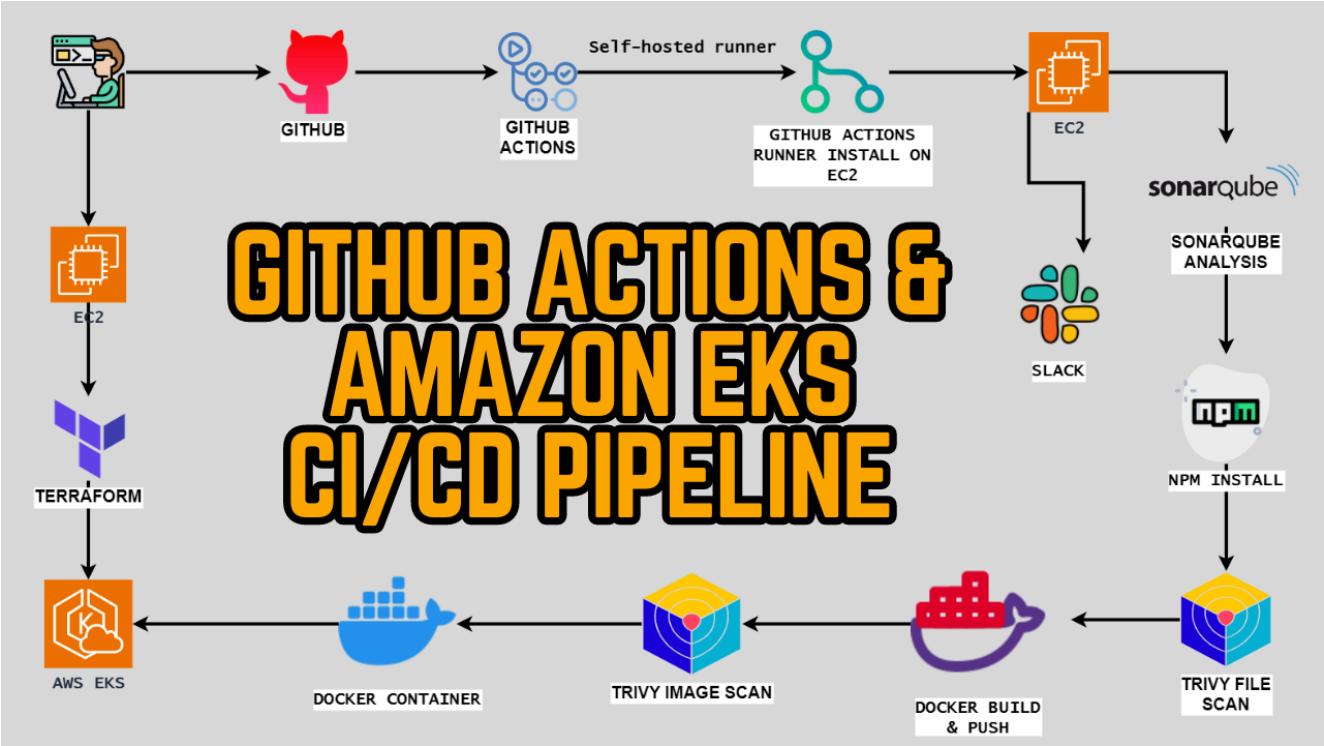
DevOps

GitHub Actions TIC-TAC TOE Game

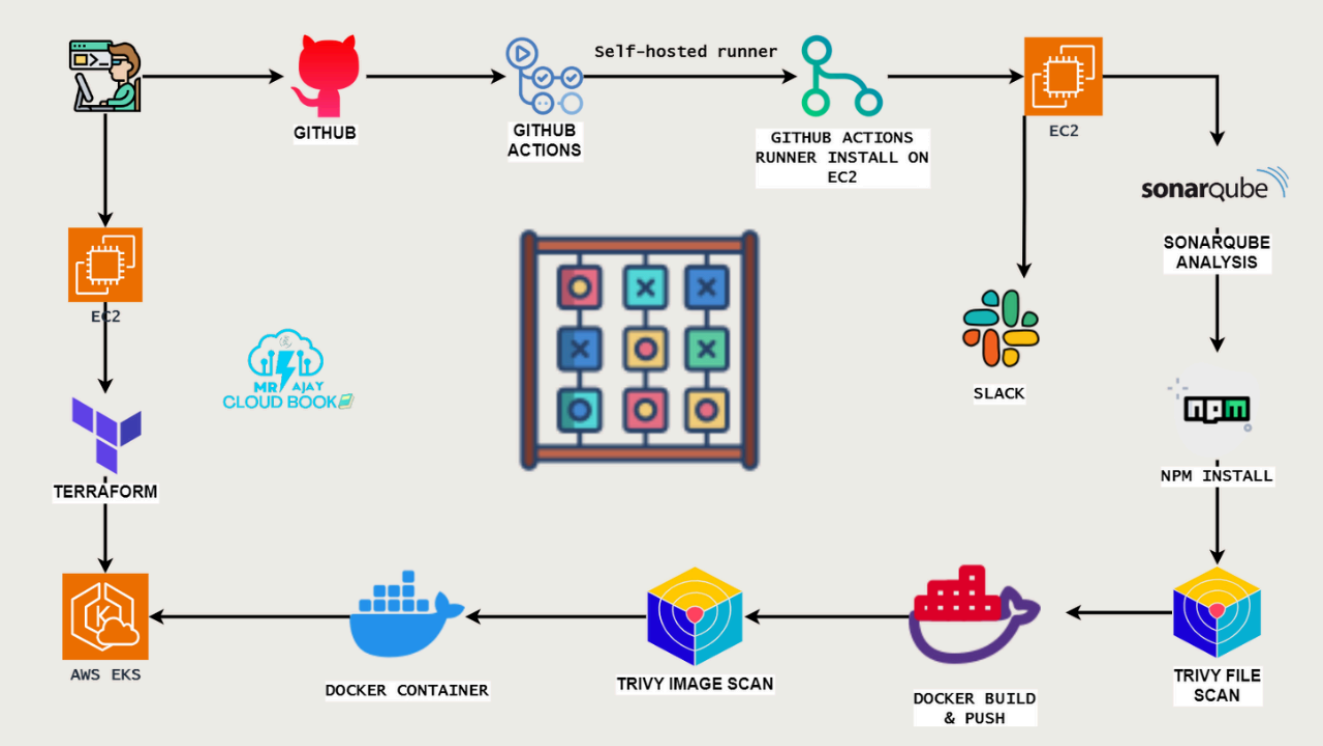
mrcloudbook.com · 8 January 2024



In today's fast-paced world of software development, automation is the name of the game. GitHub Actions is the ace up the sleeve of modern developers, enabling them to streamline their daily workflows in practical and impactful ways. In this article, we'll explore how GitHub Actions is making a real difference in real-life scenarios.

From Continuous Integration (CI) and Continuous Deployment (CD) to code quality assurance and security scanning, GitHub Actions brings automation to every

aspect of the development process. With custom workflows, enhanced collaboration, and release management, this tool empowers developers to be more efficient, reliable, and productive. Discover how GitHub Actions is not just a concept but a transformative solution in the daily lives of developers.



GitHub: https://github.com/Aj7Ay/TIC-TAC-TOE.git

YouTube video for this project: youtu.be/FghkK2hFd1k

EKS Video: https://youtu.be/5-PZnYaoZUM

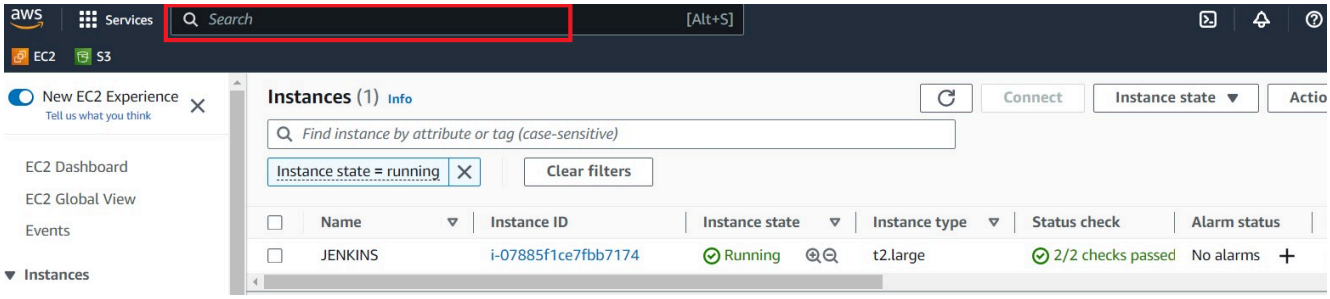
Contents [hide]

Step1A: Launch an Ec2 Instance

To launch an AWS EC2 instance with Ubuntu 22.04 using the AWS Management Console, sign in to your AWS account, access the EC2 dashboard, and click “Launch Instances.” In “Step 1,” select “Ubuntu 22.04” as the AMI, and in “Step 2,” choose “t2.medium” as the instance type. Configure the instance details, storage

Navigate to **AWS CONSOLE**

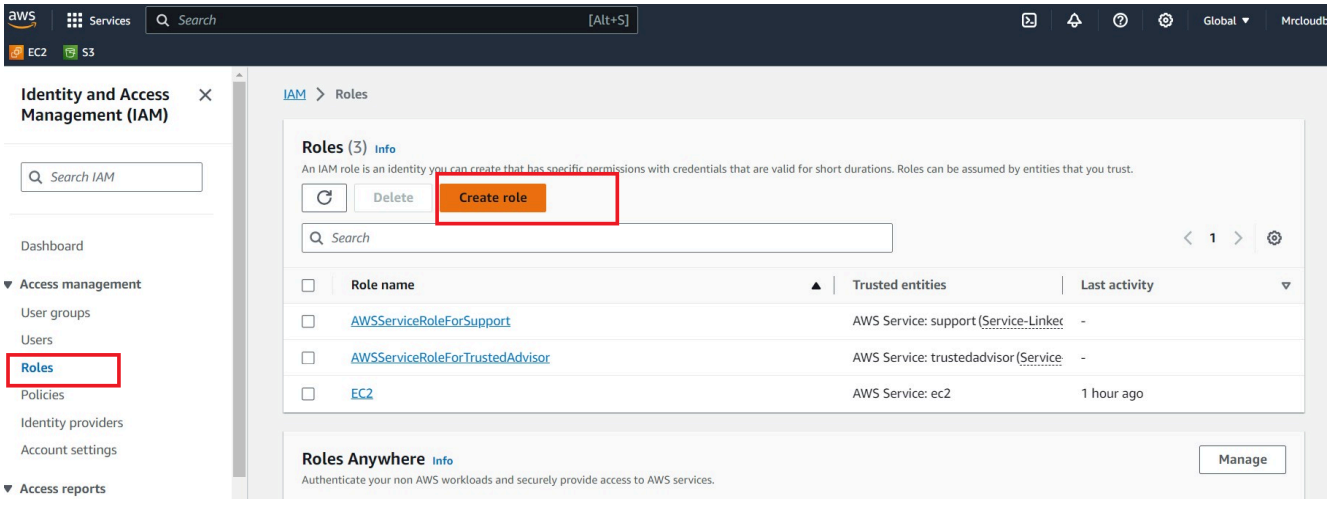
Click the “Search” field.



Type “IAM **enter**“

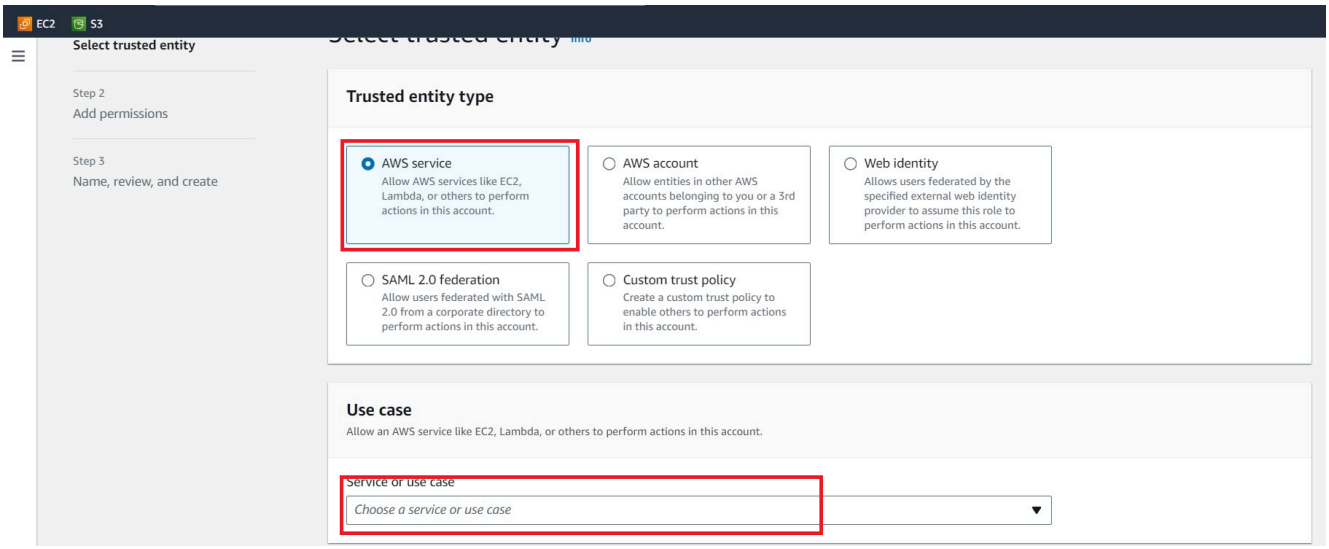
Click “Roles”

Click “Create role”



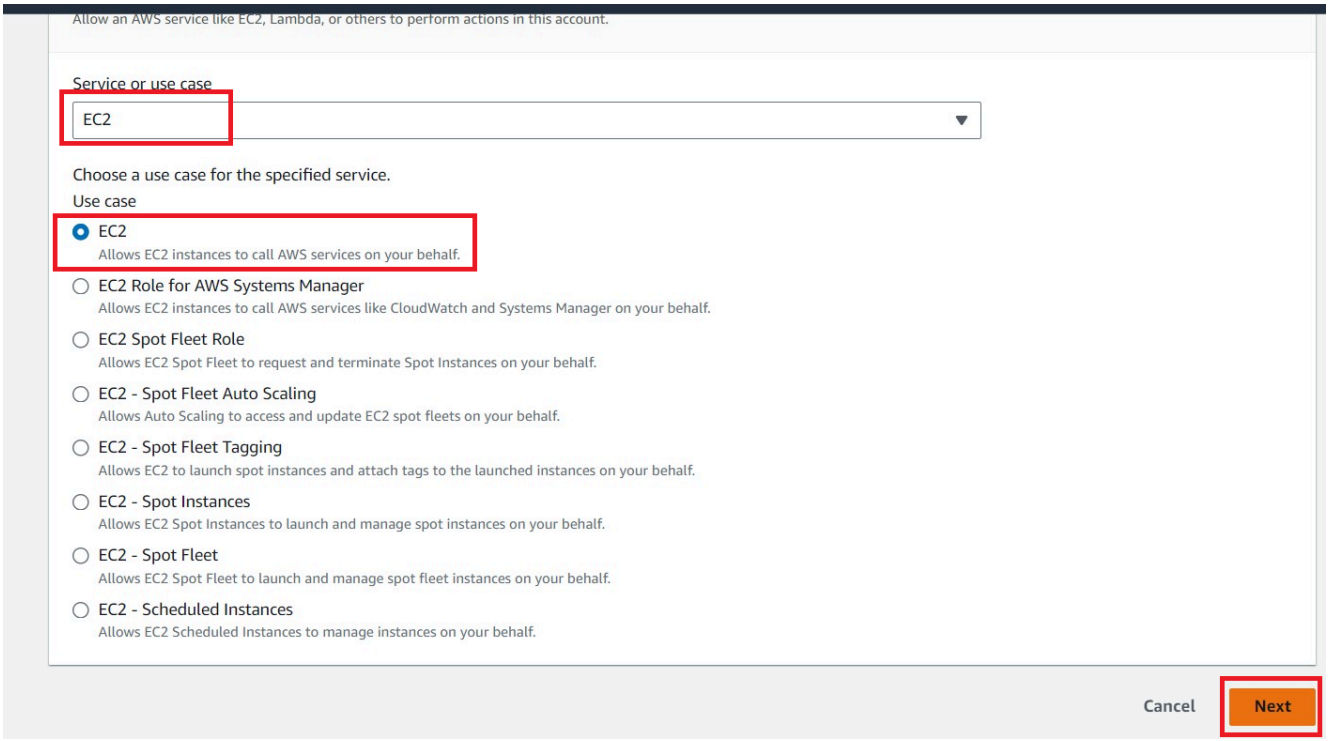
Click “AWS service”

Click “Choose a service or use case”



Click “EC2”

Click “Next”



Click the “Search” field.

Add permissions policies

Administrator Access (or) EC2 full access

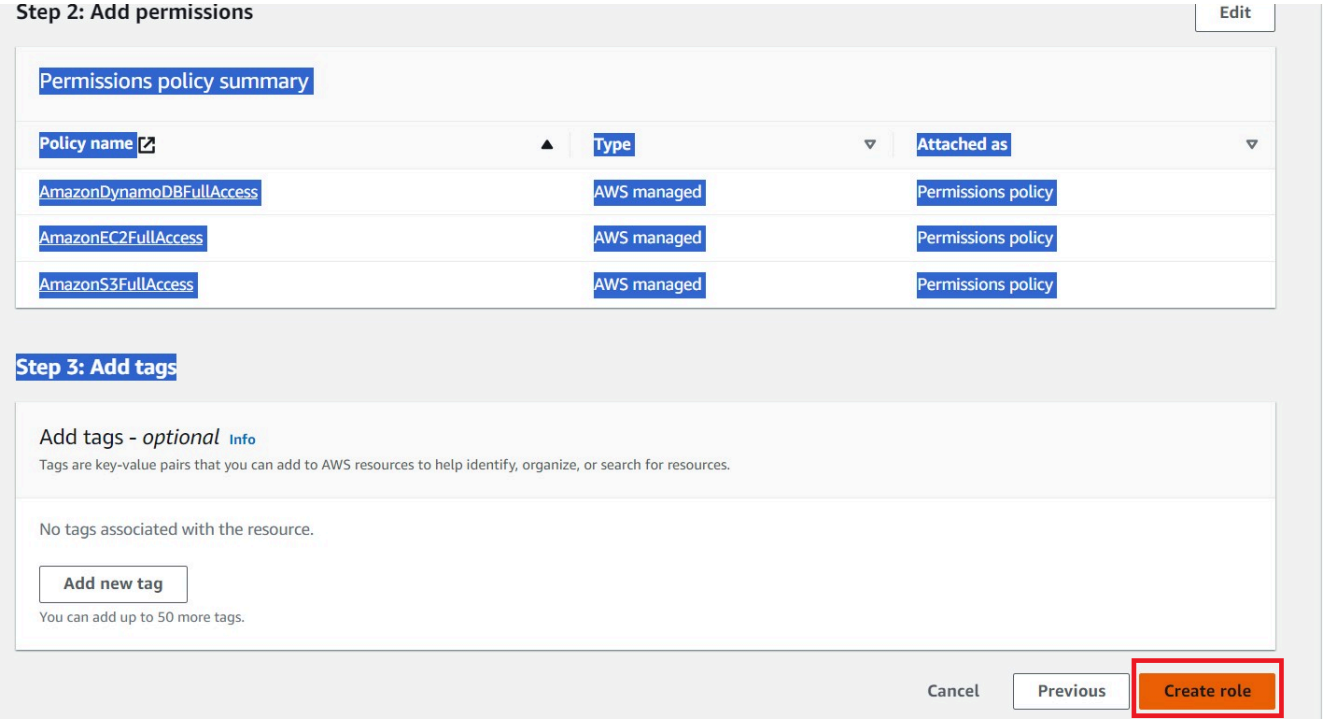
AmazonS3FullAccess and EKS Full access

click Next

Click the “Role name” field.

Type “Jenkins-cicd”

Click “Create role” (JUST SAMPLE IMAGE BELOW ONE)

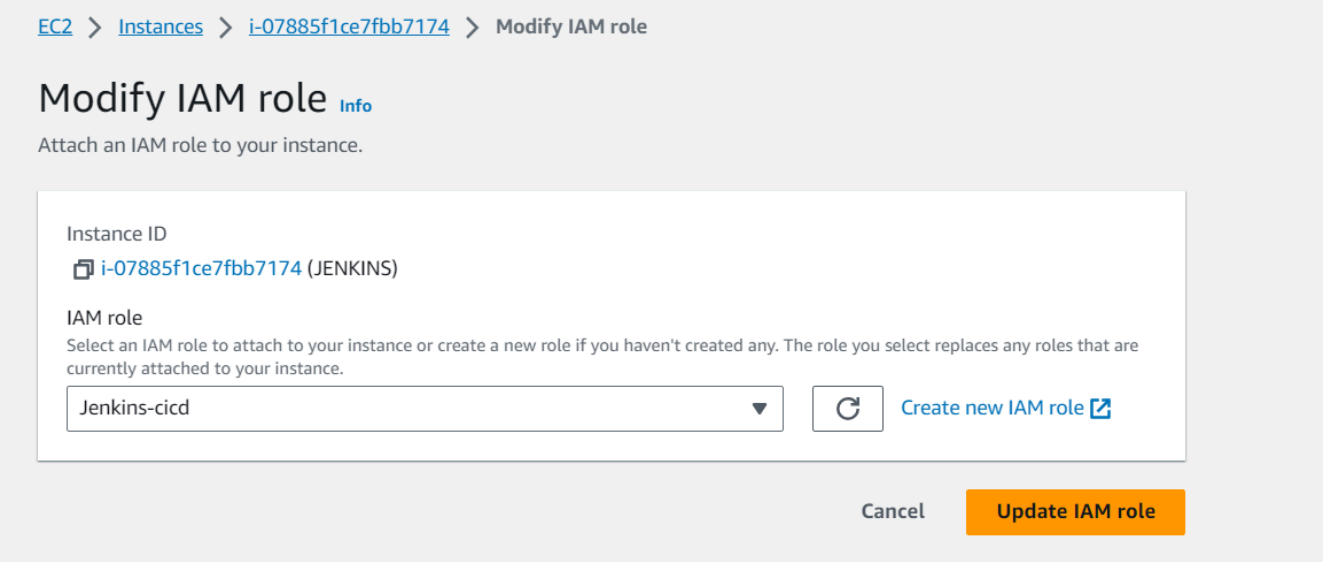


Click “EC2”

Go to the instance and add this role to the Ec2 instance.

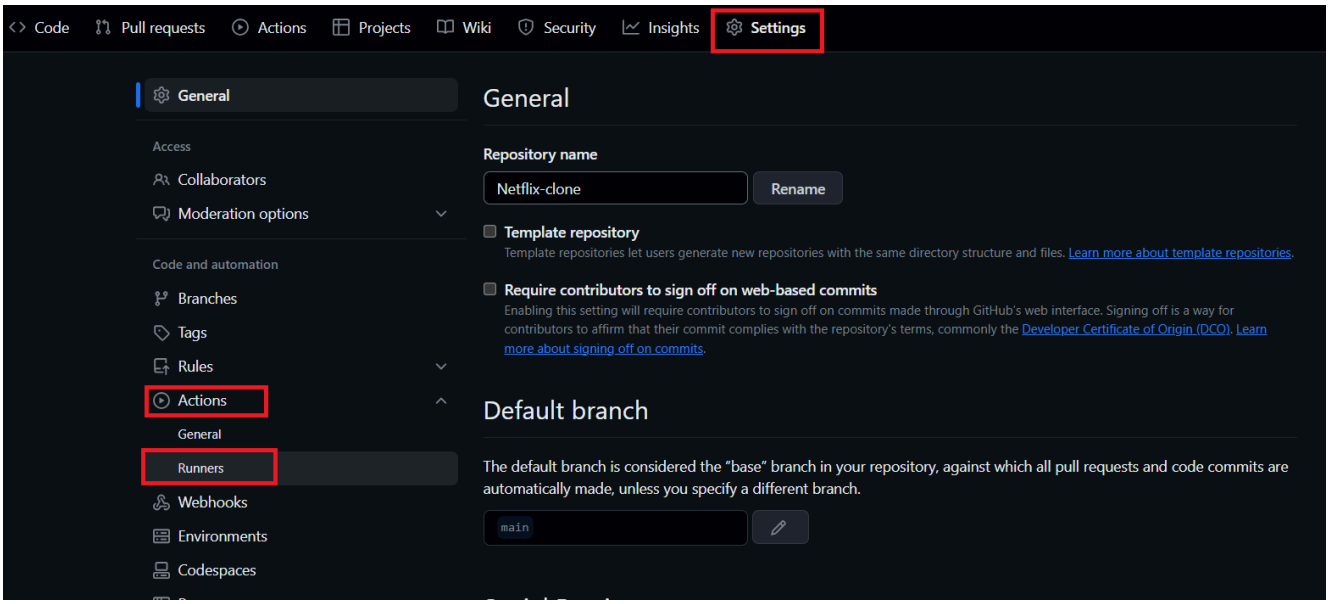
Select instance –> Actions –> Security –> Modify IAM role

Add a newly created Role and click on Update IAM role.

