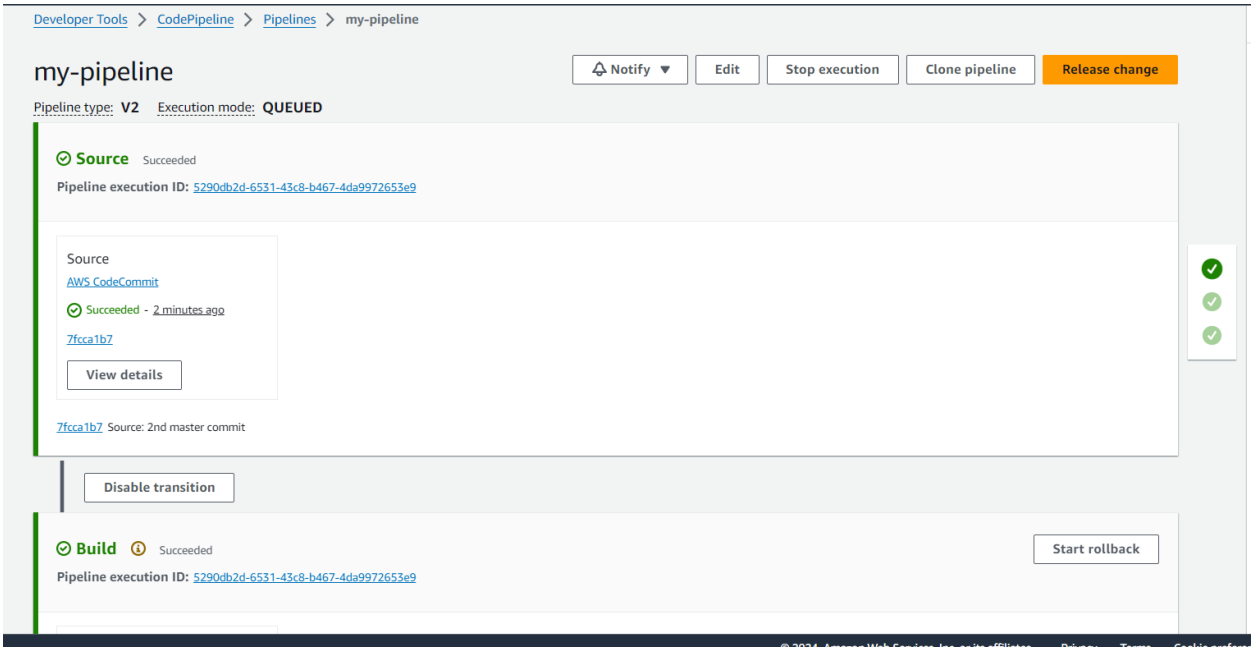


Click **Next** and then **Create pipeline**.



Now the pipeline stages in progress

After succeesfull of all stages.