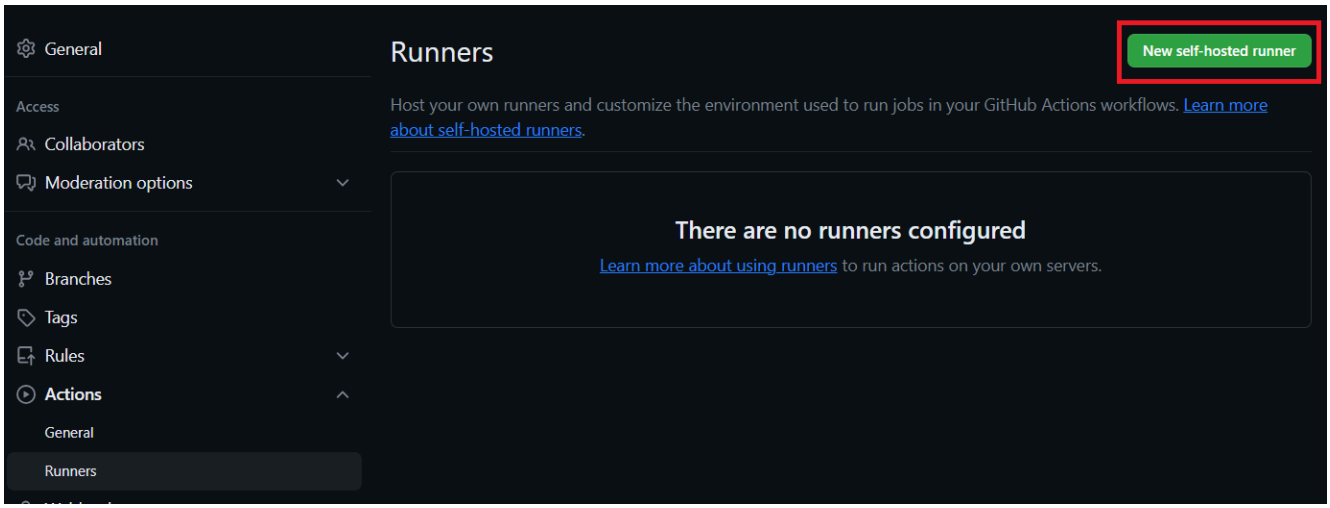


Step1B: Add a self-hosted runner to Ec2

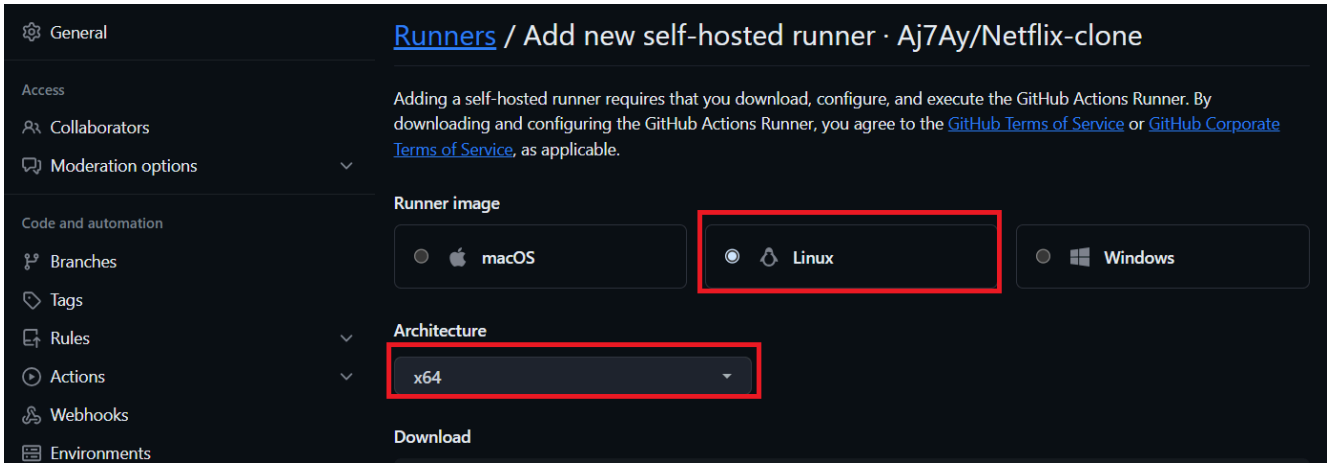
Go to GitHub and click on Settings –> Actions –> Runners



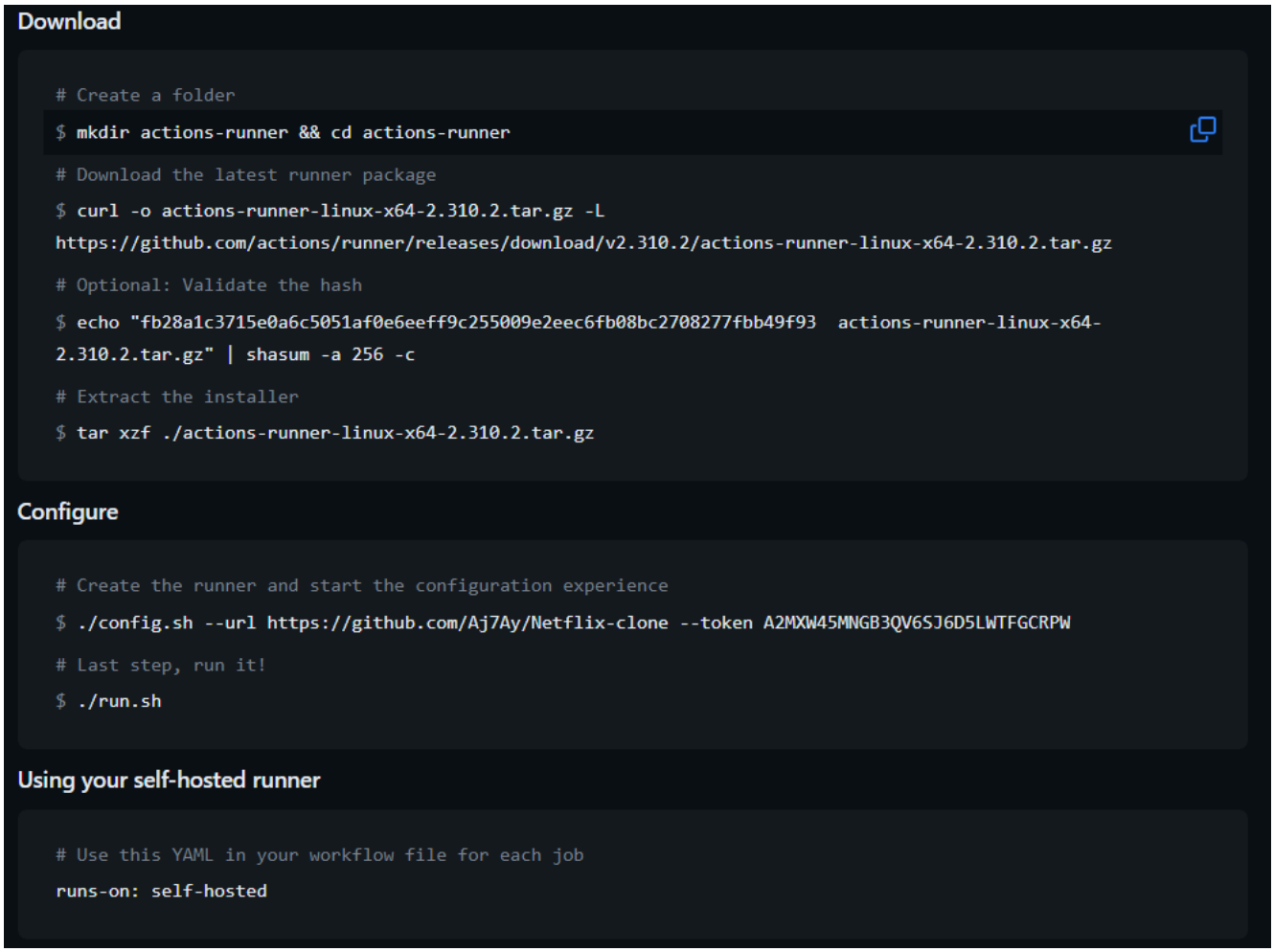
Click on New self-hosted runner



Now select Linux and Architecture X64



Use the below commands to add a self-hosted runner

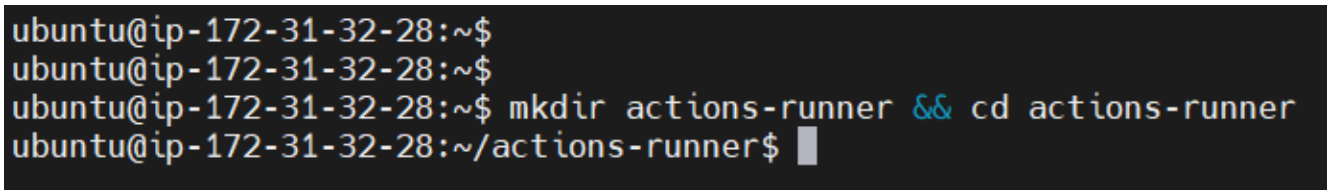


Go to Putty or Mobaxtreme and connect to your ec2 instance

And paste the commands

NOTE: USE YOUR RUNNER COMMANDS (EXAMPLE CASE IAM USING MINE)

```
mkdir actions-runner && cd actions-runner
```



The command “mkdir actions-runner && cd actions-runner” is used to create a new directory called “actions-runner” in the current working directory and then immediately change the current working directory to the newly created “actions-

runner" directory. This allows you to organize your files and perform subsequent actions within the newly created directory without having to navigate to it separately.

```
curl -o actions-runner-linux-x64-2.310.2.tar.gz -L https://github.com/a
```

This command downloads a file called "actions-runner-linux-x64-2.310.2.tar.gz" from a specific web address on GitHub and saves it in your current directory.

Let's validate the hash installation

```
echo "fb28a1c3715e0a6c5051af0e6eeff9c255009e2eec6fb08bc2708277fbb49f93
```

Now Extract the installer

```
tar xzf ./actions-runner-linux-x64-2.310.2.tar.gz
```

```
ubuntu@ip-172-31-32-28:~/actions-runner$
ubuntu@ip-172-31-32-28:~/actions-runner$
ubuntu@ip-172-31-32-28:~/actions-runner$ tar xzf ./actions-runner-linux-x64-2.310.2.tar.gz
ubuntu@ip-172-31-32-28:~/actions-runner$
```

Let's configure the runner

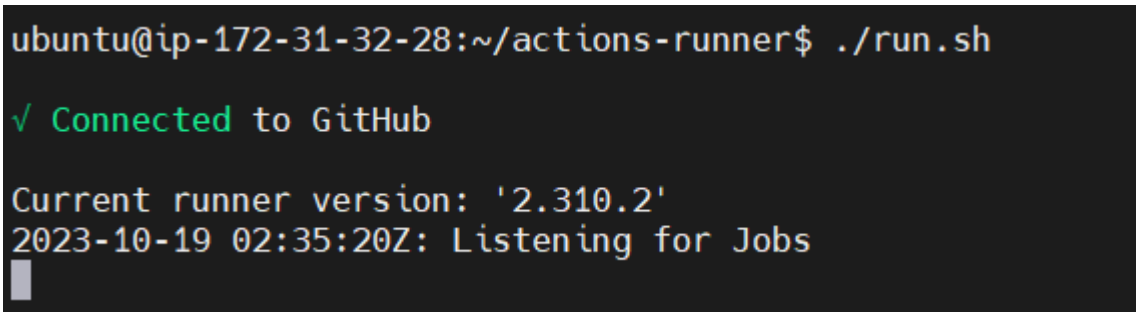
```
./config.sh --url https://github.com/Aj7Ay/Netflix-clone --token A2MXW4
```

```
ubuntu@ip-172-31-32-28:~/actions-runner$
ubuntu@ip-172-31-32-28:~/actions-runner$
ubuntu@ip-172-31-32-28:~/actions-runner$ ./config.sh --url https://github.com/Aj7Ay/Netflix-clone --token A2MXW45MNGB3QV6SJ6D5LWTFGCRPW

--------------------------------------------------------------------------------
|                              AJAY                                            |
|        ____ _ _   _   _       _          _     _                            |
|       / ___(_) |_| | | |_   _| |__      / \   __| |_(_) ___  _ __  ___       |
|      | |  _| | __| |_| | | | | '_ \    / _ \ / _| __| |/ _ \| '_ \/ __|      |
|      | |_| | | |_|  _  | |_| | |_) |  / ___ \ (_| |_| | (_) | | | \__ \      |
|       \____|_|\__|_| |_|\__,_|_.__/  /_/   \_\___|\__|_|\___/|_| |_|___/      |
|                                                                              |
|                       Self-hosted runner registration                        |
|                                                                              |
--------------------------------------------------------------------------------

# Authentication


√ Connected to GitHub

# Runner Registration

Enter the name of the runner group to add this runner to: [press Enter for Default]  CLICK ENTER

Enter the name of runner: [press Enter for ip-172-31-32-28] aws-netflix   PROVIDE A RUNNER NAME HERE

This runner will have the following labels: 'self-hosted', 'Linux', 'X64'
Enter any additional labels (ex. label-1,label-2): [press Enter to skip] aws-netflix  LABEL NAME

√ Runner successfully added
√ Runner connection is good

# Runner settings

Enter name of work folder: [press Enter for _work]  Enter

√ Settings Saved.

ubuntu@ip-172-31-32-28:~/actions-runner$
```

If you provide multiple labels use commas for each label

Let's start runner

```
./run.sh
```



Let's close Runner for now.

```
ctrl + c  #to close
```

Step2A: Install Docker and Run Sonarqube Container

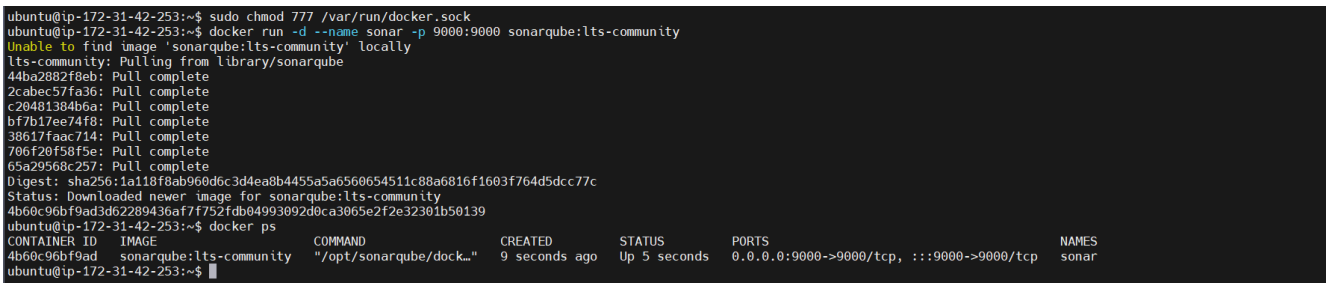
Connect to your Ec2 instance using Putty, Mobaxtreme or Git bash and install docker on it.

```
sudo apt-get update
sudo apt install docker.io -y
sudo usermod -aG docker ubuntu
newgrp docker
sudo chmod 777 /var/run/docker.sock
```

Pull the SonarQube Docker image and run it.

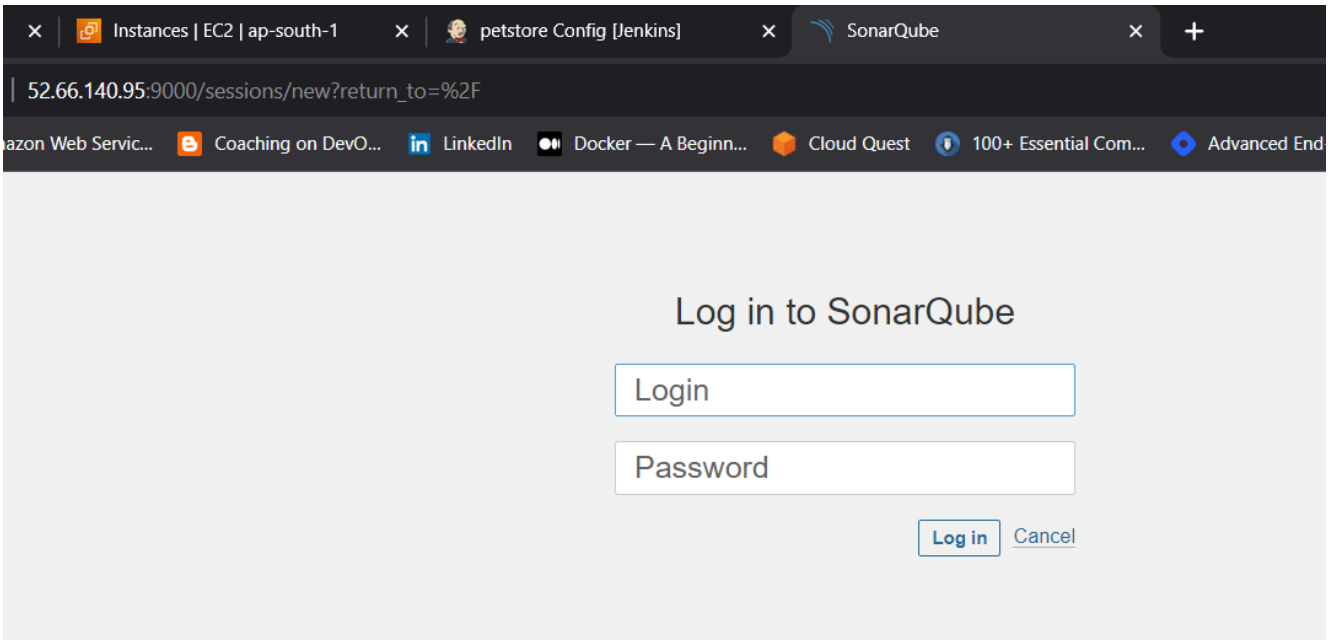
After the docker installation, we will create a Sonarqube container (Remember to add 9000 ports in the security group).

```
docker run -d --name sonar -p 9000:9000 sonarqube:lts-community
```



Now copy the IP address of the ec2 instance

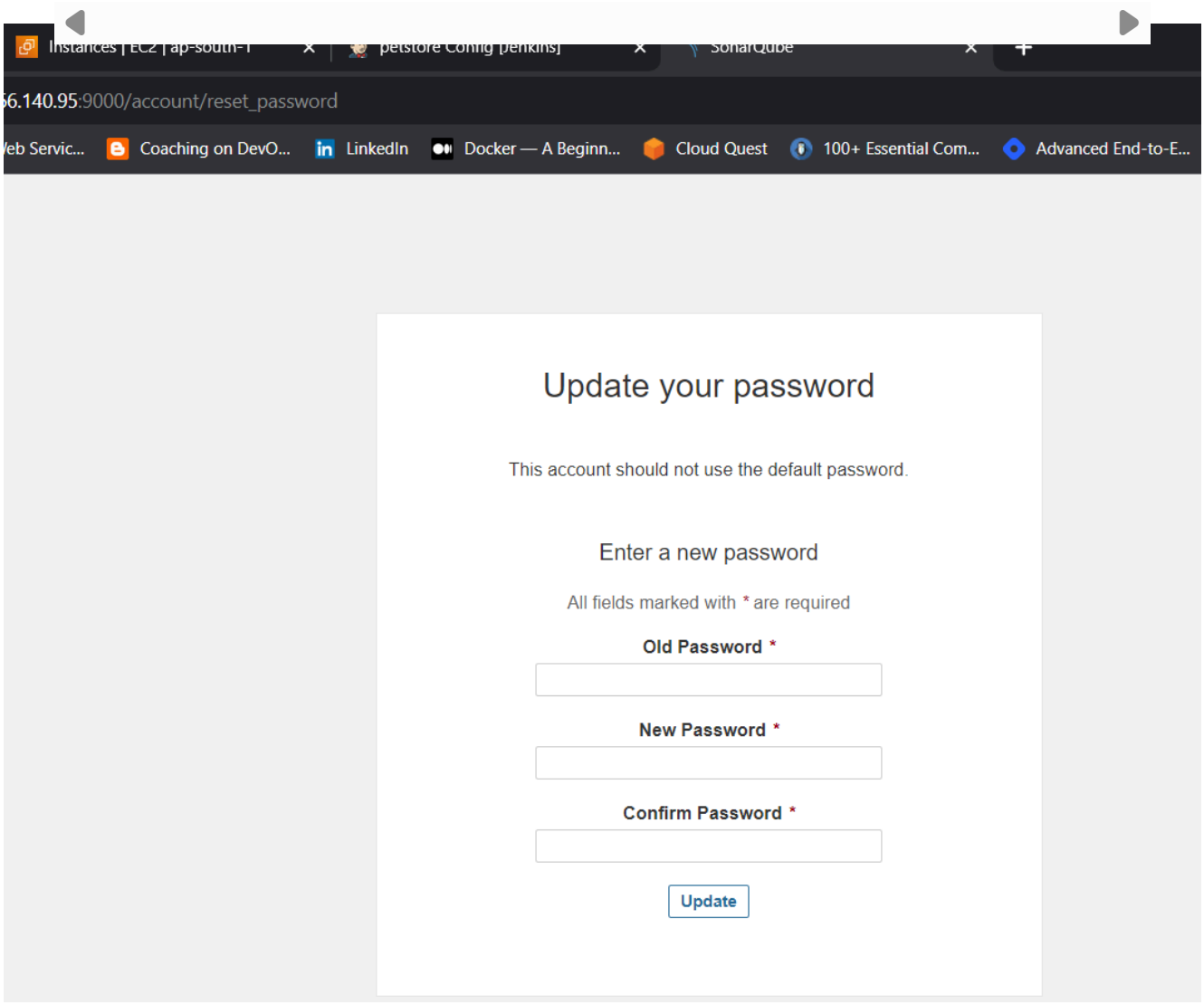
```
ec2-public-ip:9000
```



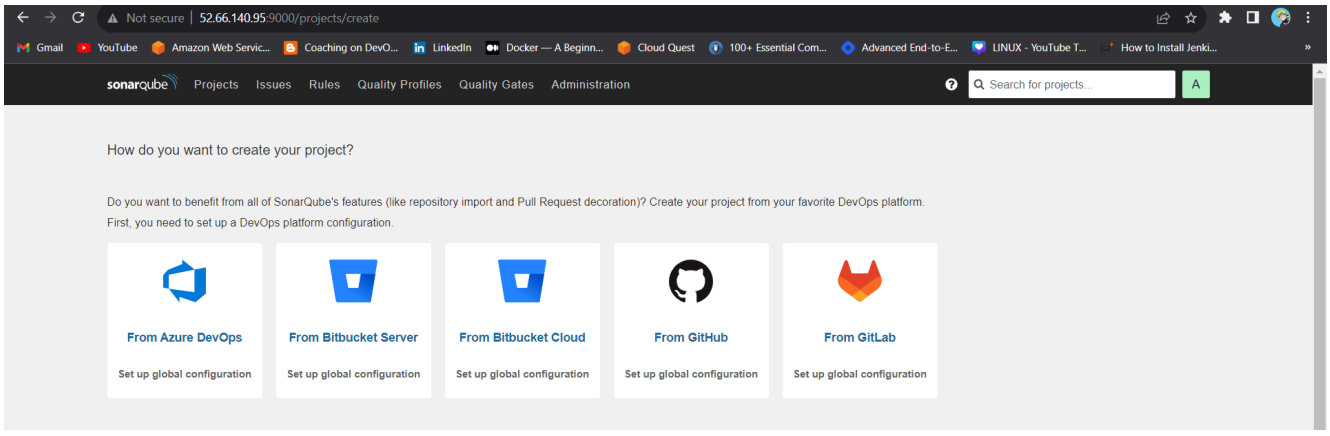
Provide Login and password

```
login admin
```

```
password admin
```



Update your Sonarqube password & This is the Sonarqube dashboard

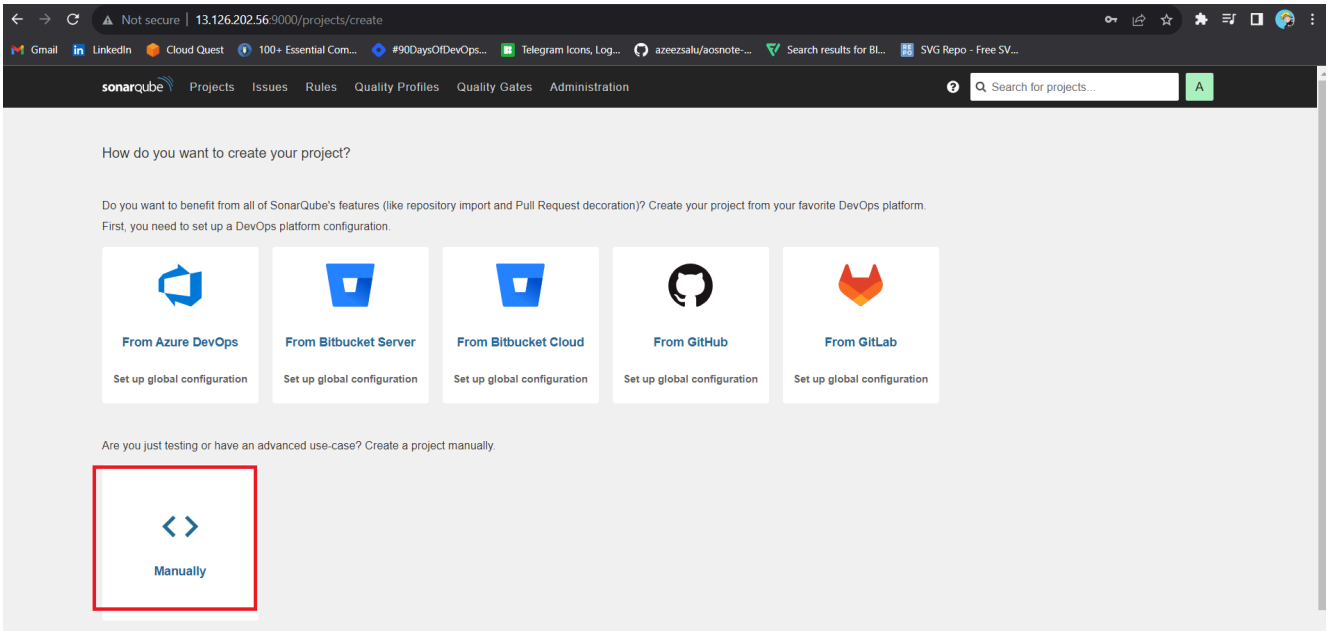


Step2B: Integrating SonarQube with GitHub Actions

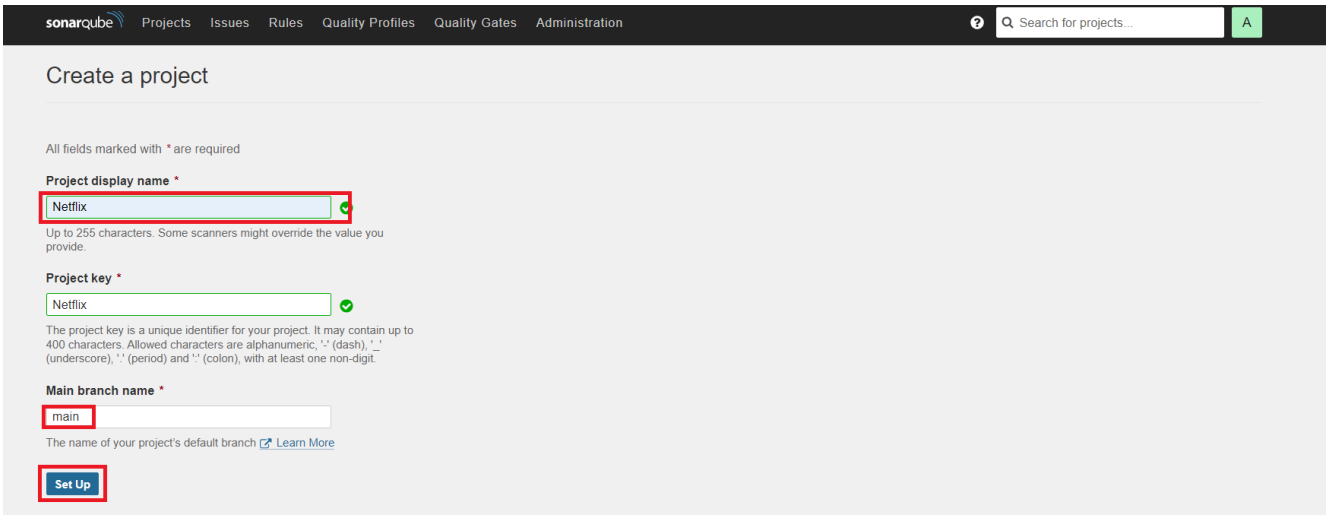
Integrating SonarQube with GitHub Actions allows you to automatically analyze your code for quality and security as part of your continuous integration pipeline.

We already have Sonarqube up and running

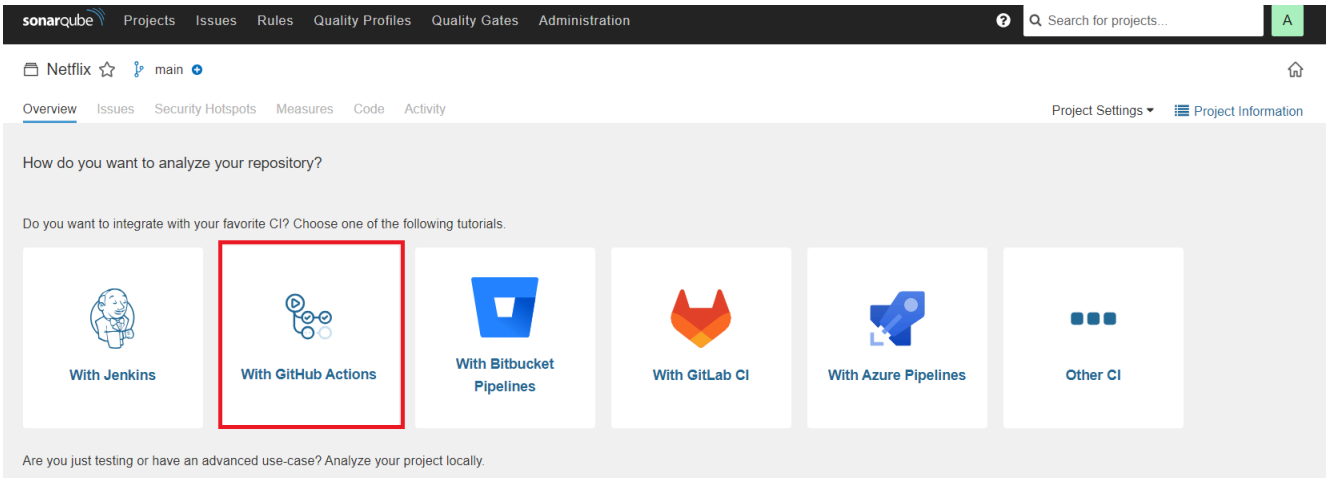
On Sonarqube Dashboard click on Manually



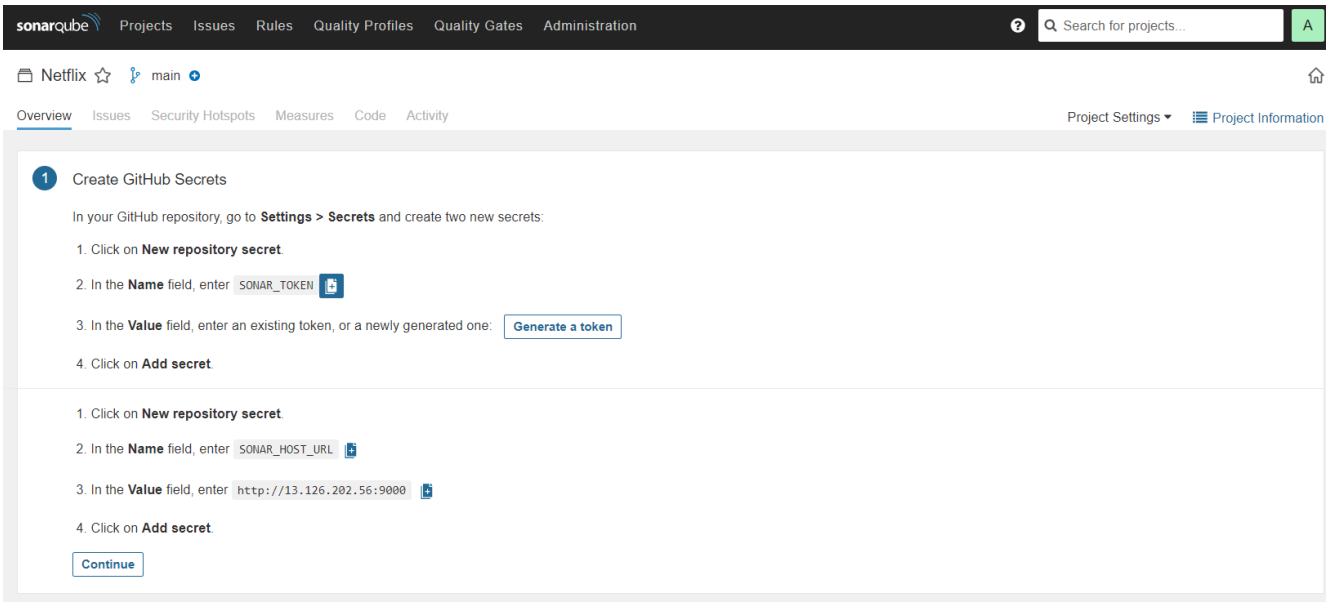
Next, provide a name for your project and provide a Branch name and click on setup



On the next page click on With GitHub actions

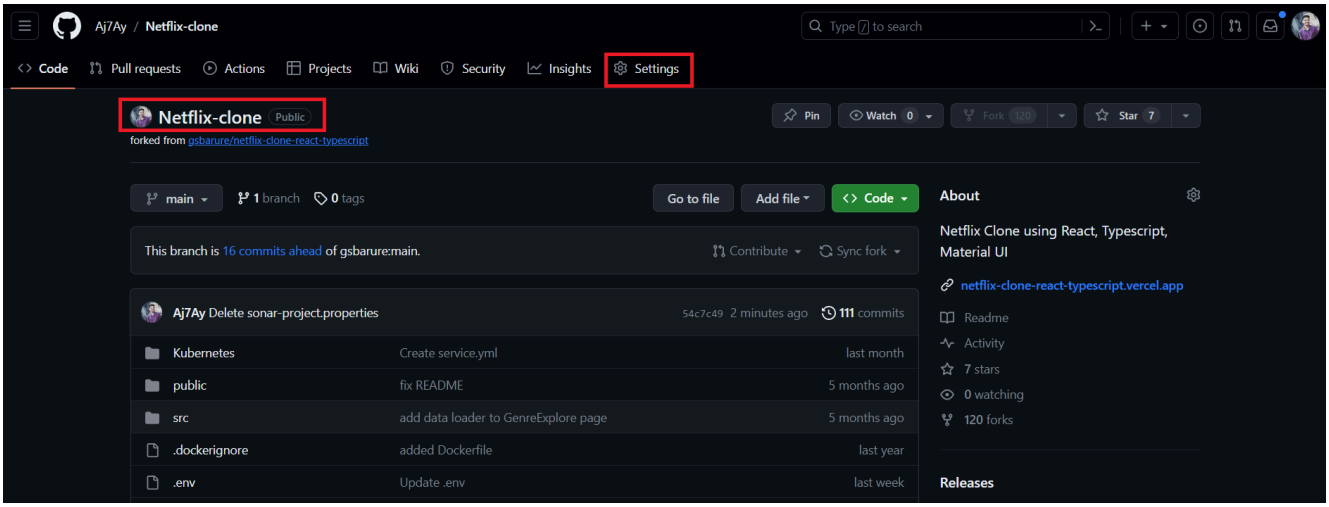


This will Generate an overview of the Project and provide some instructions to integrate

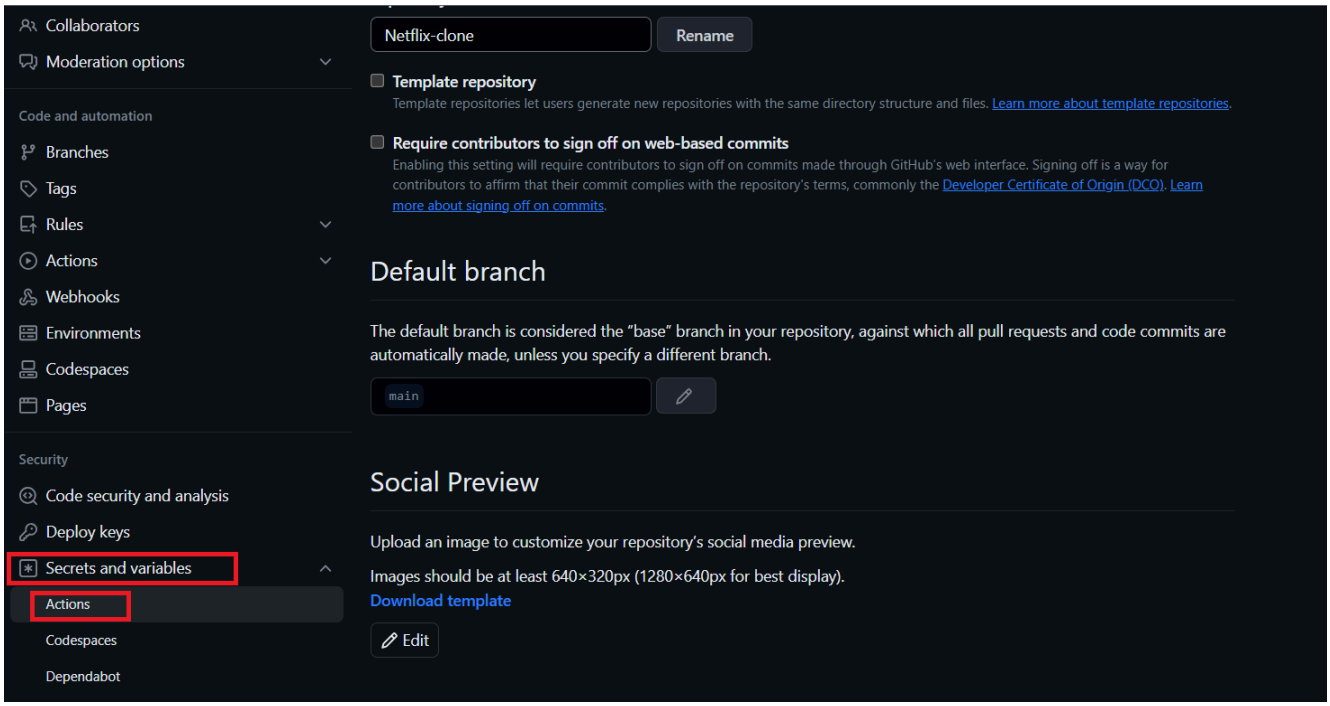


Let's Open your GitHub and select your Repository

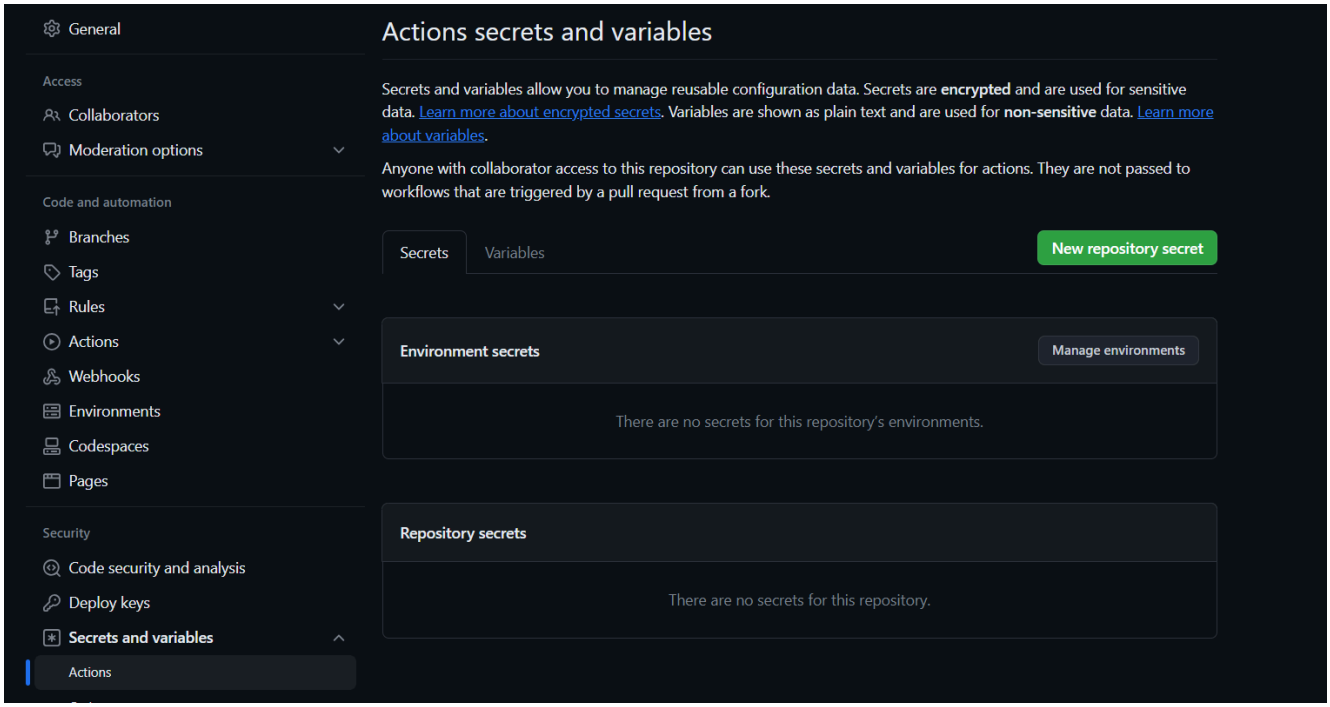
In my case it is Netflix-clone and Click on Settings



Search for Secrets and variables and click on and again click on actions

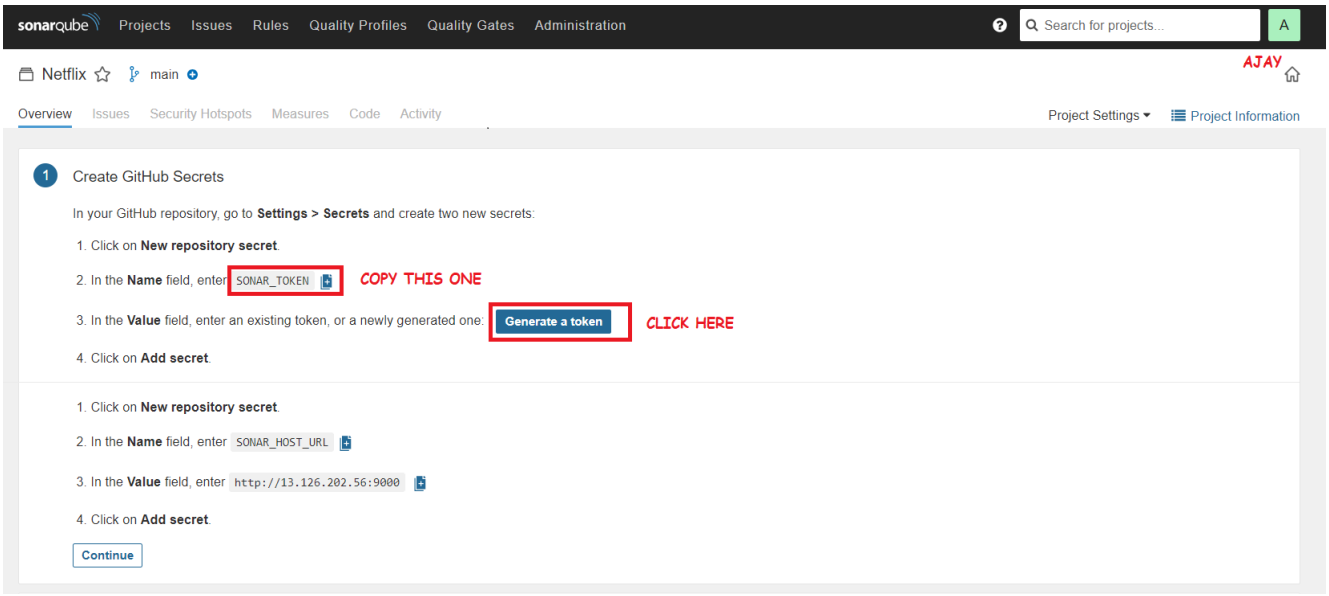


It will open a page like this click on New Repository secret

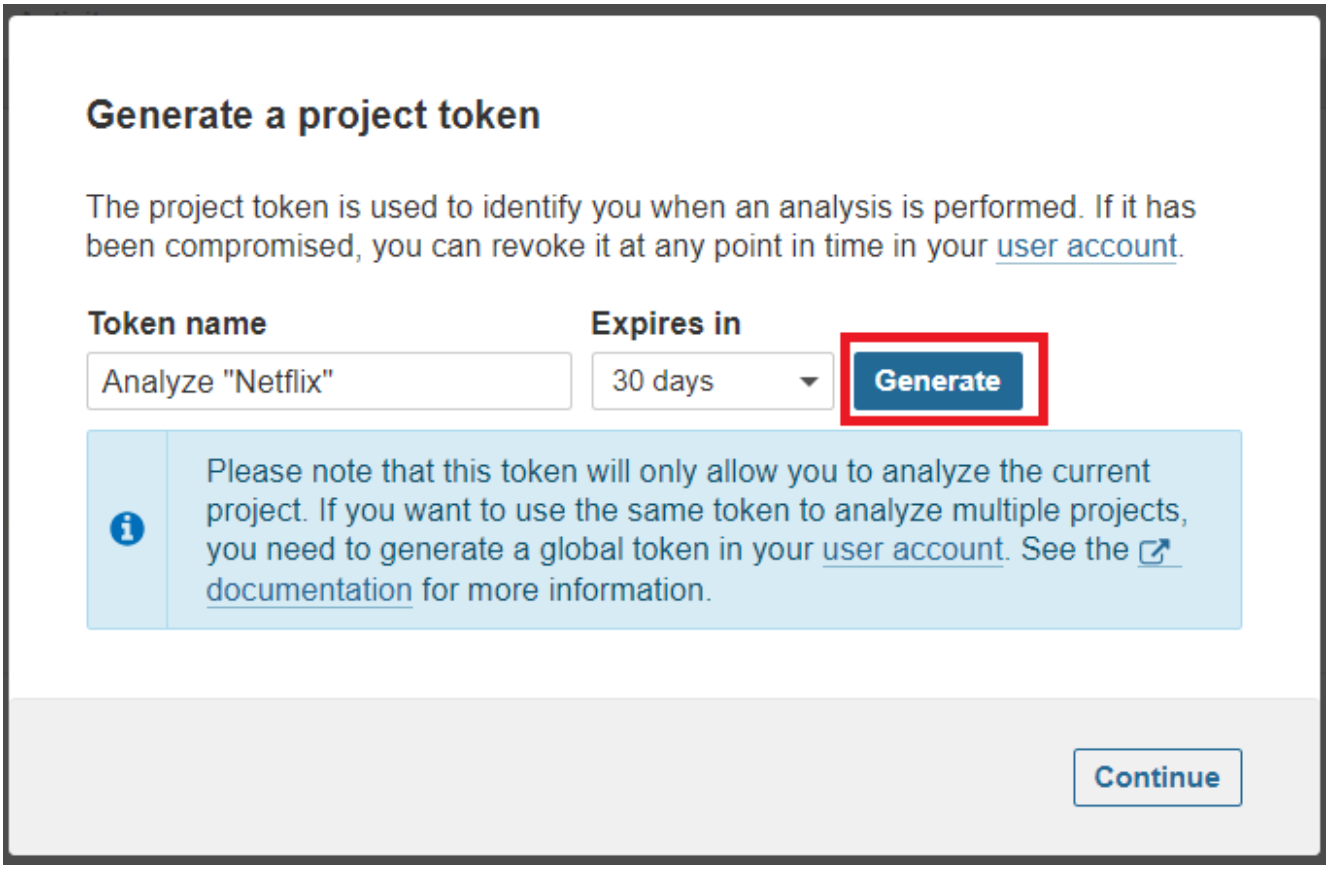


Now go back to Your Sonarqube Dashboard

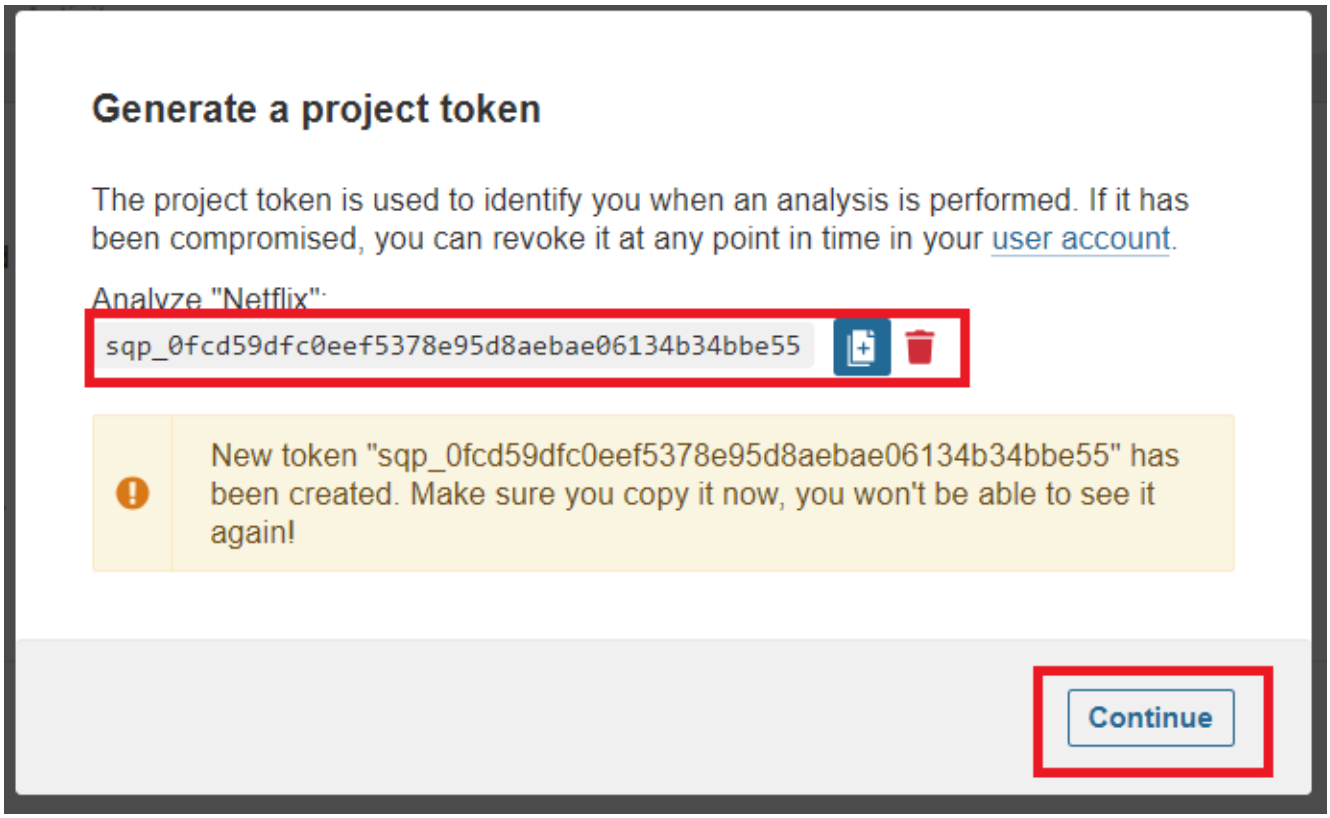
Copy SONAR_TOKEN and click on Generate Token