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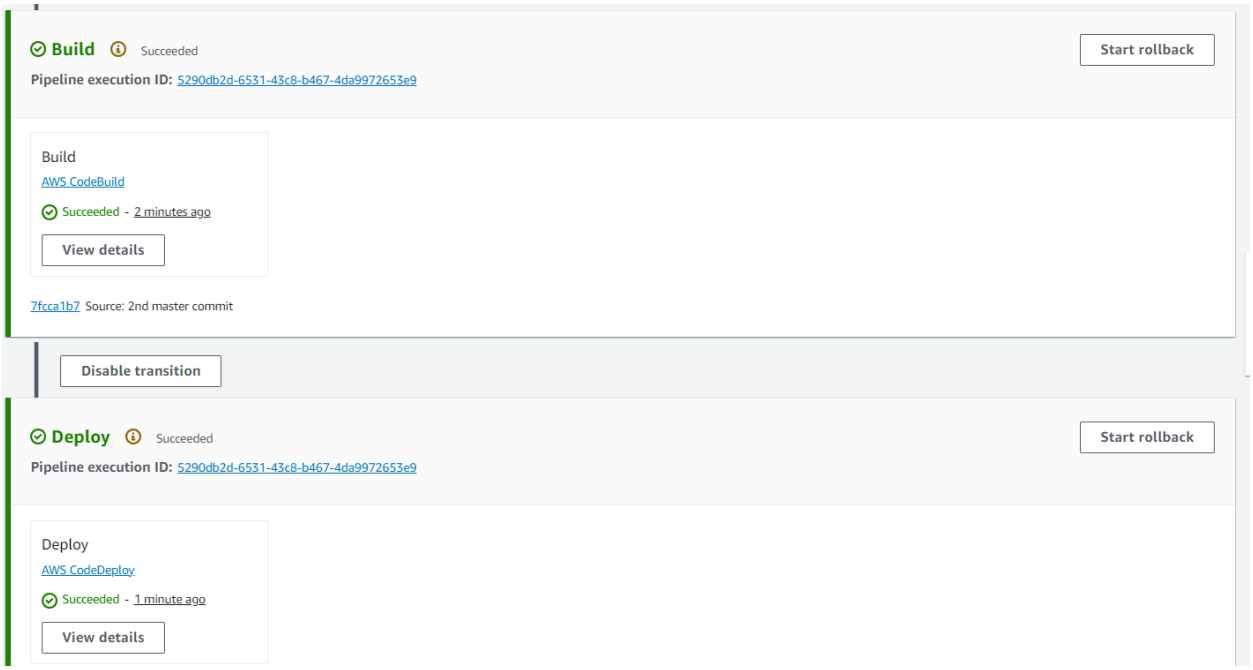

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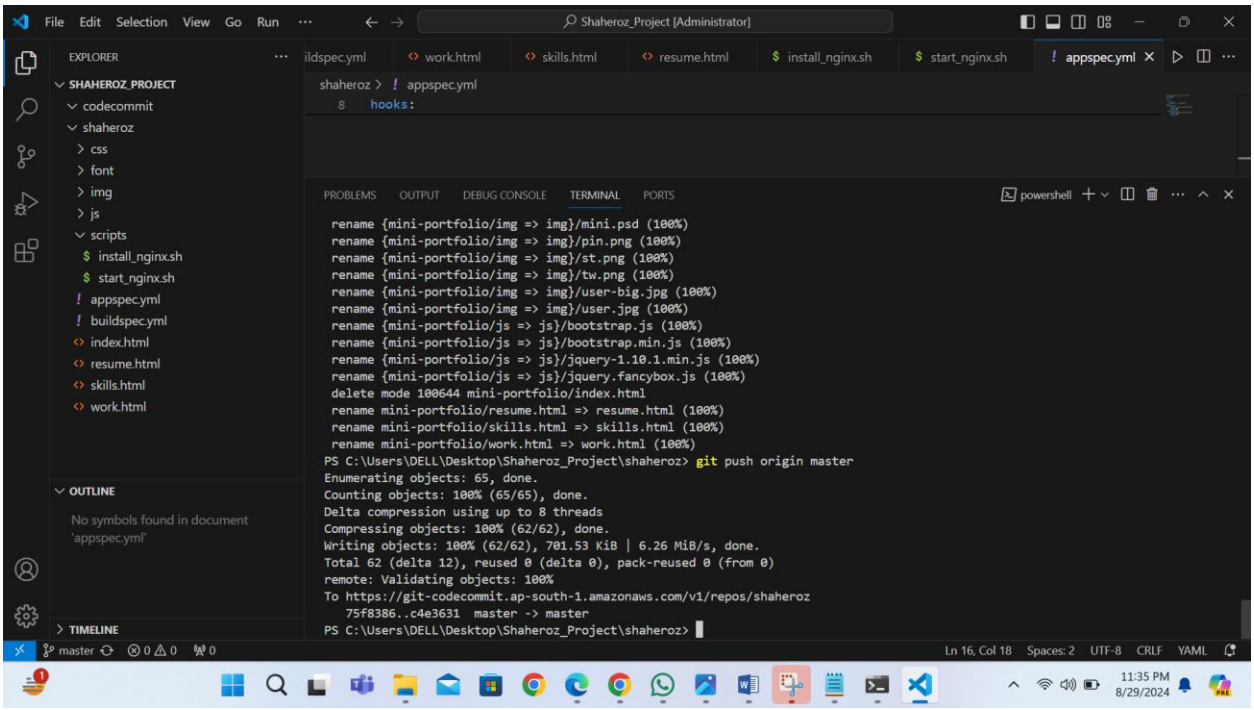
Test and Validate the Pipeline