Click on Generate



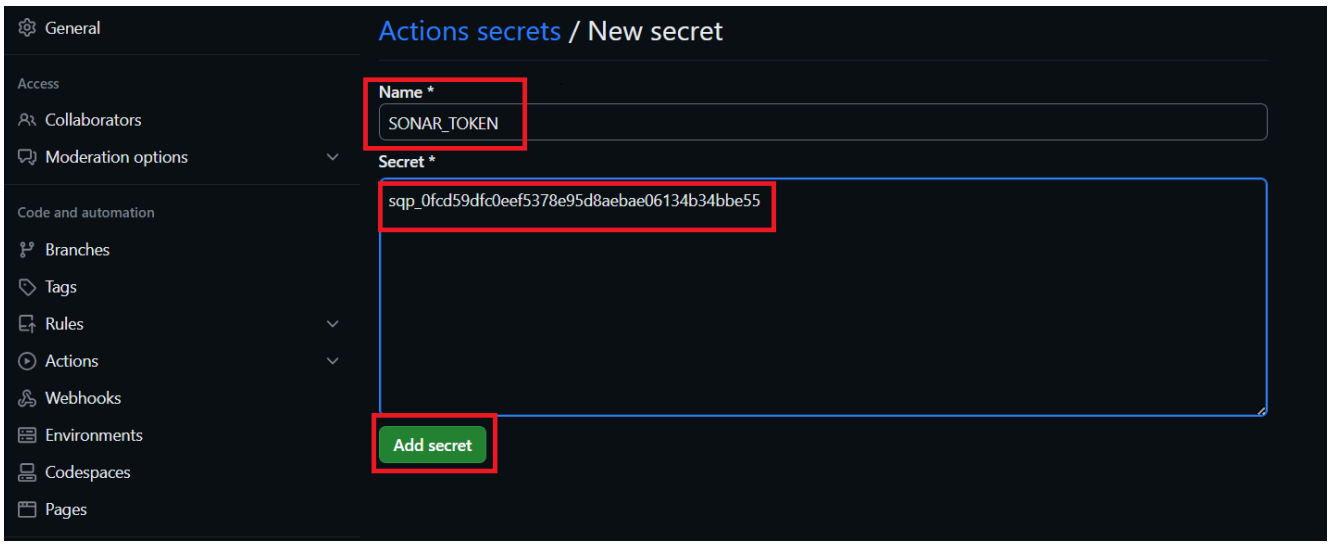
Let's copy the Token and add it to GitHub secrets



Now go back to GitHub and Paste the copied name for the secret and token

Name: SONAR_TOKEN

Secret: Paste Your Token and click on Add secret



Now go back to the Sonarqube Dashboard

Copy the Name and Value

1 Create GitHub Secrets

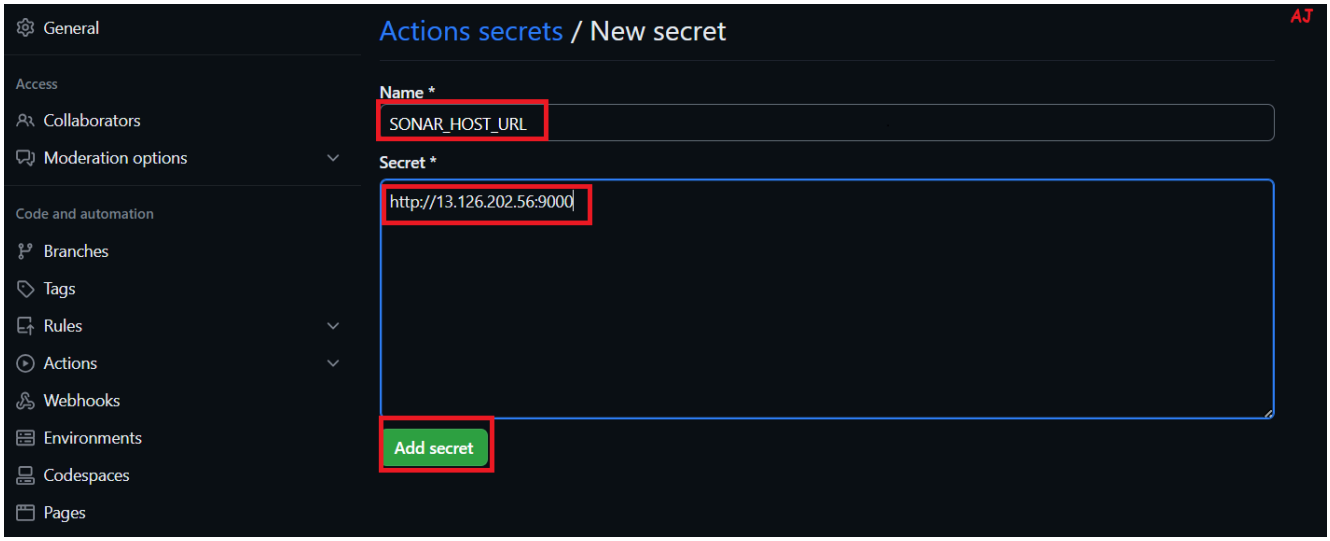
In your GitHub repository, go to **Settings > Secrets** and create two new secrets:

1. Click on **New repository secret**.
2. In the **Name** field, enter `SONAR_TOKEN`
3. In the **Value** field, enter an existing token, or a newly generated one: Generate a token
4. Click on **Add secret**.

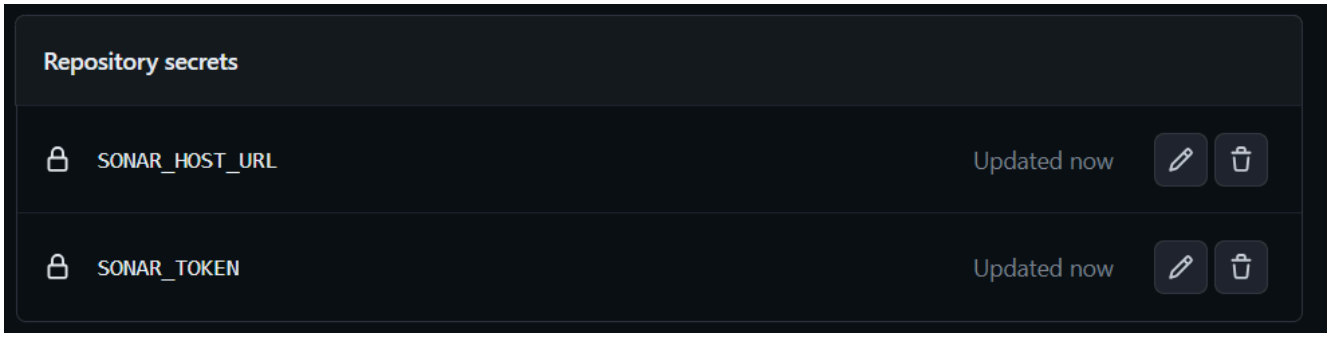
1. Click on **New repository secret**.
2. In the **Name** field, enter `SONAR_HOST_URL`
3. In the **Value** field, enter `http://13.126.202.56:9000`
4. Click on **Add secret**.

Continue

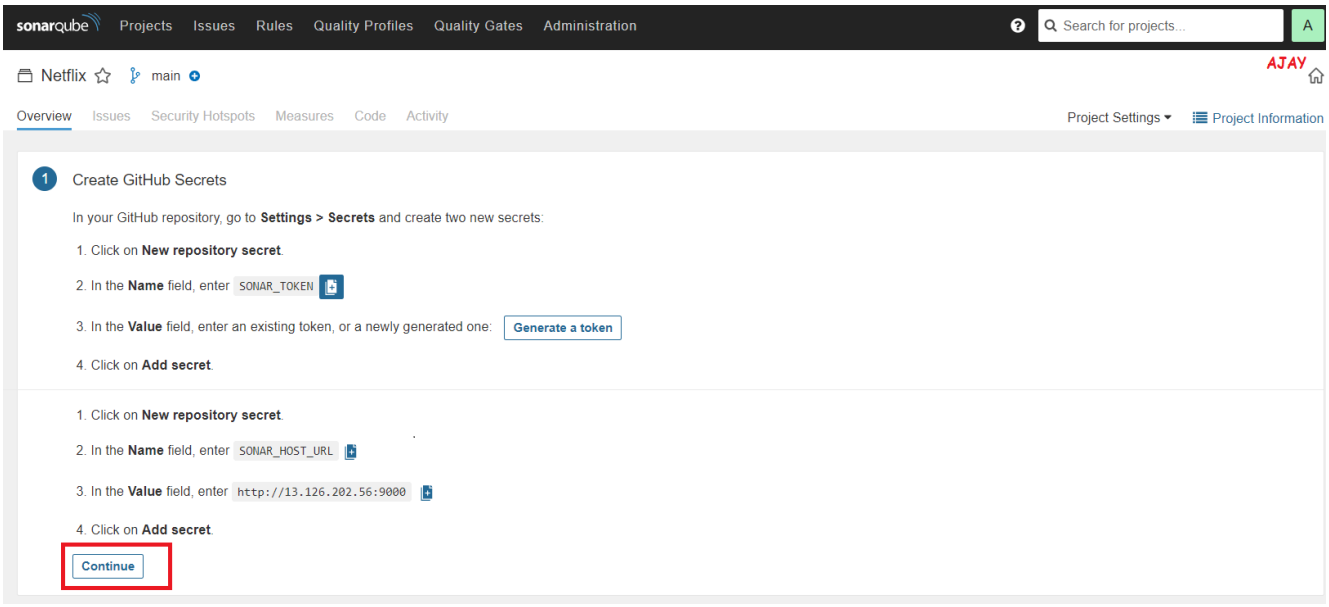
Go to GitHub now and paste-like this and click on add secret



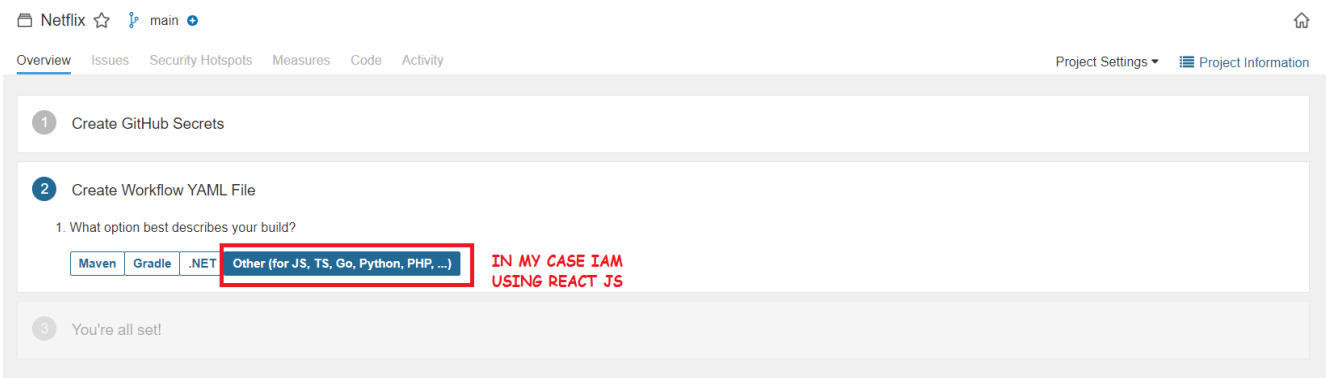
Our Sonarqube secrets are added and you can see



Go to Sonarqube Dashboard and click on continue

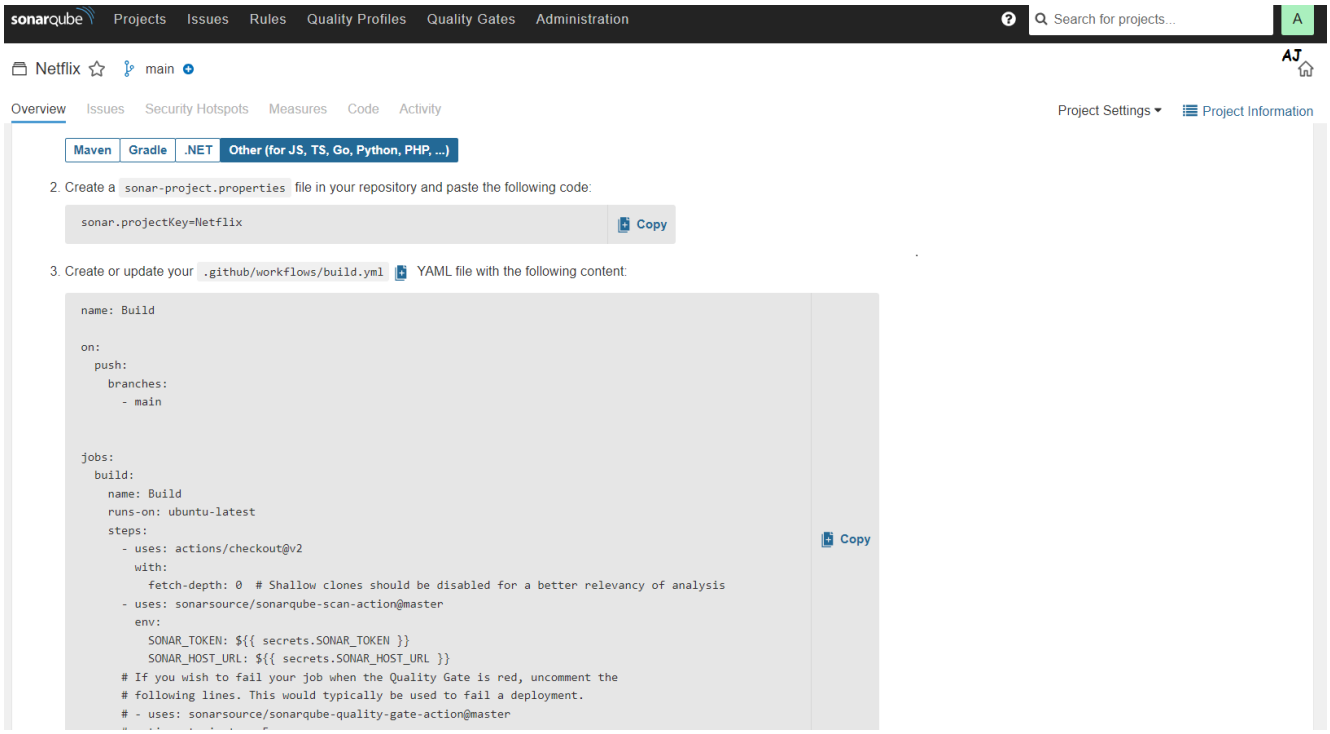


Now create your Workflow for your Project. In my case, the Netflix project is built using React Js. That's why I am selecting Other

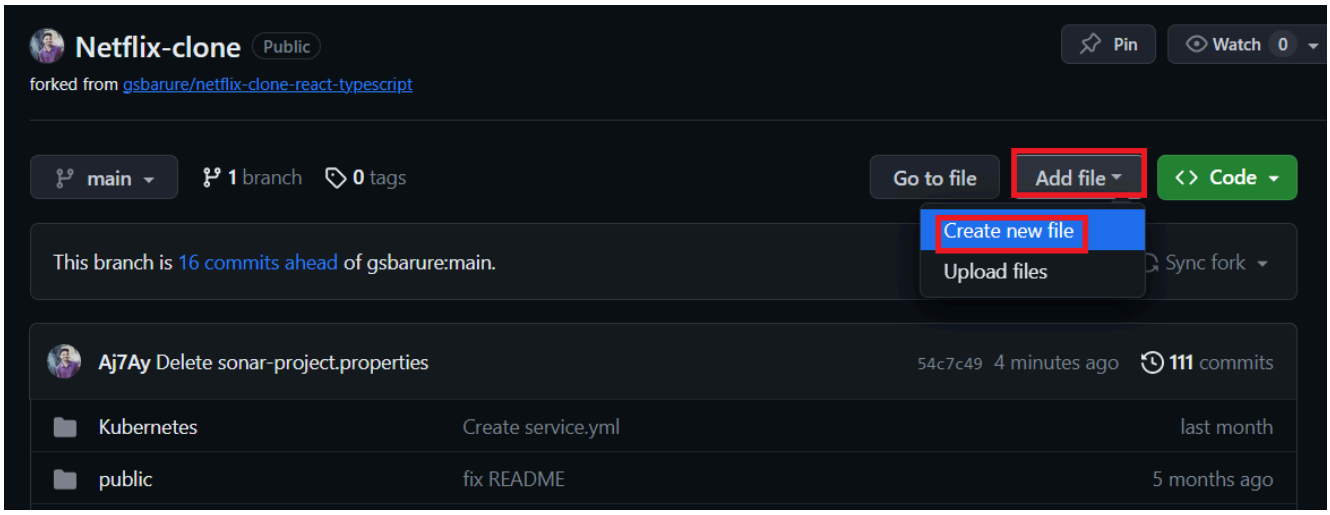


Now it Generates and workflow for my Project

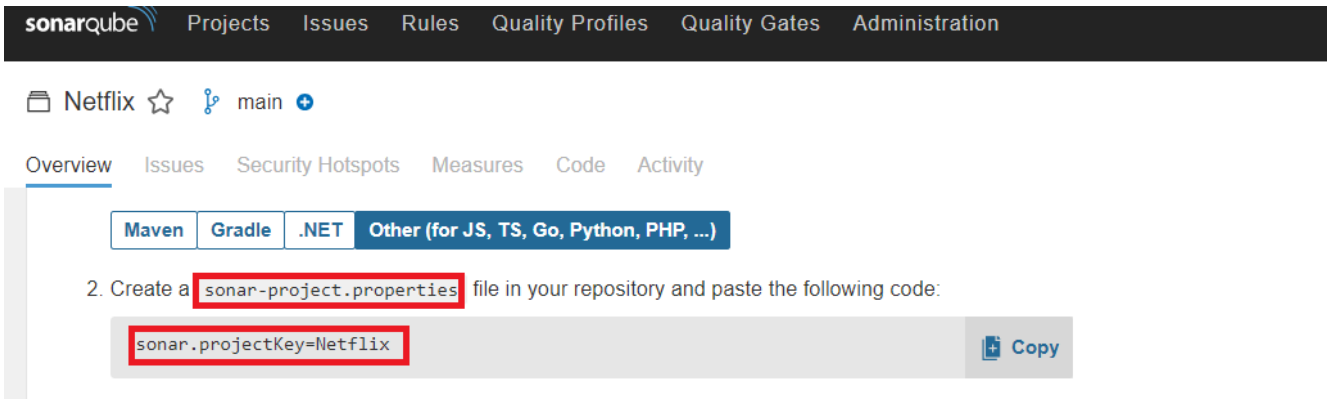
(Use your files for this block please)



Go back to GitHub. click on Add file and then create a new file



Go back to the Sonarqube dashboard and copy the file name and content



Here file name (in my case only)

sonar-project.properties

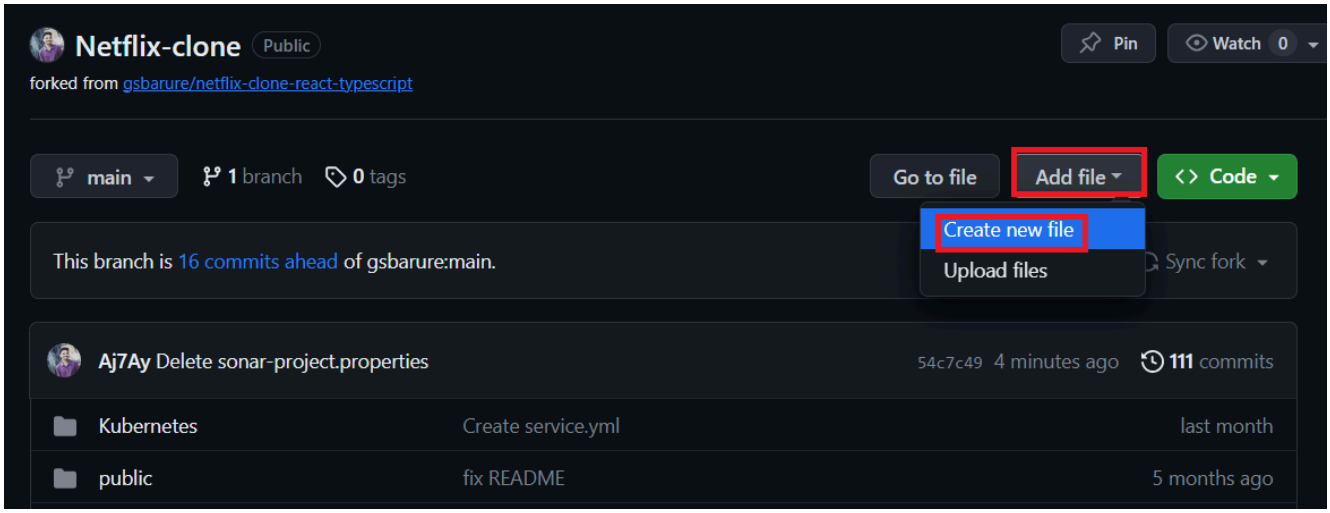
The content to add to the file is (copied from the above image)

```
sonar.projectKey=Tic-game
```

Add in GitHub like this (sample images)

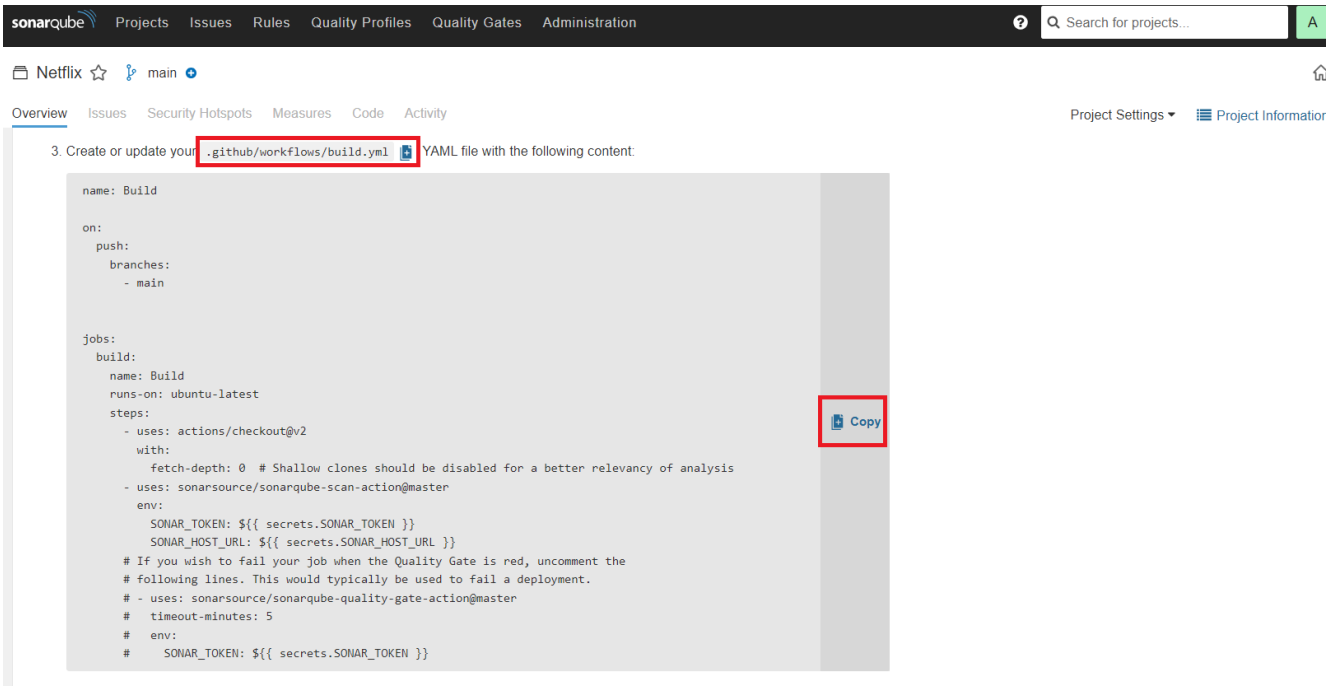
Let's add our workflow

To do that click on Add file and then click on Create a new file



Here is the file name

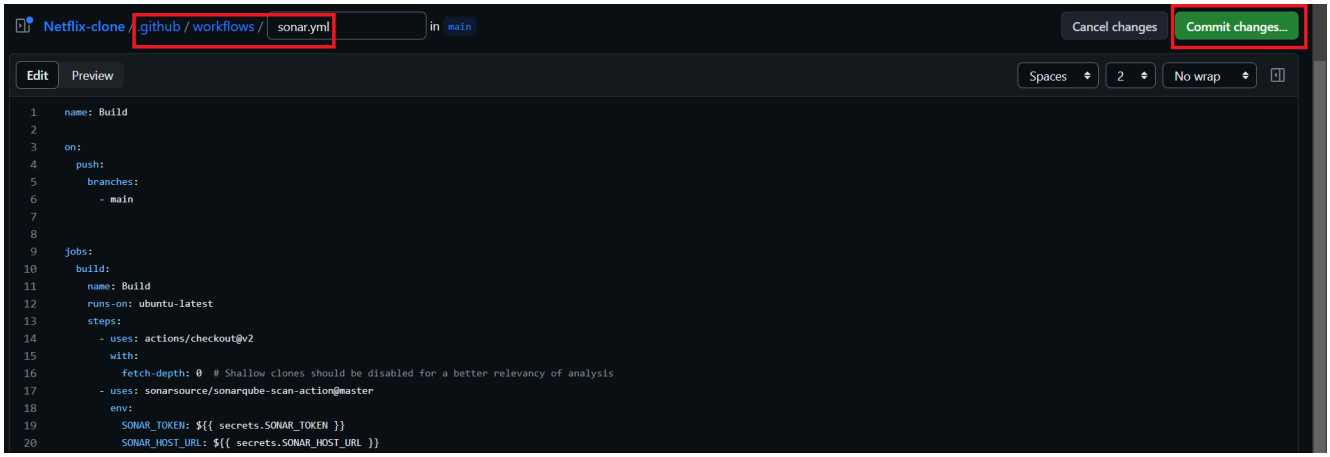
```
.github/workflows/build.yml  #you can use any name iam using sonar.yml
```



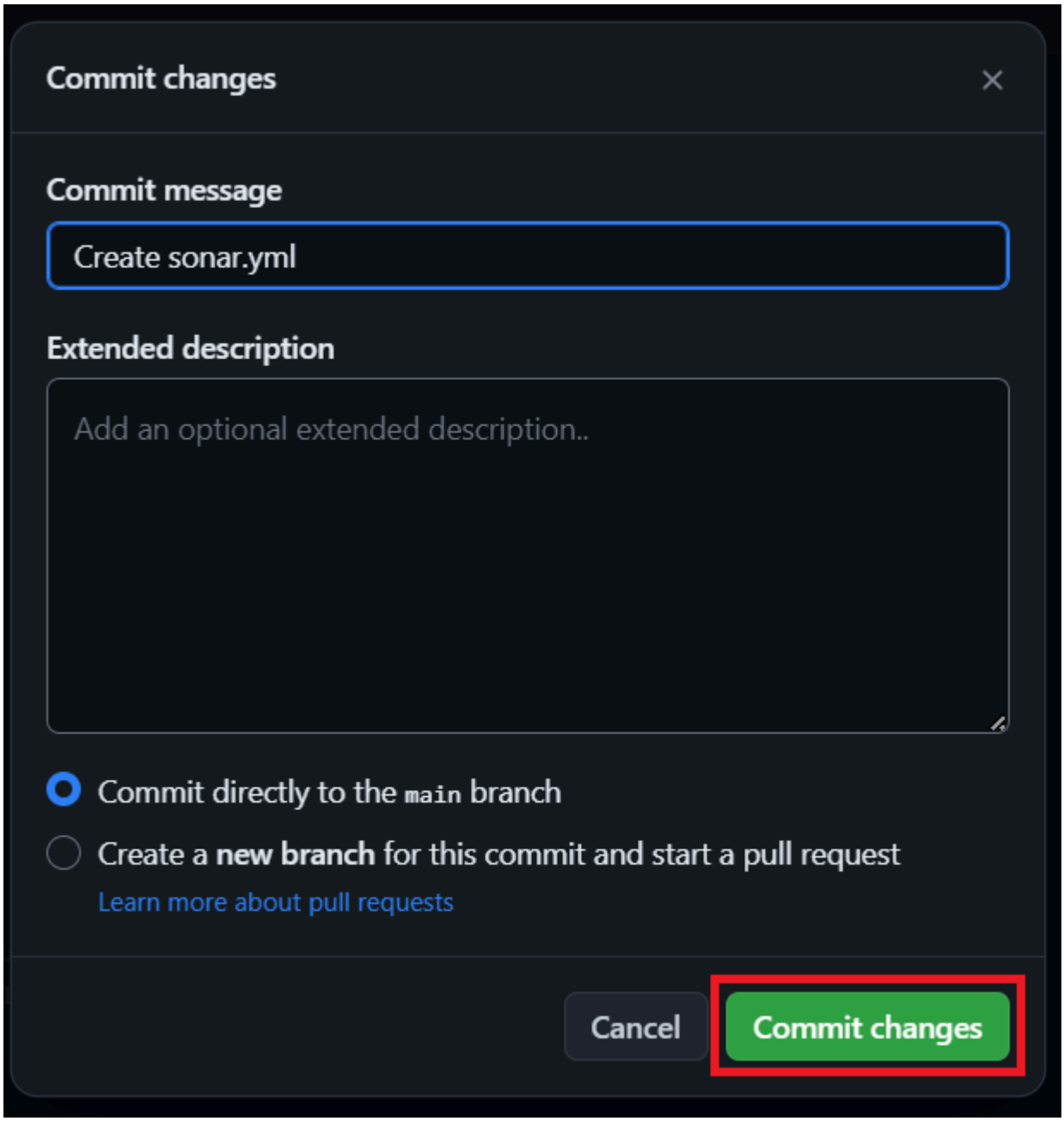
Copy content and add it to the file

```
name: Build,Analyze,scan
on:
  push:
    branches:
      - main
jobs:
  build-analyze-scan:
    name: Build
    runs-on: [self-hosted]
    steps:
      - name: Checkout code
        uses: actions/checkout@v2
        with:
          fetch-depth: 0  # Shallow clones should be disabled for a bet
```

```
    - name: Build and analyze with SonarQube
      uses: sonarsource/sonarqube-scan-action@master
      env:
        SONAR_TOKEN: ${{ secrets.SONAR_TOKEN }}
        SONAR_HOST_URL: ${{ secrets.SONAR_HOST_URL }}
```



Click on commit changes

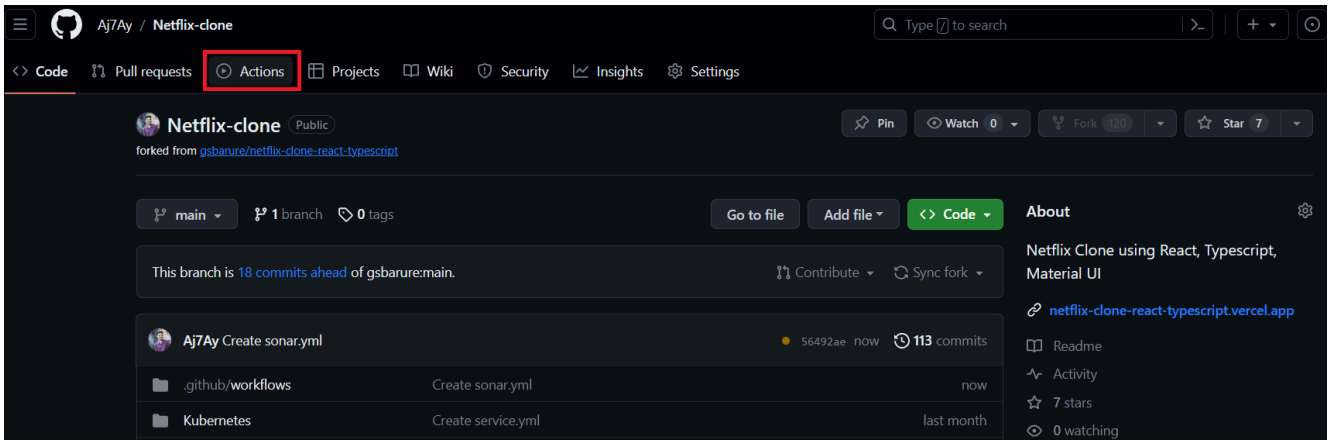


Now workflow is created.

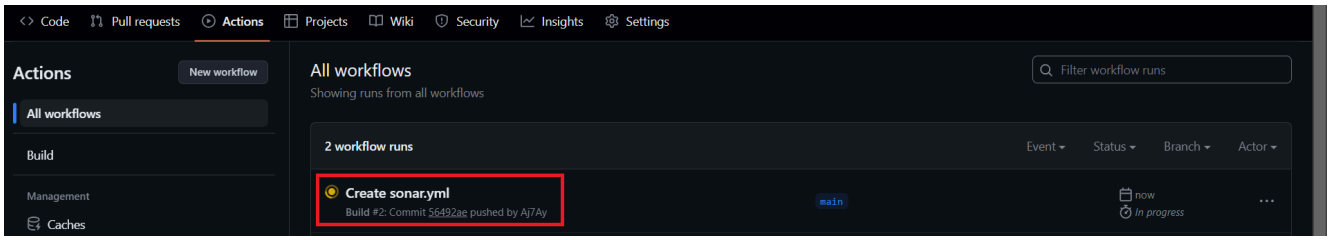
Start again GitHub actions runner from instance

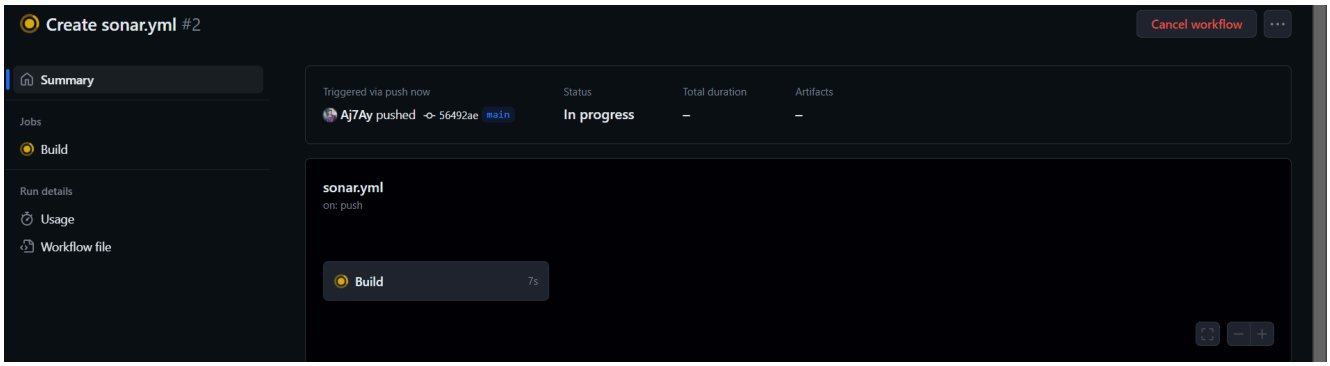
```
cd actions-runner
./run.sh
```

Click on Actions now

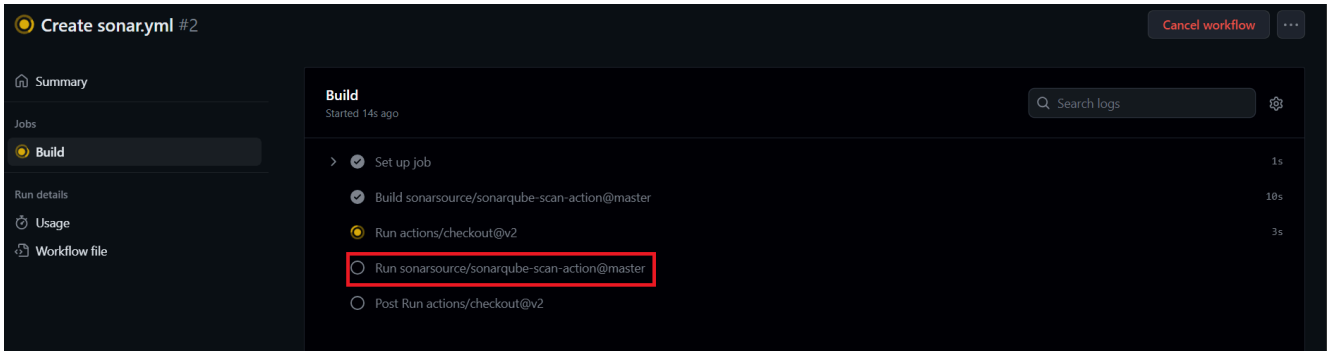


Now it's automatically started the workflow

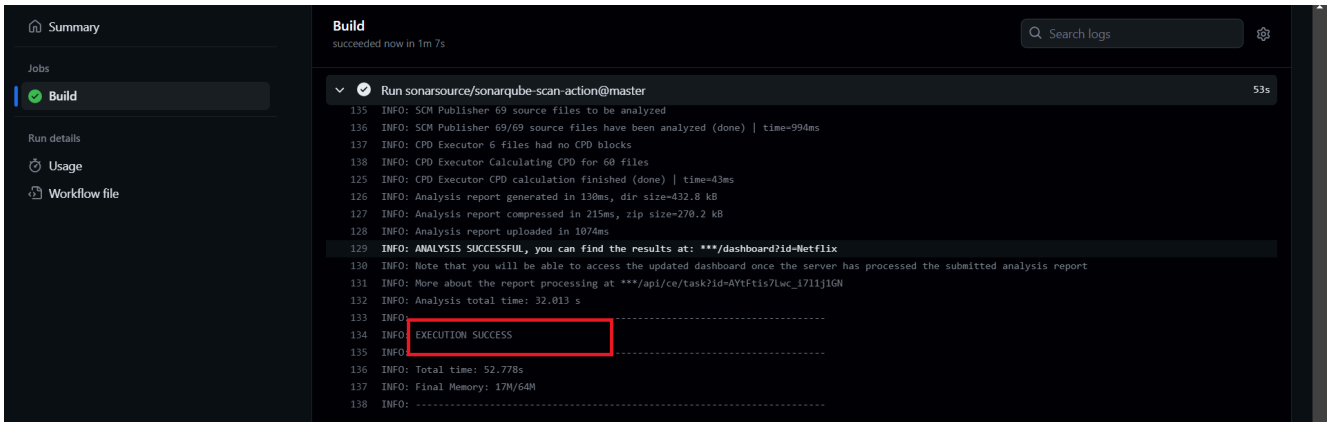




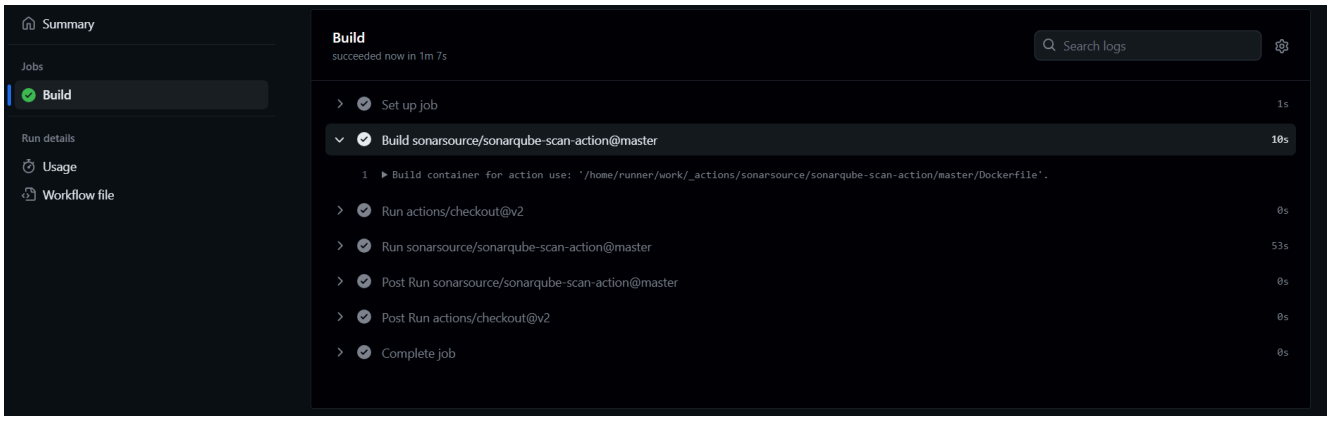
Let's click on Build and see what are the steps involved



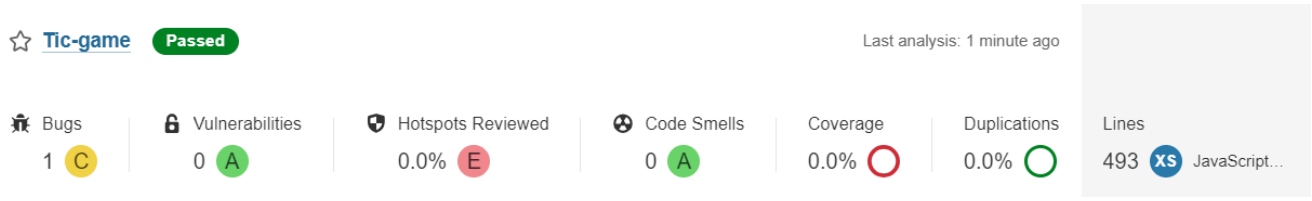
Click on Run Sonarsource and you can do this after the build completion



Build complete.



Go to the Sonarqube dashboard and click on projects and you can see the analysis



If you want to see the full report, click on issues.

Step2C: INSTALLATION OF OTHER TOOLS

1. **Install Java 17**:
    - Install Temurin (formerly Adoptium) JDK 17.
2. **Install Trivy** (Container Vulnerability Scanner).
3. **Install Terraform**.
4. **Install kubectl** (Kubernetes command-line tool).

5. **Install AWS CLI** (Amazon Web Services Command Line Interface).
6. **Install Node.js 16 and npm**.

The script automates the installation of these software tools commonly used for development and deployment.

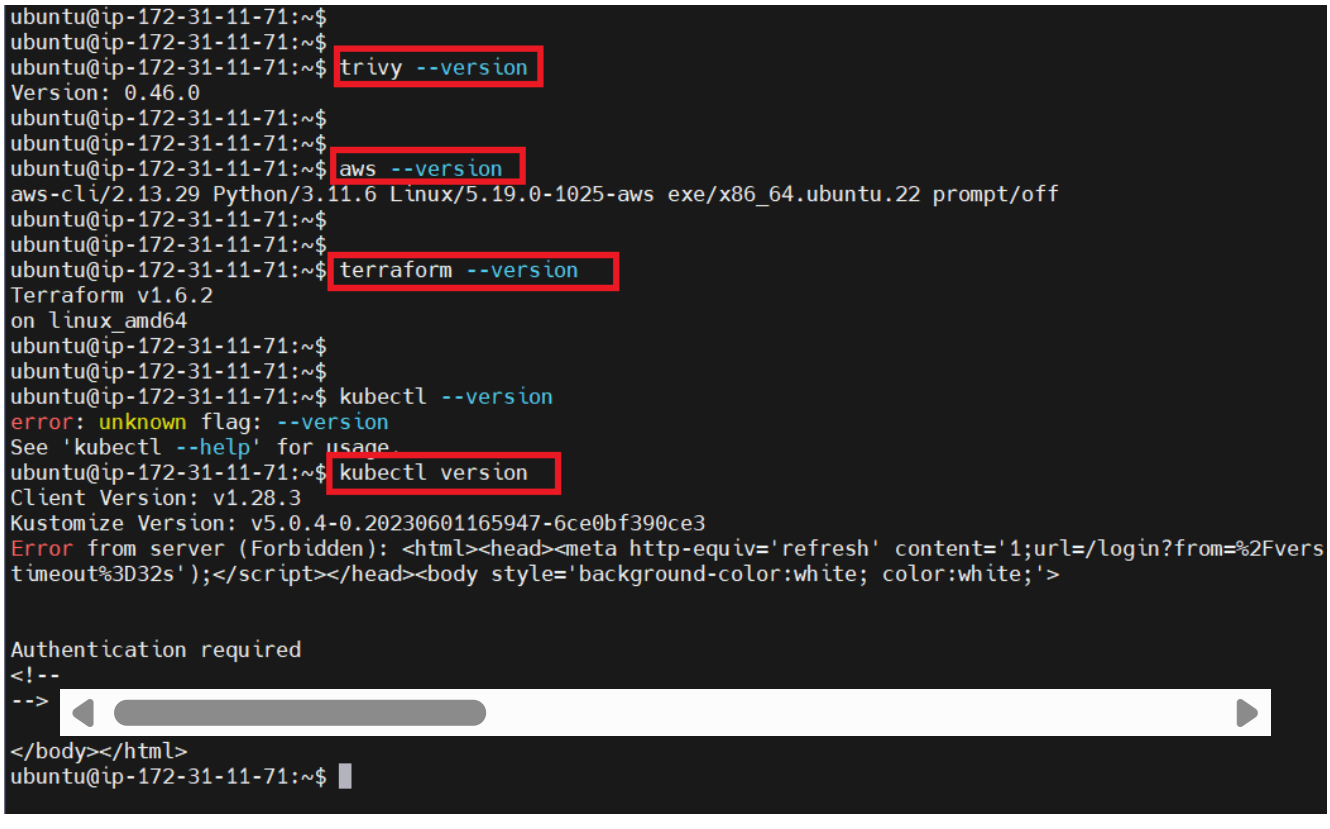
Script

```
#!/bin/bash
sudo apt update -y
sudo touch /etc/apt/keyrings/adoptium.asc
sudo wget -O /etc/apt/keyrings/adoptium.asc https://packages.adoptium.ne
echo "deb [signed-by=/etc/apt/keyrings/adoptium.asc] https://packages.ad
sudo apt update -y
sudo apt install temurin-17-jdk -y
/usr/bin/java --version

# Install Trivy
sudo apt-get install wget apt-transport-https gnupg lsb-release -y
wget -qO - https://aquasecurity.github.io/trivy-repo/deb/public.key | gp
echo "deb [signed-by=/usr/share/keyrings/trivy.gpg] https://aquasecurity
sudo apt-get update
sudo apt-get install trivy -y

# Install Terraform
sudo apt install wget -y
wget -O- https://apt.releases.hashicorp.com/gpg | sudo gpg --dearmor -o
echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg]
sudo apt update && sudo apt install terraform

# Install kubectl
sudo apt update
sudo apt install curl -y
curl -LO https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/releas
sudo install -o root -g root -m 0755 kubectl /usr/local/bin/kubectl
kubectl version --client

# Install AWS CLI
curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awsc
sudo apt-get install unzip -y
```

```
unzip awscliv2.zip
sudo ./aws/install

# Install Node.js 16 and npm
curl -fsSL https://deb.nodesource.com/gpgkey/nodesource.gpg.key | sudo g
echo "deb [signed-by=/usr/share/keyrings/nodesource-archive-keyring.gpg]
sudo apt update
sudo apt install -y nodejs
```

Check whether the versions are also installed or not.

```
trivy --version
terraform --version
aws --version
kubectl version
node -v
java --version
```



```
ubuntu@ip-172-31-36-122:~$
ubuntu@ip-172-31-36-122:~$ node -v
v16.20.2
ubuntu@ip-172-31-36-122:~$
```

```
ubuntu@ip-172-31-36-122:~$
ubuntu@ip-172-31-36-122:~$ java --version
openjdk 17.0.9 2023-10-17
OpenJDK Runtime Environment Temurin-17.0.9+9 (build 17.0.9+9)
OpenJDK 64-Bit Server VM Temurin-17.0.9+9 (build 17.0.9+9, mixed mode, sharing)
ubuntu@ip-172-31-36-122:~$
```

EKS provision

Clone the repo onto your instance

```
git clone https://github.com/Aj7Ay/TIC-TAC-TOE.git
cd TIC-TAC-TOE
cd Eks-terraform
```

This changes the directory to EKS terraform files

Change your S3 bucket in the backend file

Initialize the terraform

```
terraform init
```

```
ubuntu@ip-172-31-36-122:~/TIC-TAC-TOE/Eks-terraform$ terraform init

Initializing the backend...

Successfully configured the backend "s3"! Terraform will automatically
use this backend unless the backend configuration changes.

Initializing provider plugins...
- Finding hashicorp/aws versions matching "~> 5.0"...
- Installing hashicorp/aws v5.23.1...
- Installed hashicorp/aws v5.23.1 (signed by HashiCorp)

Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

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

Validate the configuration and syntax of files

```
terraform validate
```

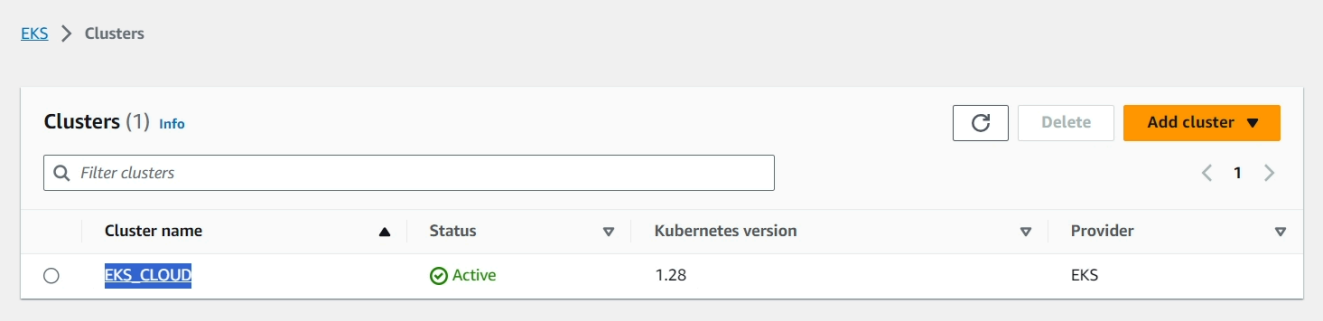
```
ubuntu@ip-172-31-36-122:~/TIC-TAC-TOE/Eks-terraform$
ubuntu@ip-172-31-36-122:~/TIC-TAC-TOE/Eks-terraform$ terraform validate
Success! The configuration is valid.
```

Plan and apply

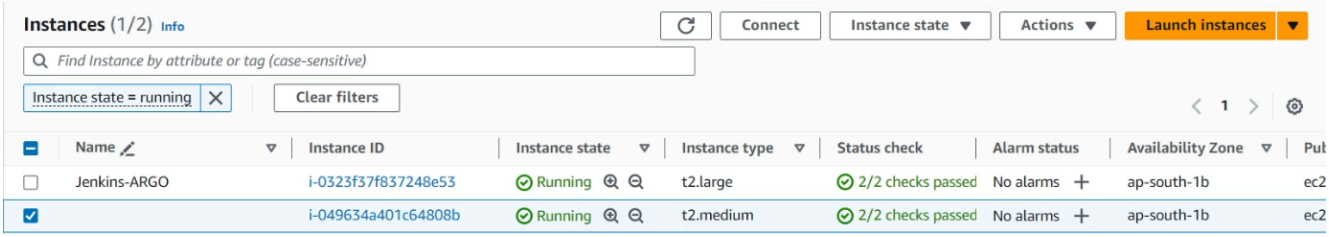
```
terraform plan
terraform apply
```