1. **Make a Code Change in VS Code**:
    - Edit a file or make a code change in your project.
    - Commit and push the changes to your repository.



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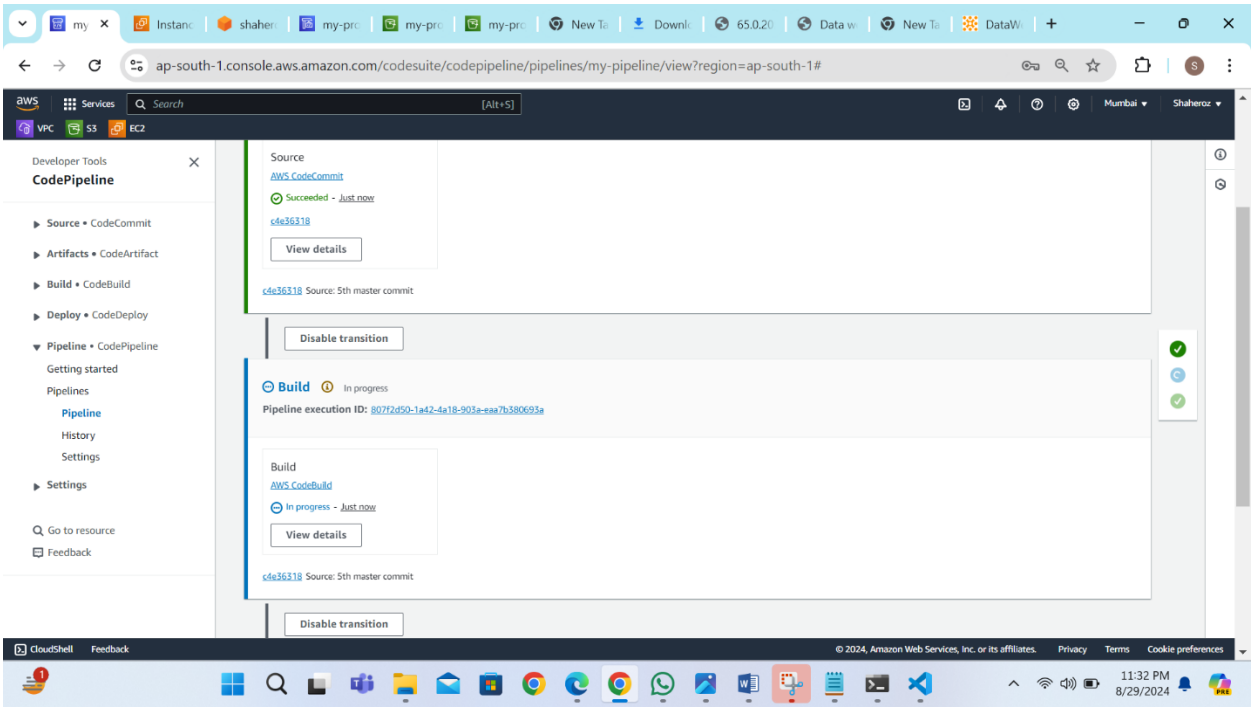
Monitor Pipeline Execution:

- Watch the pipeline execution in **AWS CodePipeline** from the AWS Management Console



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Ensure the entire CI/CD pipeline runs smoothly and deploys the changes to the production environment without errors.

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