```
ubuntu@ip-172-31-36-122:~/TIC-TAC-TOE/Eks-terraform$
ubuntu@ip-172-31-36-122:~/TIC-TAC-TOE/Eks-terraform$ terraform apply
data.aws_iam_policy_document.assume_role: Reading...
data.aws_vpc.default: Reading...
data.aws_iam_policy_document.assume_role: Read complete after 0s [id=3552664922]
data.aws_vpc.default: Read complete after 1s [id=vpc-0f6bdd74ced5c07c0]
data.aws_subnets.public: Reading...
data.aws_subnets.public: Read complete after 0s [id=ap-south-1]

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:

  # aws_eks_cluster.example will be created
  + resource "aws_eks_cluster" "example" {
      + arn                   = (known after apply)
      + certificate_authority = (known after apply)
      + cluster_id            = (known after apply)
      + created_at            = (known after apply)
      + endpoint              = (known after apply)
      + id                    = (known after apply)
      + identity              = (known after apply)
      + name                  = "EKS_CLOUD"
      + platform_version      = (known after apply)
      + role_arn              = (known after apply)
      + status                = (known after apply)
      + tags_all              = (known after apply)
      + version               = (known after apply)
```

It will take 10 minutes to create the cluster



Node group ec2 instance



Now add the remaining steps

Next, install npm dependencies

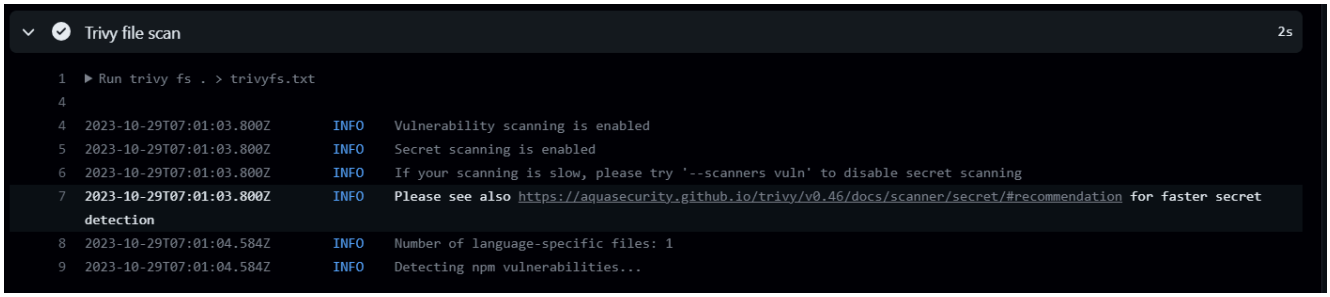
```
- name: NPM Install
  run: npm install # Add your specific npm install command
```

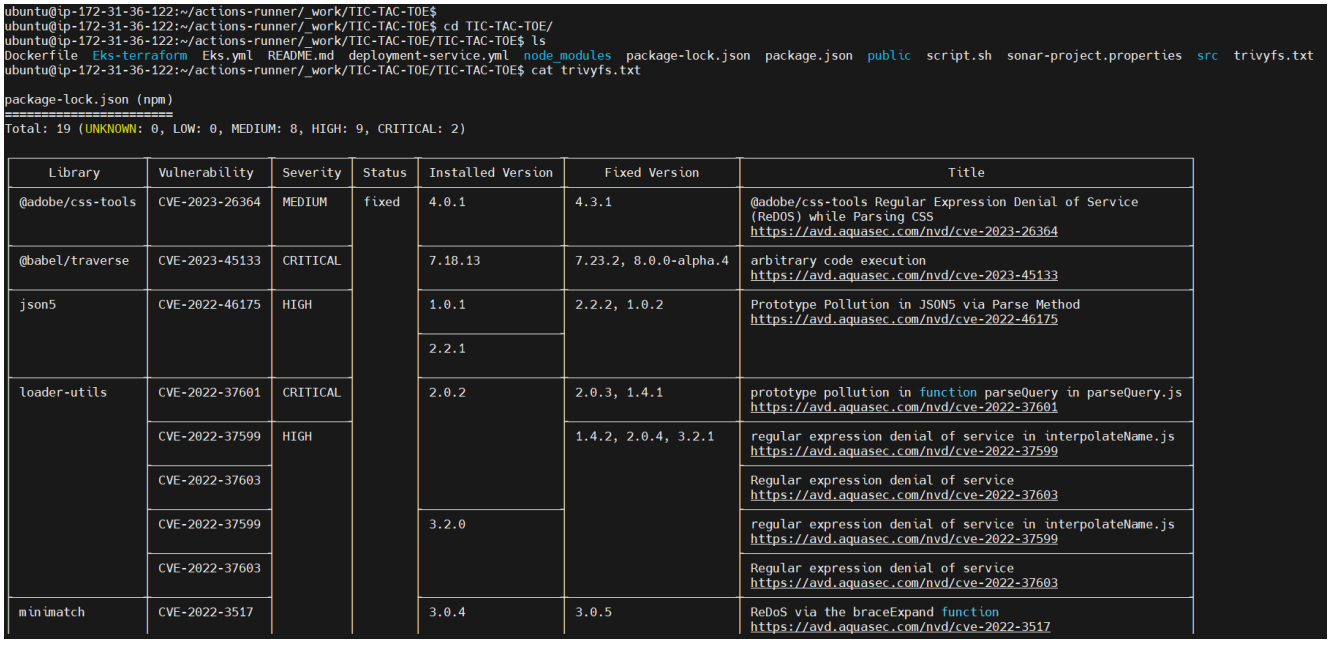
This step runs `npm install` to install Node.js dependencies. You can replace this with your specific npm install command.

```
- name: Install Trivy
  run: |
    # Scanning files
    trivy fs . > trivyfs.txt
```

This step runs Trivy to scan files. It scans the current directory (denoted by `.`) and redirects the output to a file named `trivyfs.txt`.

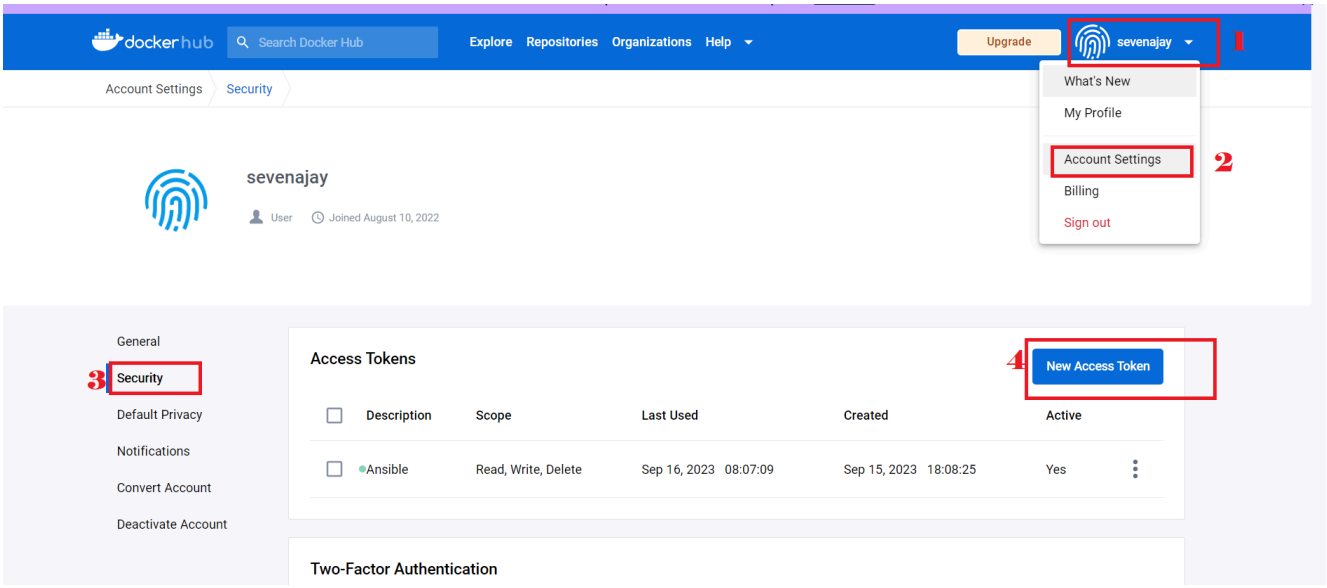
If you add this to the workflow, you will get below output



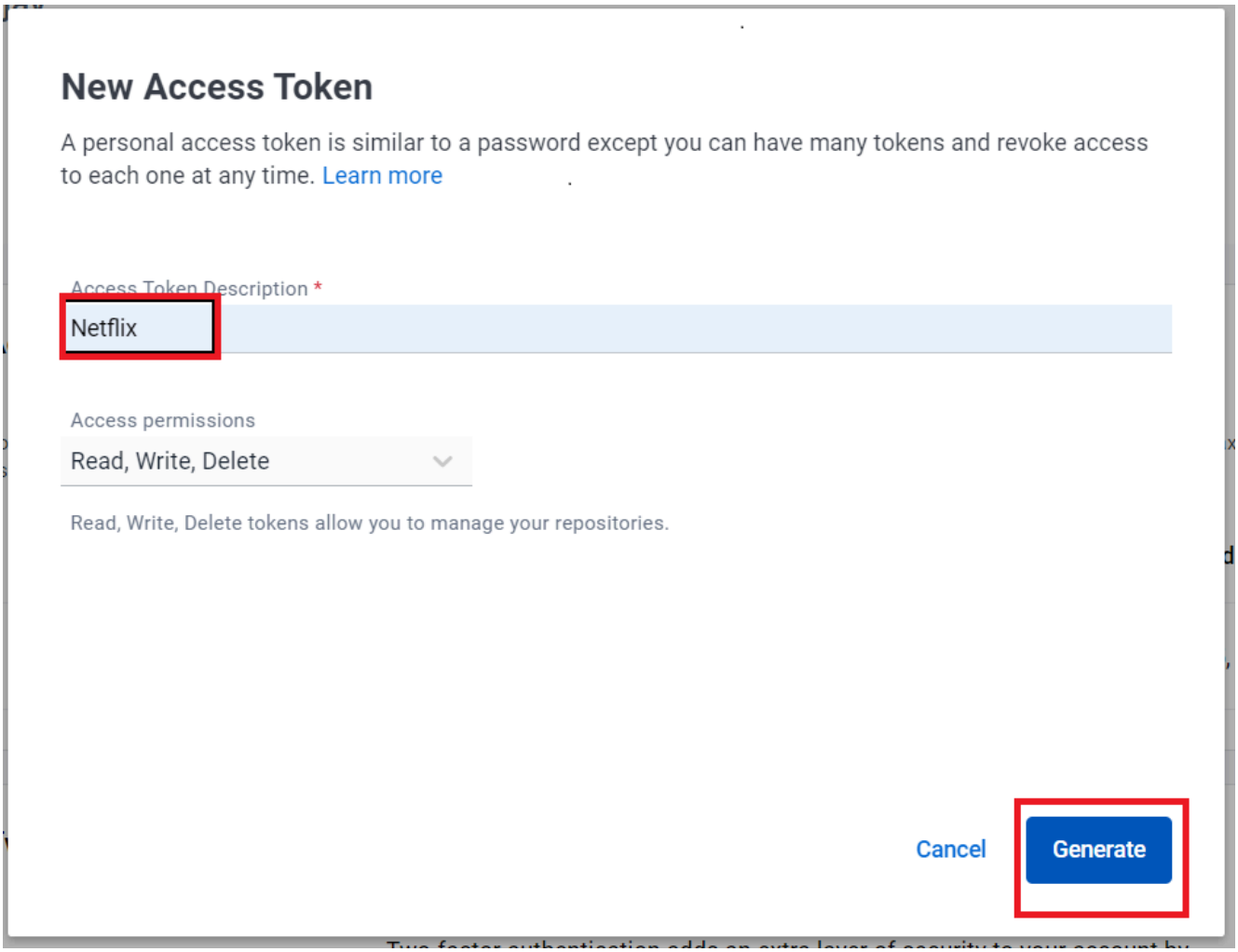


Create a Personal Access token for your Dockerhub account

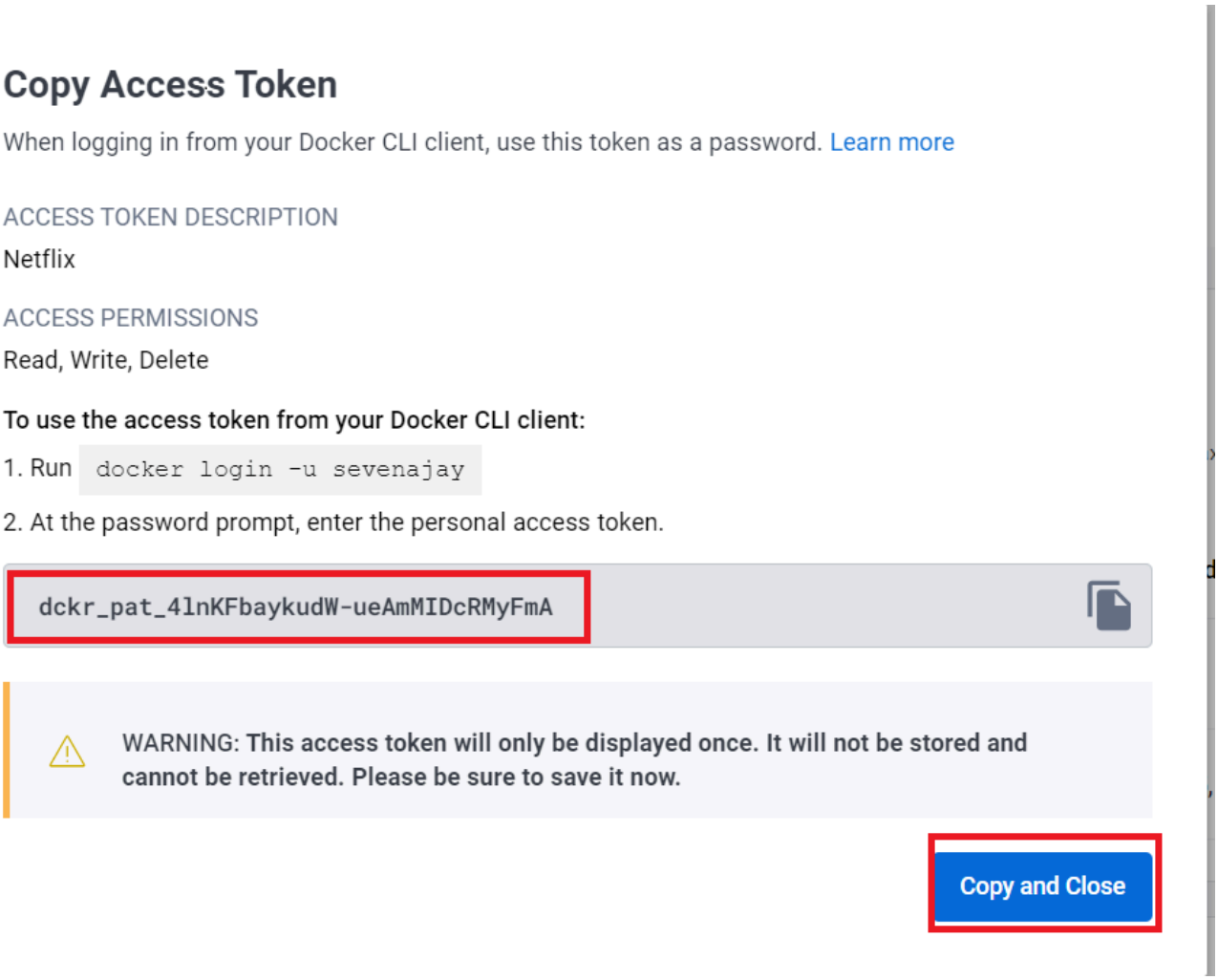
Go to docker hub and click on your profile –> Account settings –> security –> New access token



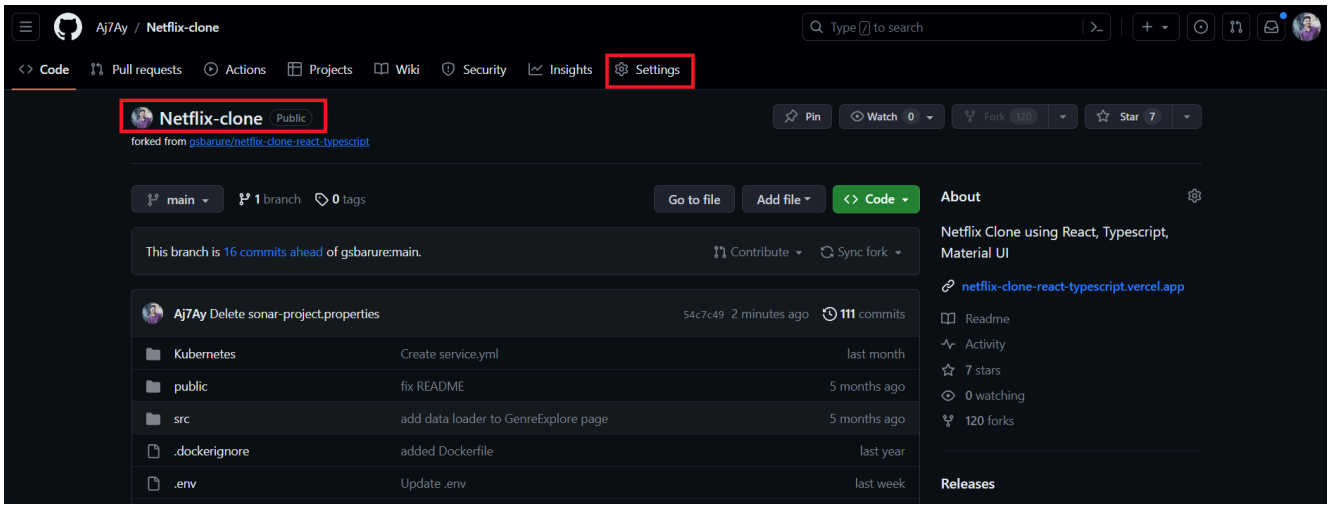
It asks for a name Provide a name and click on generate token



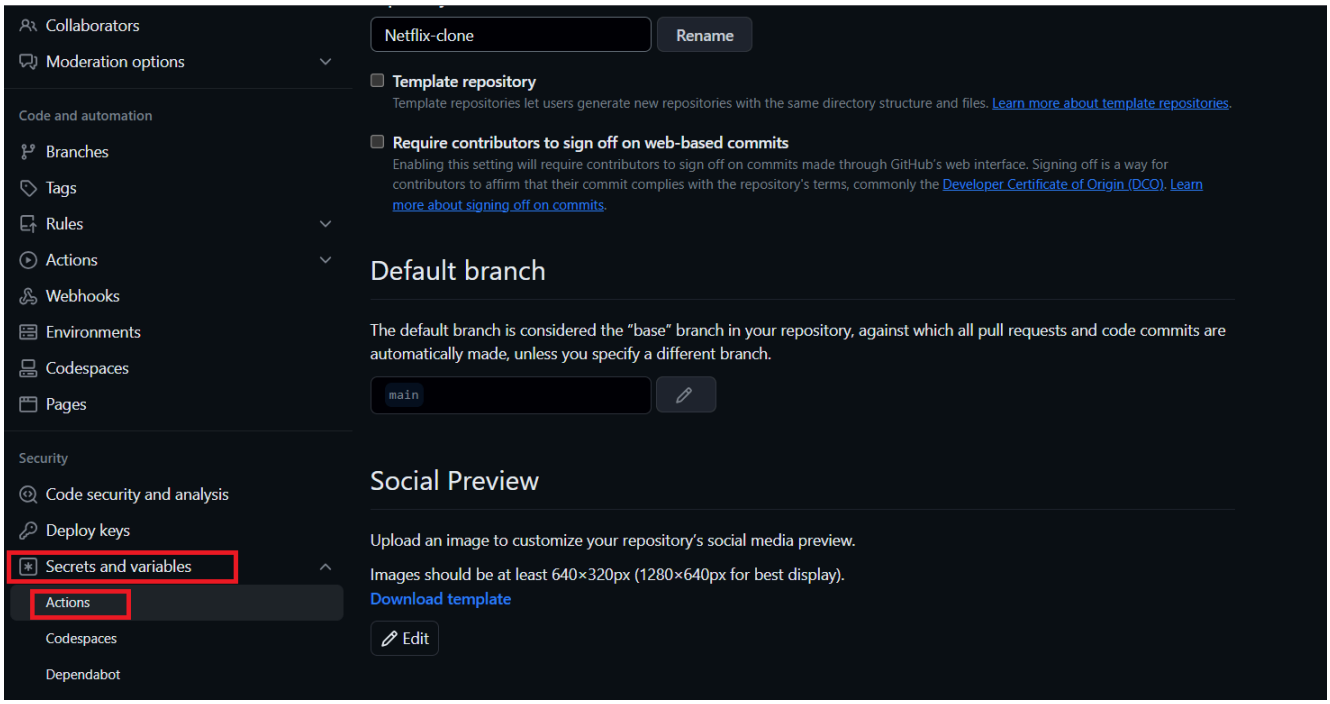
Copy the token save it in a safe place, and close



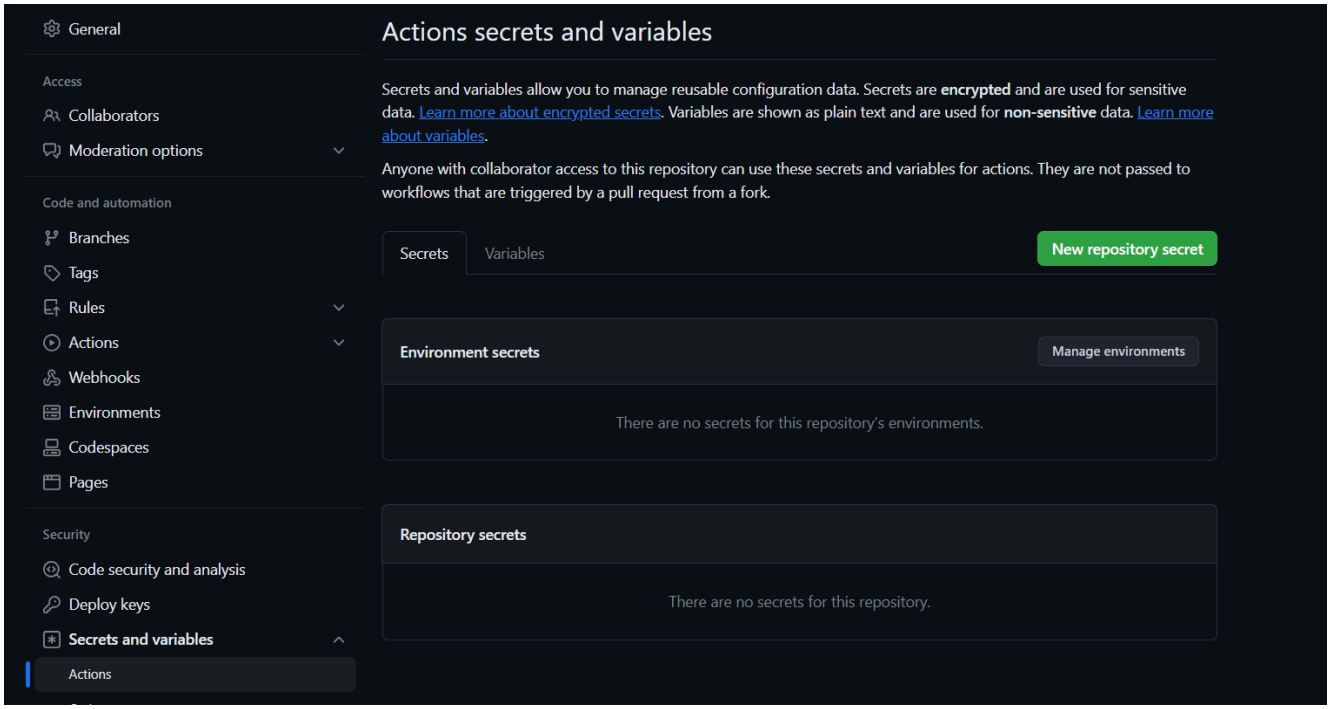
Now Go to GitHub again and click on settings



Search for Secrets and variables and click on and again click on actions

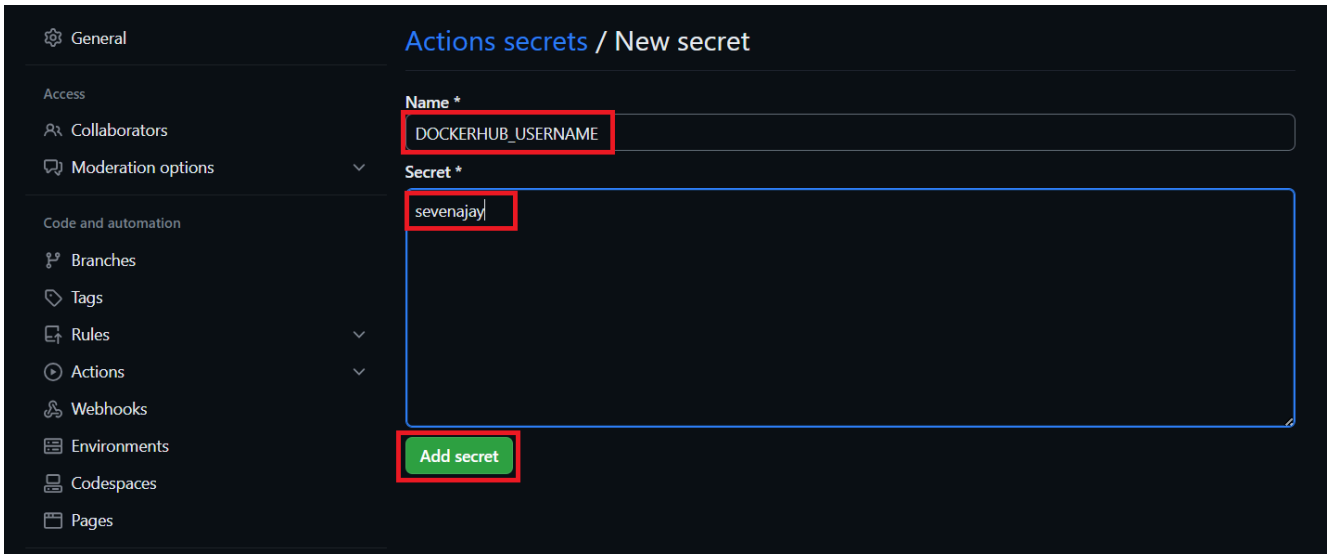


It will open a page like this click on New Repository secret



Add your Dockerhub username with the secret name as

```
DOCKERHUB_USERNAME    #use your dockerhub username
```

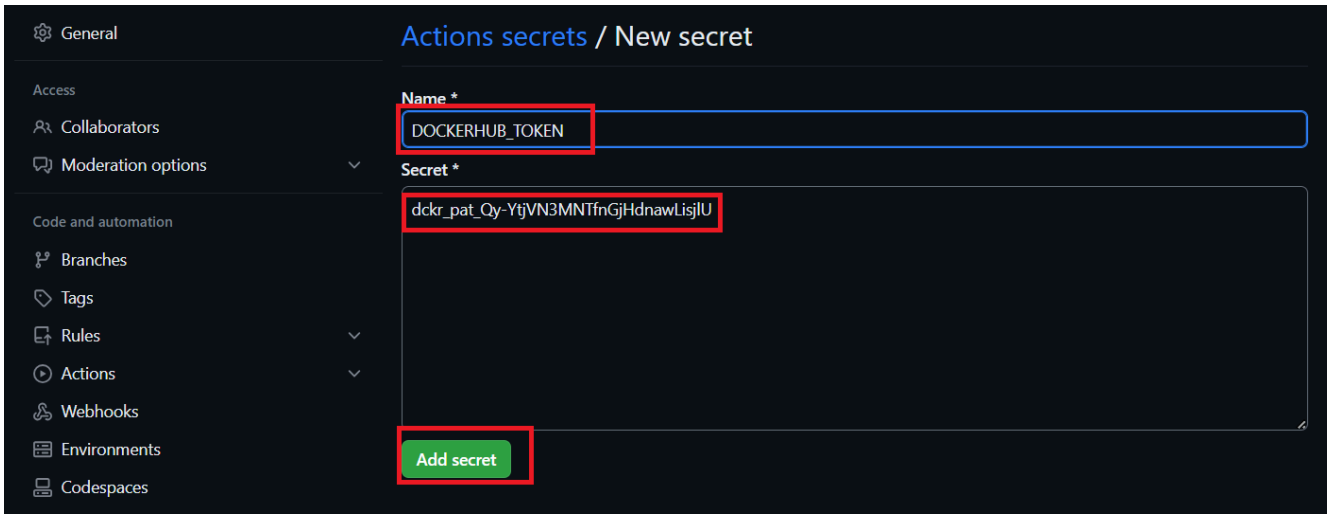


Click on Add Secret.

Let's add our token also and click on the new repository secret again

Name

```
DOCKERHUB_TOKEN
```



Paste the token that you generated and click on Add secret.

– name: Docker build and push run: | # Run commands to build and push Docker images docker build -t tic-tac-toe . docker tag tic-tac-toe sevenajay/tic-tac-toe:latest docker login -u ${{ secrets.DOCKERHUB_USERNAME }} -p ${{

secrets.DOCKERHUB_TOKEN }} docker push sevenajay/tic-tac-toe:latest env: DOCKER_CLI_ACI: 1

This step builds a Docker image with specific build arguments and tags it. It also logs in to Docker Hub using the provided credentials stored in secrets and pushes the Docker image.

If you run this job now you will get below output

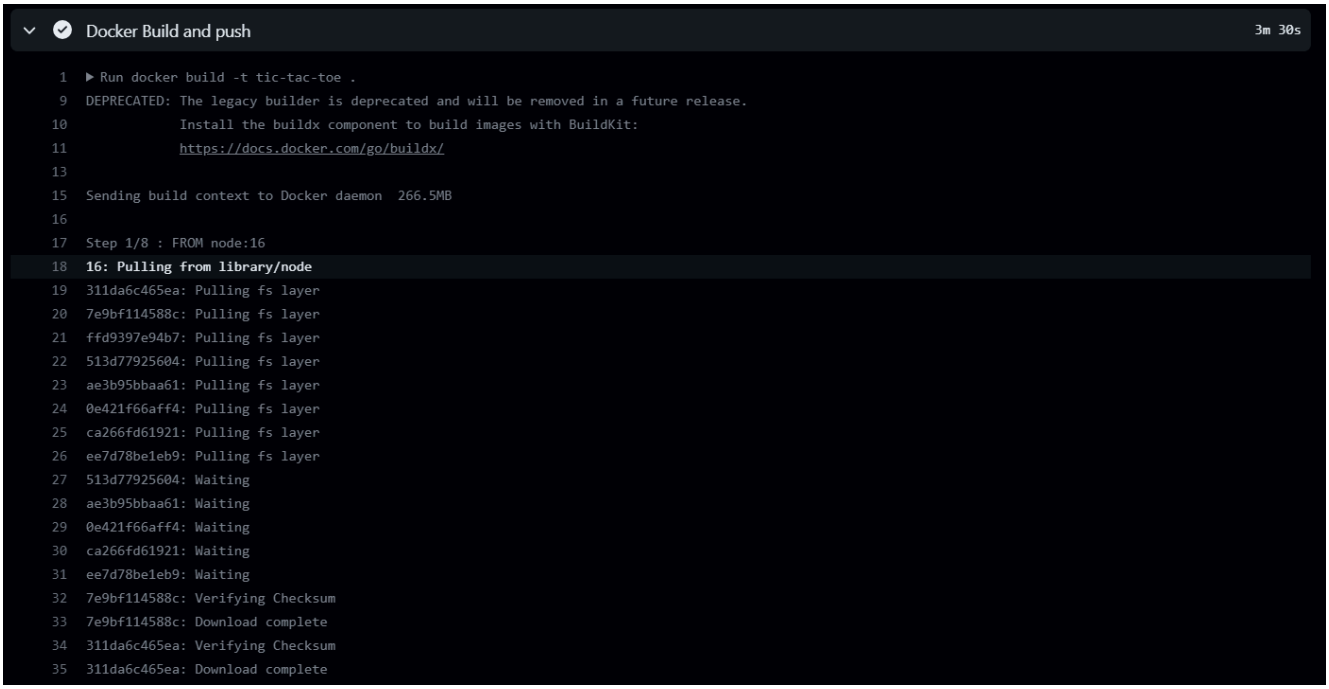
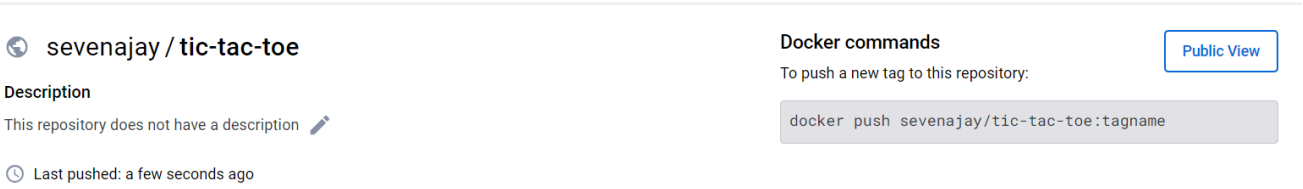


Image is pushed to Dockerhub



DEPLOY

```
deploy:
  needs: build-analyze-scan
  runs-on: self-hosted # Use your self-hosted runner label here
```

This section defines another job named “deploy.” It specifies that this job depends on the successful completion of the “build-analyze-scan” job. It also runs on a self-

hosted runner. You should replace `self-hosted` with the label of your self-hosted runner.

```
steps:
  - name: Pull the Docker image
    run: docker pull sevenajay/tic-tac-toe:latest
```

This step pulls the Docker image from Docker Hub, specified by `sevenajay/tic-tac-toe:latest`, which was built and pushed in the previous "build-analyze-scan" job

```
- name: Trivy image scan
  run: trivy image sevenajay/tic-tac-toe:latest # Add Trivy scan comman
```

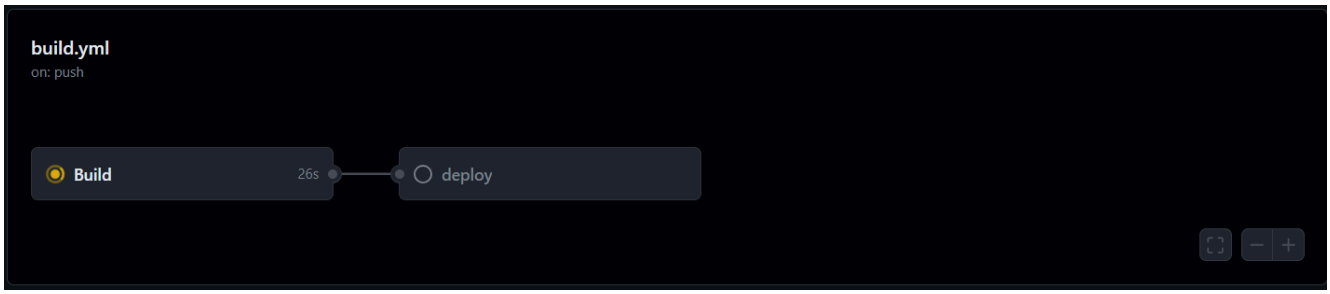
This step runs Trivy to scan the Docker image tagged as `sevenajay/tic-tac-toe:latest`. You should add the Trivy scan command here.

```
- name: Run the container
  run: docker run -d --name ticgame -p 3000:3000 sevenajay/tic-tac-toe:
```

This step runs a Docker container named "ticgame" in detached mode (`-d`). It maps port 3000 on the host to port 3000 in the container. It uses the Docker image tagged as `sevenajay/tic-tac-toe:latest`.

If you run this workflow.

Output



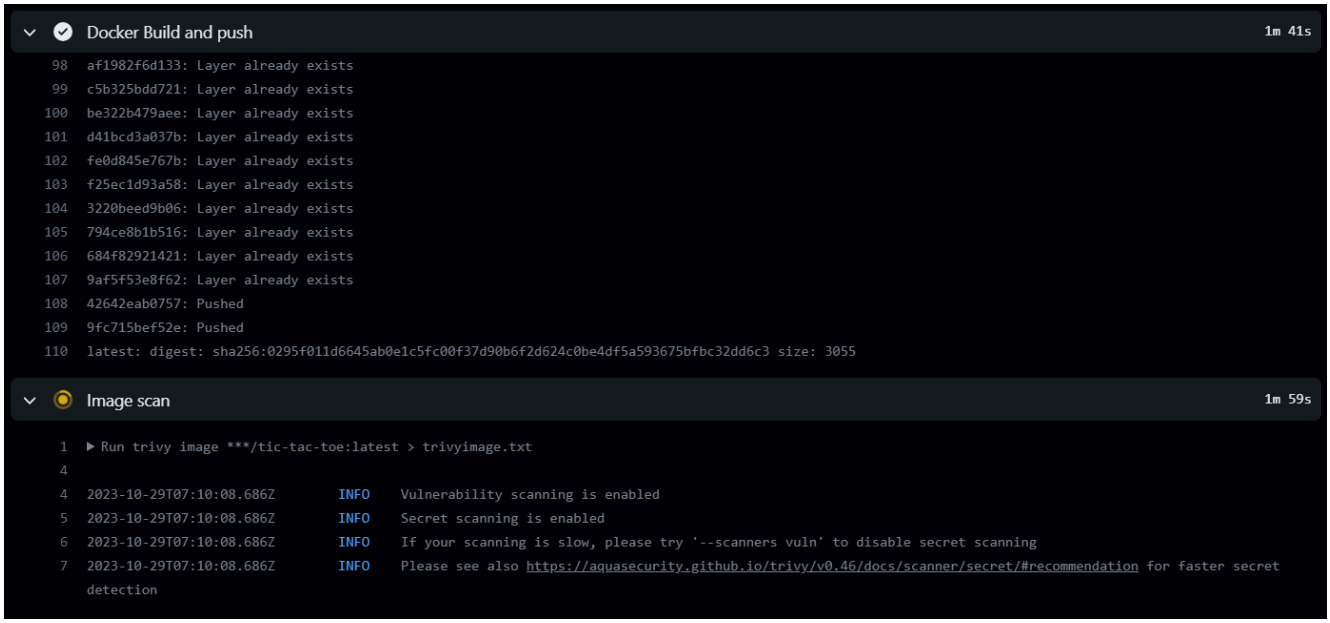


Image scan report

```
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$ cat trivyimage.txt

sevenajay/tic-tac-toe:latest (debian 10.13)
==========================================
Total: 1658 (UNKNOWN: 1, LOW: 1066, MEDIUM: 351, HIGH: 227, CRITICAL: 13)

┌─────────┬────────────────┬──────────┬────────┬───────────────────┬───────────────┬──────────────────────────────────────────────────────────────┐
│ Library │ Vulnerability  │ Severity │ Status │ Installed Version │ Fixed Version │                            Title                             │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ apt     │ CVE-2011-3374  │ LOW      │ affected │ 1.8.2.3         │               │ It was found that apt-key in apt, all versions, do not       │
│         │                │          │        │                   │               │ correctly...                                                 │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2011-3374                    │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ bash    │ CVE-2019-18276 │          │        │ 5.0-4             │               │ when effective UID is not equal to its real UID the saved... │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2019-18276                   │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ binutils│ CVE-2017-13716 │          │        │ 2.31.1-16         │               │ binutils: Memory leak with the C++ symbol demangler routine  │
│         │                │          │        │                   │               │ in libiberty                                                 │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2017-13716                   │
│         ├────────────────┤          │        │                   ├───────────────┼──────────────────────────────────────────────────────────────┤
│         │ CVE-2018-1000876 │        │        │                   │               │ integer overflow leads to heap-based buffer overflow in      │
│         │                │          │        │                   │               │ objdump                                                      │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2018-1000876                 │
```

Deployed to the container.

output

```
<ec2-ip:3000>
```

Deploy to EKS

```
- name: Update kubeconfig
  run: aws eks --region <cluster-region> update-kubeconfig --name <clust
```

This step updates the kubeconfig to configure `kubectl` to work with an Amazon EKS cluster in the region with the name of your cluster.

```
- name: Deploy to EKS
  run: kubectl apply -f deployment-service.yml
```

This step deploys Kubernetes resources defined in the `deployment-service.yml` file to the Amazon EKS cluster using `kubectl apply` .

SLACK

Go to your Slack channel, if you don't have create one

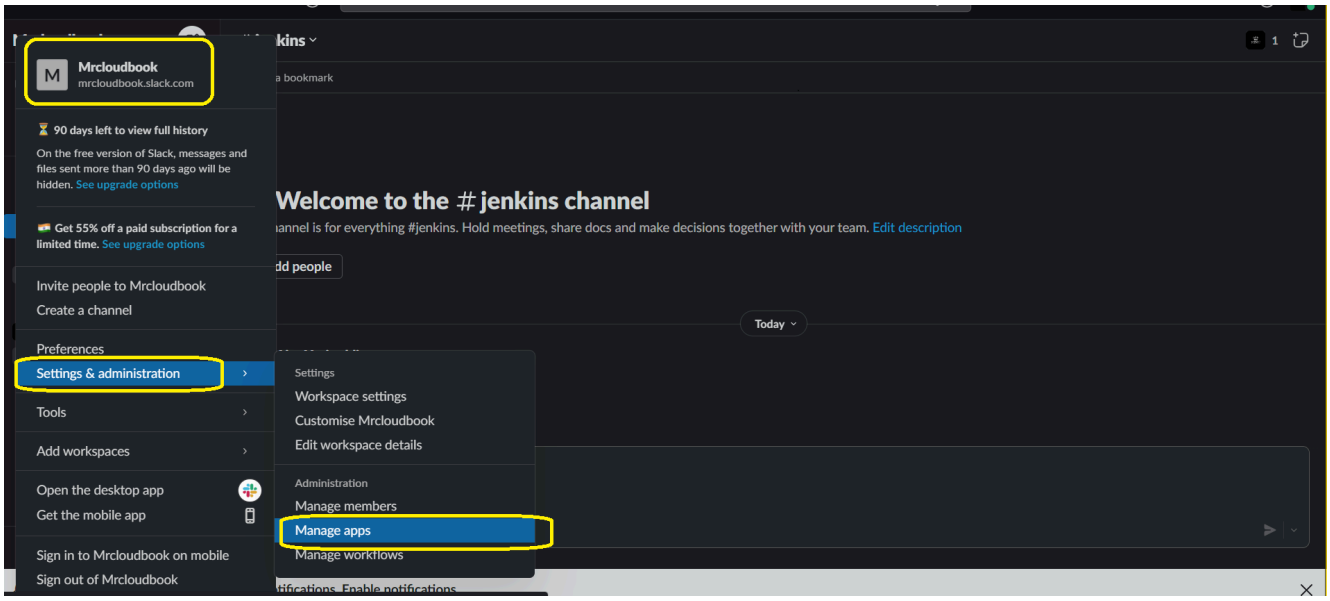
https://mrcloudbook.hashnode.dev/a-guide-to-integrating-slack-with-jenkins

Go to Slack channel and create a channel for notifications

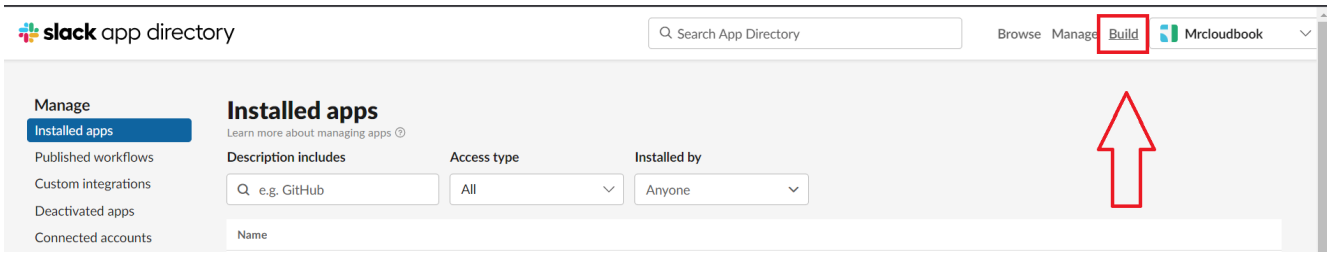
click on your name

Select Settings and Administration

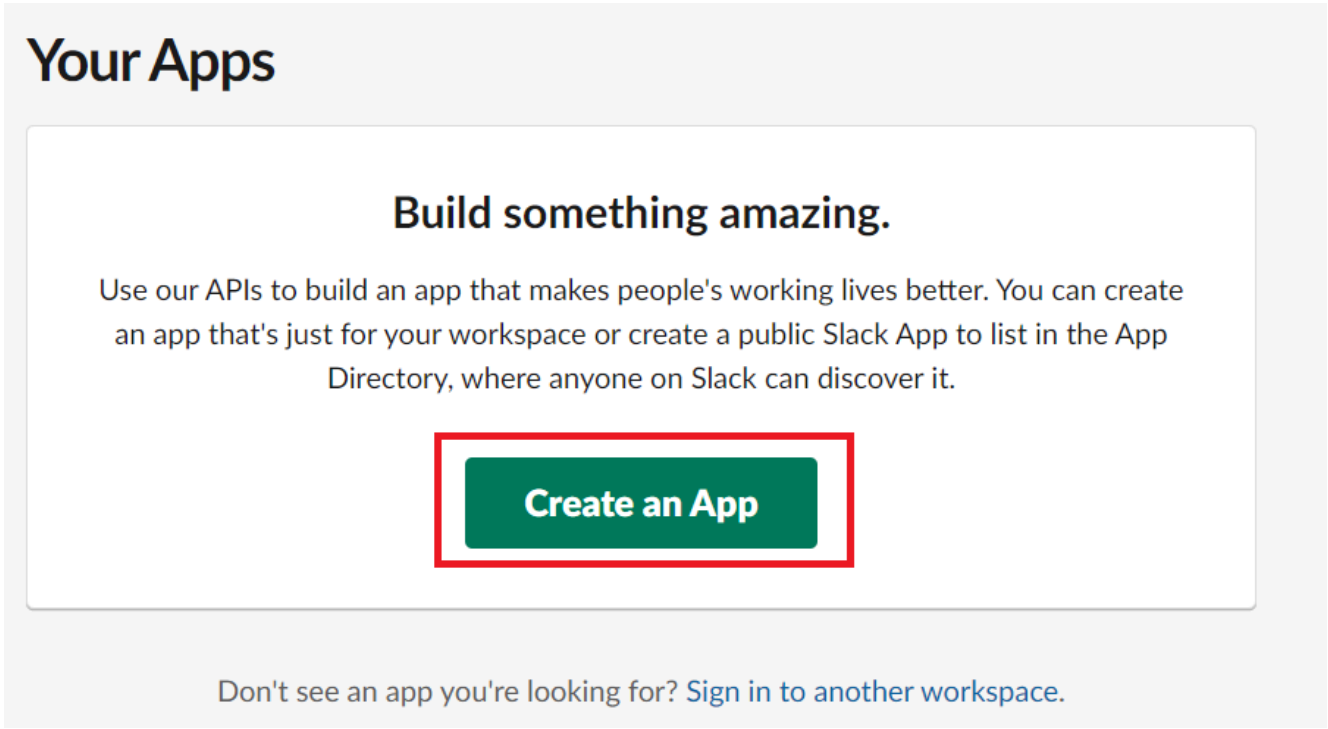
Click on Manage apps



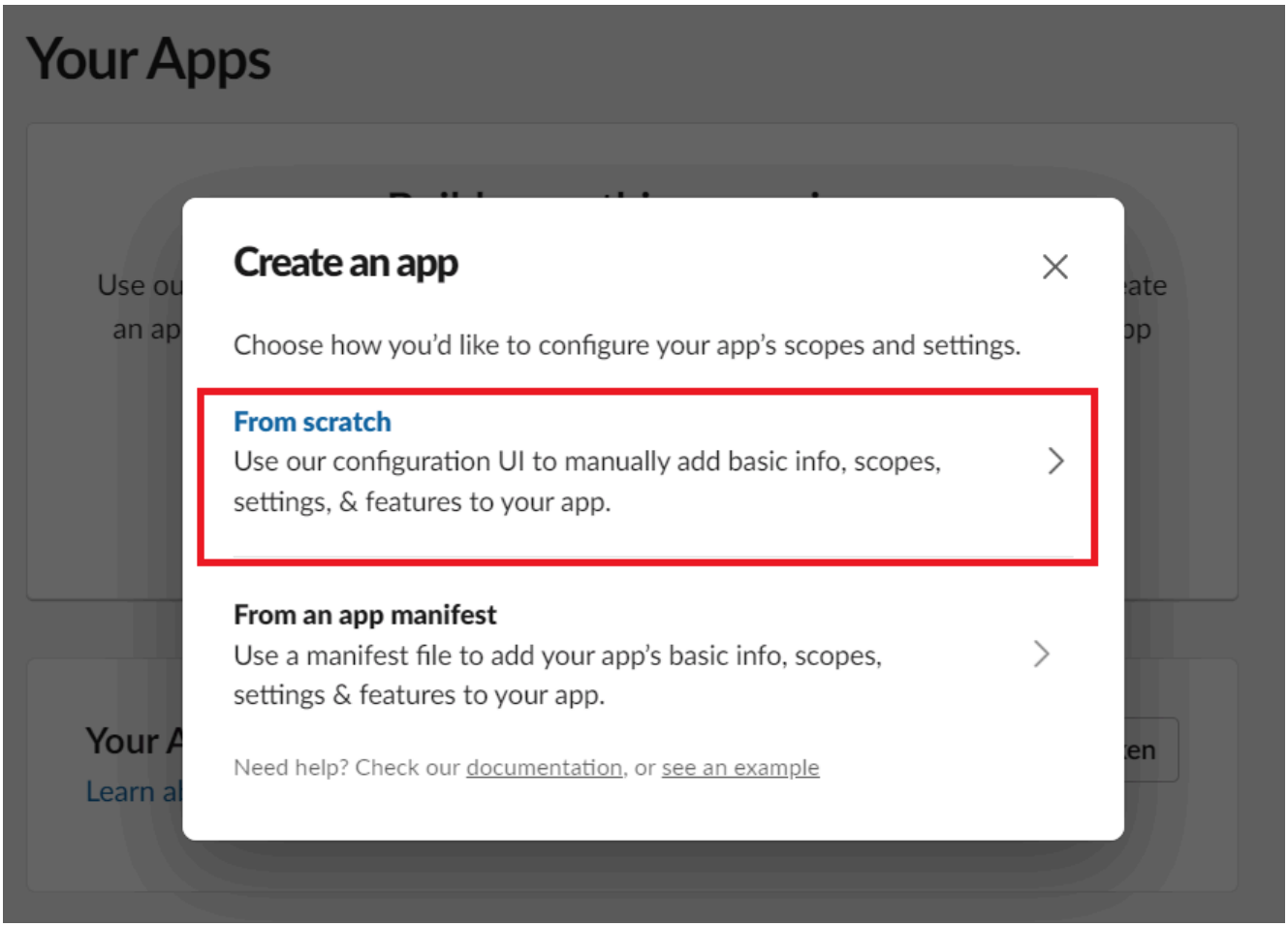
It will open a new tab, select build now



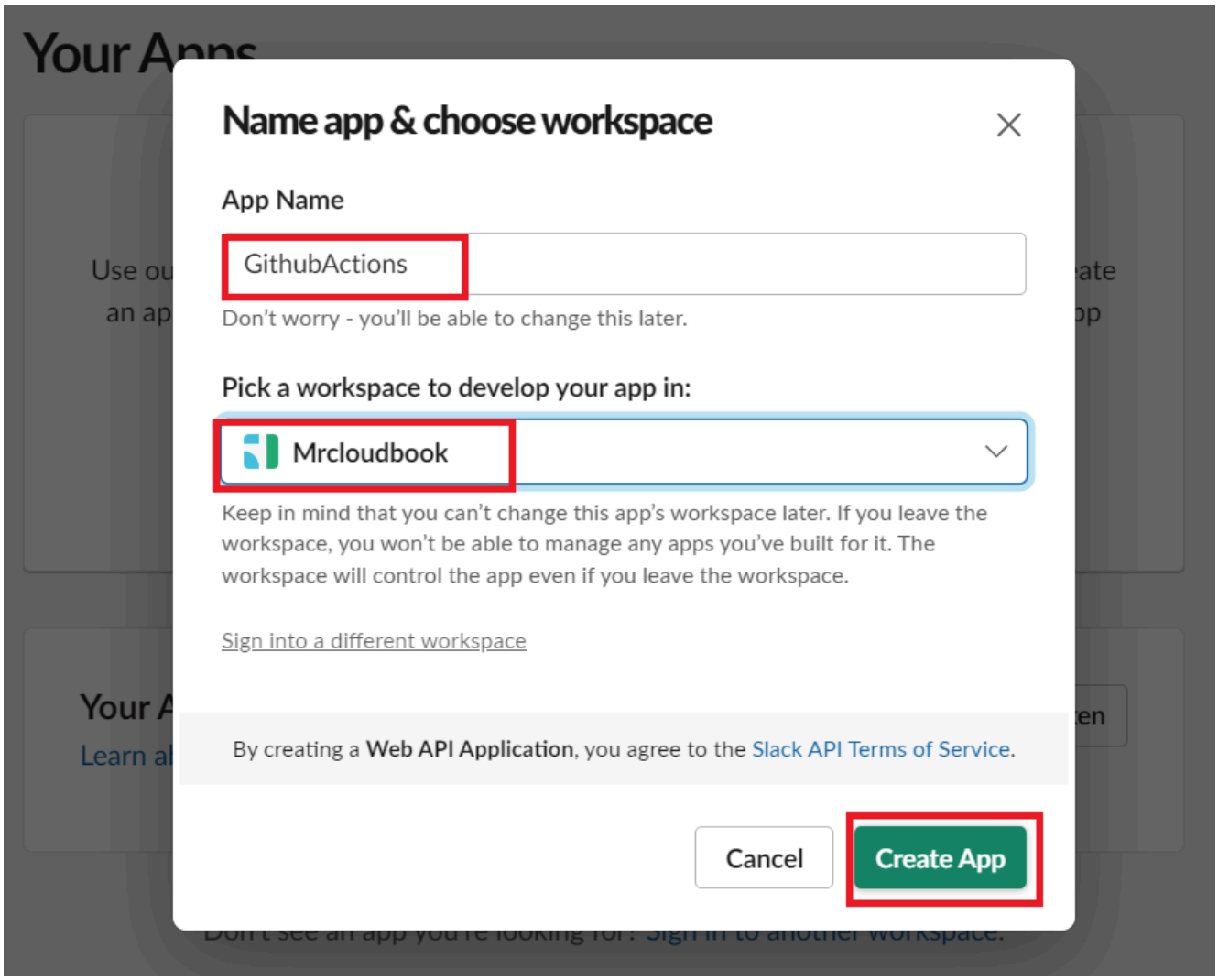
Click on create an app



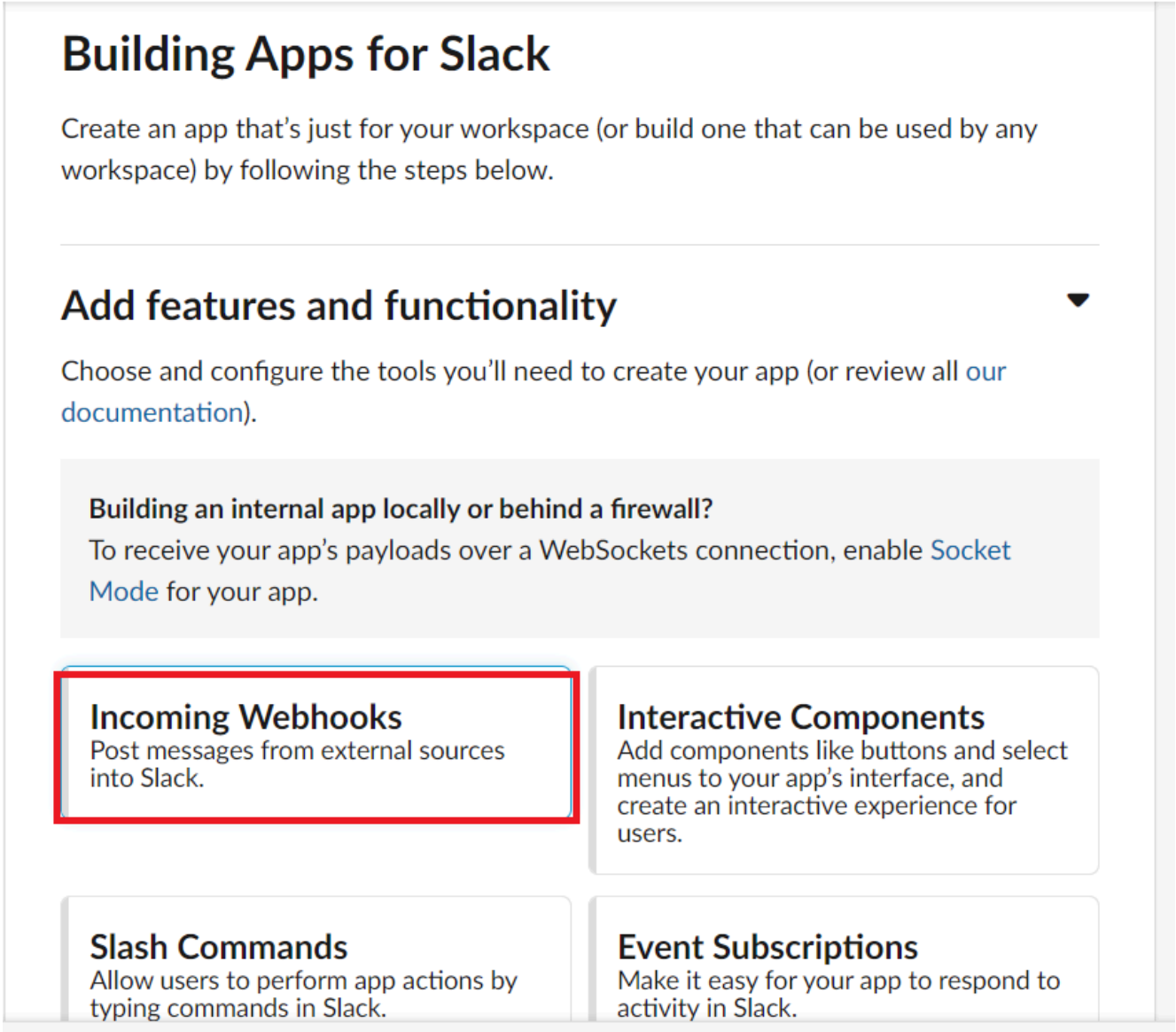
Select from scratch



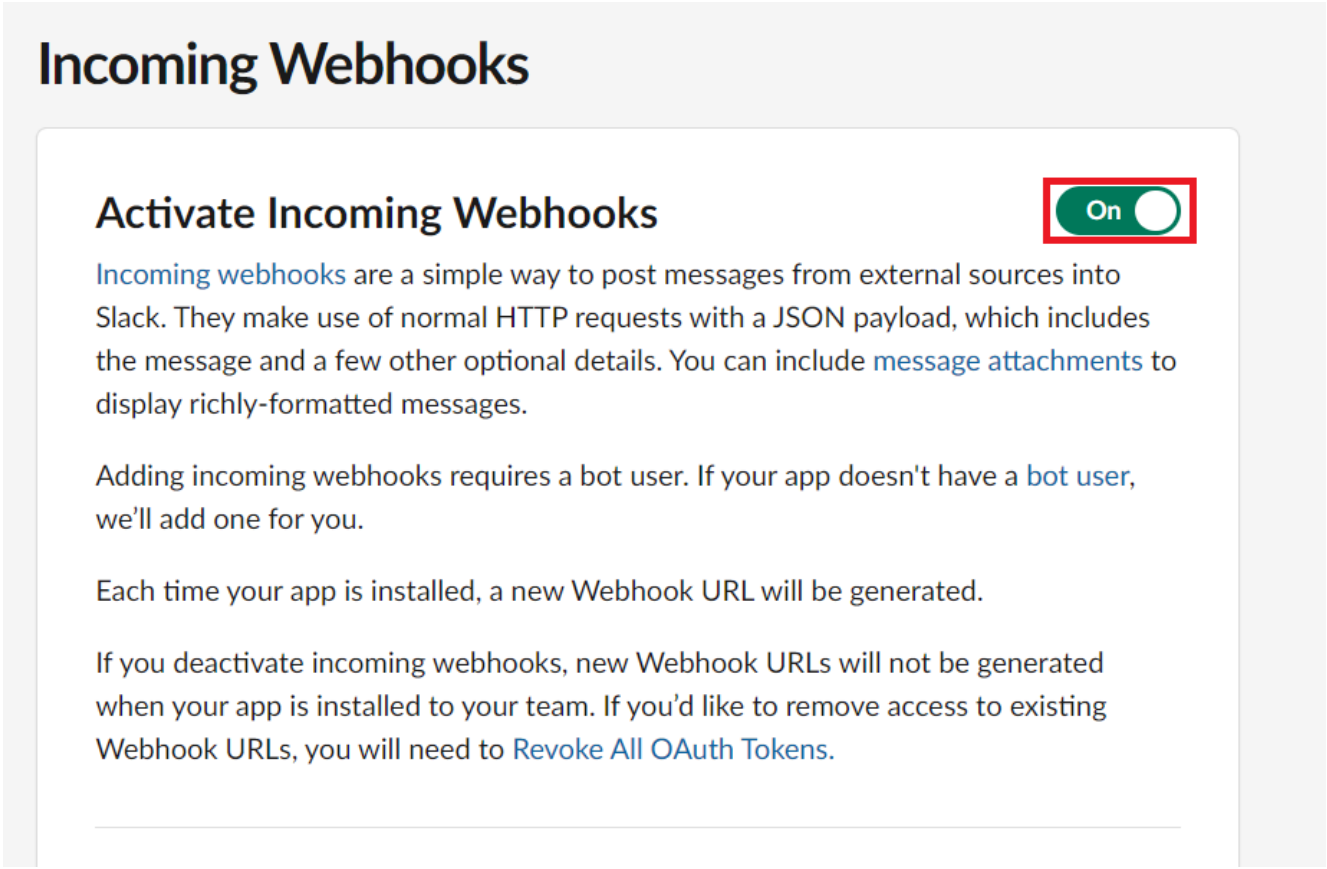
Provide a name for the app and select workspace and create



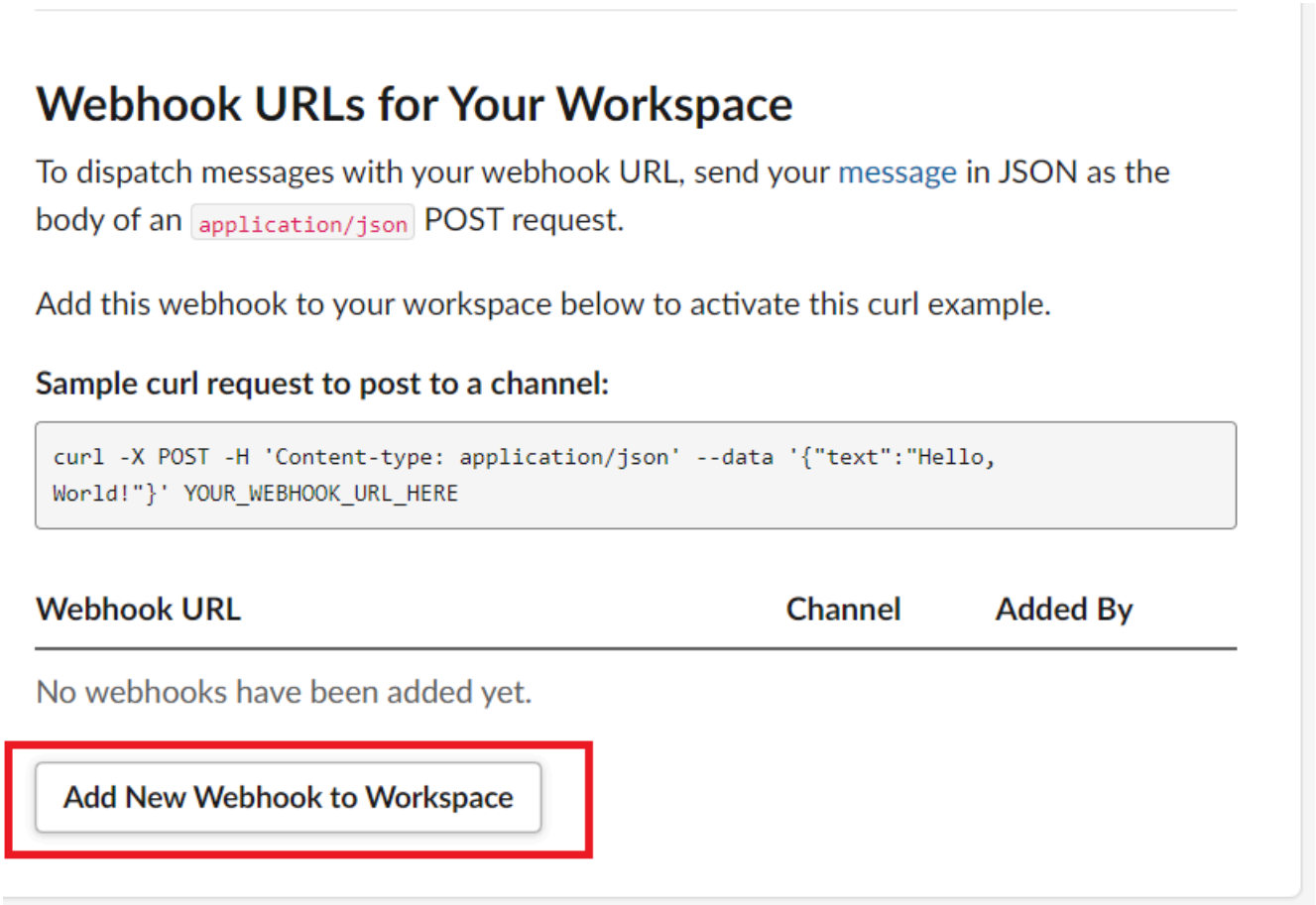
Select Incoming webhooks



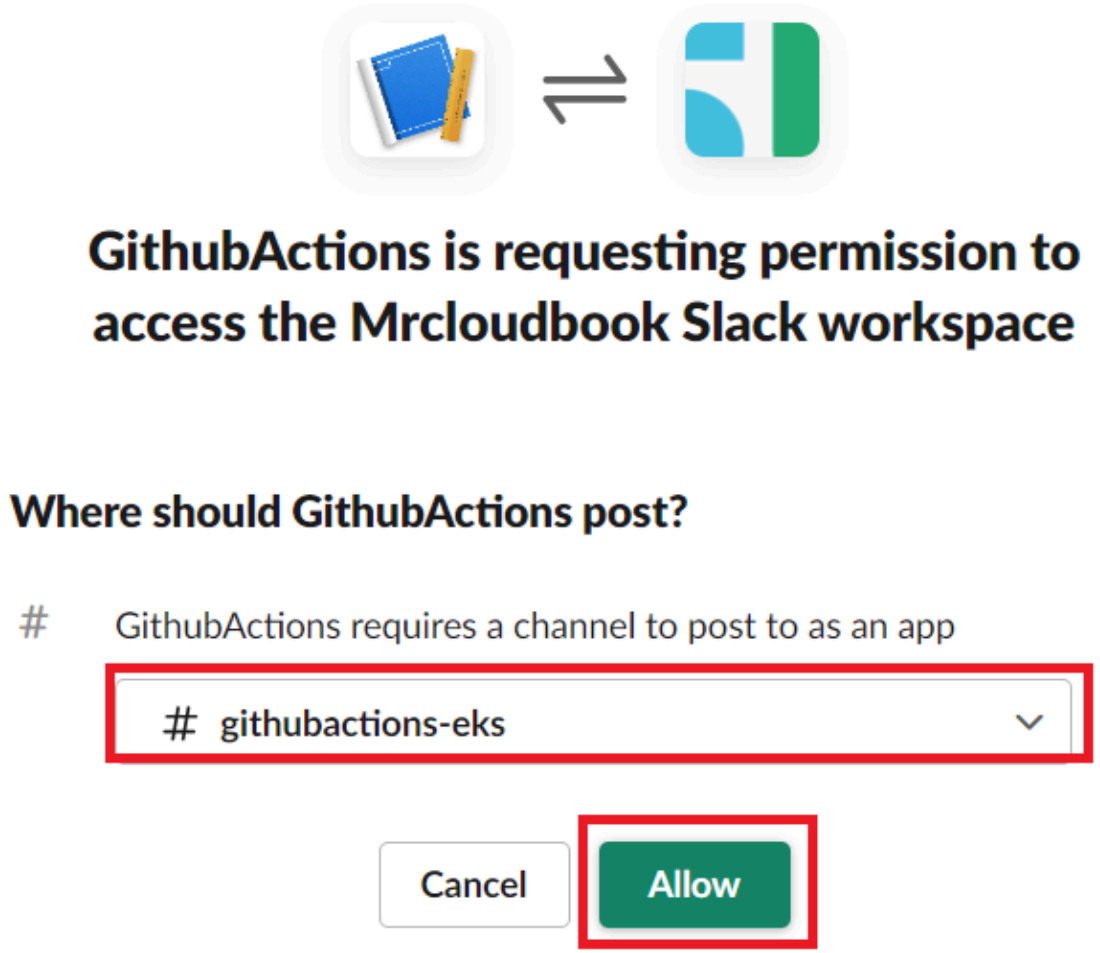
Set incoming webhooks to on



Click on Add New webhook to workspace



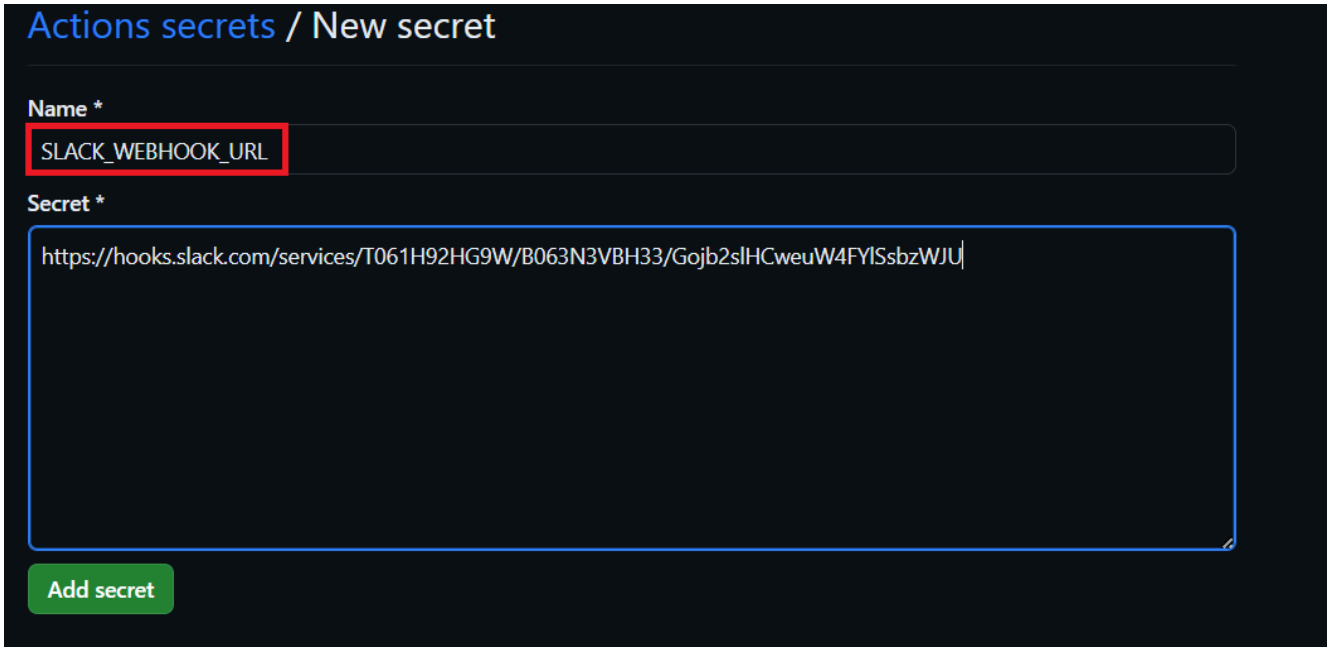
Select Your channel that created for notifications and allow



It will generate a webhook URL copy it

Now come back to GitHub and click on settings

Go to secrets –> actions –> new repository secret and add



Add the below code to the workflow and commit and the workflow will start.

```
- name: Send a Slack Notification
  if: always()
  uses: act10ns/slack@v1
  with:
    status: ${{ job.status }}
    steps: ${{ toJson(steps) }}
    channel: '#git'
  env:
    SLACK_WEBHOOK_URL: ${{ secrets.SLACK_WEBHOOK_URL }}
```

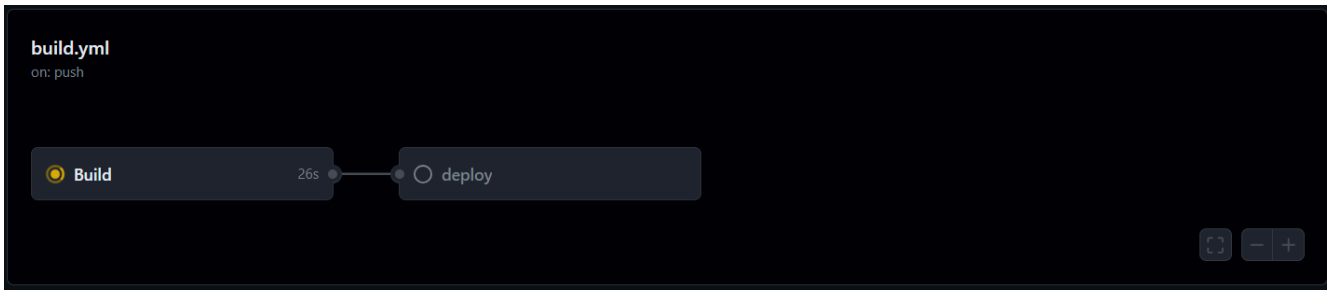
This step sends a Slack notification. It uses the `act10ns/slack` action and is configured to run "always," which means it runs regardless of the job status. It sends the notification to the specified Slack channel using the webhook URL stored in secrets.

Complete Workflow

```
name: Build,Analyze,scan
on:
  push:
    branches:
      - main
jobs:
  build-analyze-scan:
    name: Build
    runs-on: [self-hosted]
    steps:
      - name: Checkout code
        uses: actions/checkout@v2
        with:
          fetch-depth: 0  # Shallow clones should be disabled for a beti
      - name: Build and analyze with SonarQube
        uses: sonarsource/sonarqube-scan-action@master
        env:
          SONAR_TOKEN: ${{ secrets.SONAR_TOKEN }}
          SONAR_HOST_URL: ${{ secrets.SONAR_HOST_URL }}
      - name: npm install dependency
```

```
        run: npm install
      - name: Trivy file scan
        run: trivy fs . > trivyfs.txt
      - name: Docker Build and push
        run: |
          docker build -t tic-tac-toe .
          docker tag tic-tac-toe sevenajay/tic-tac-toe:latest
          docker login -u ${{ secrets.DOCKERHUB_USERNAME }} -p ${{ secre
          docker push sevenajay/tic-tac-toe:latest
        env:
          DOCKER_CLI_ACI: 1
      - name: Image scan
        run: trivy image sevenajay/tic-tac-toe:latest > trivyimage.txt
  deploy:
   needs: build-analyze-scan
   runs-on: [self-hosted]
   steps:
      - name: docker pull image
        run: docker pull sevenajay/tic-tac-toe:latest
      - name: Image scan
        run: trivy image sevenajay/tic-tac-toe:latest > trivyimagedeploy
      - name: Deploy to container
        run: docker run -d --name game -p 3000:3000 sevenajay/tic-tac-to
      - name: Update kubeconfig
        run: aws eks --region ap-south-1 update-kubeconfig --name EKS_CI
      - name: Deploy to kubernetes
        run: kubectl apply -f deployment-service.yml
      - name: Send a Slack Notification
        if: always()
        uses: act10ns/slack@v1
        with:
          status: ${{ job.status }}
          steps: ${{ toJson(steps) }}
          channel: '#githubactions-eks'
        env:
          SLACK_WEBHOOK_URL: ${{ secrets.SLACK_WEBHOOK_URL }}
```

Run this workflow now



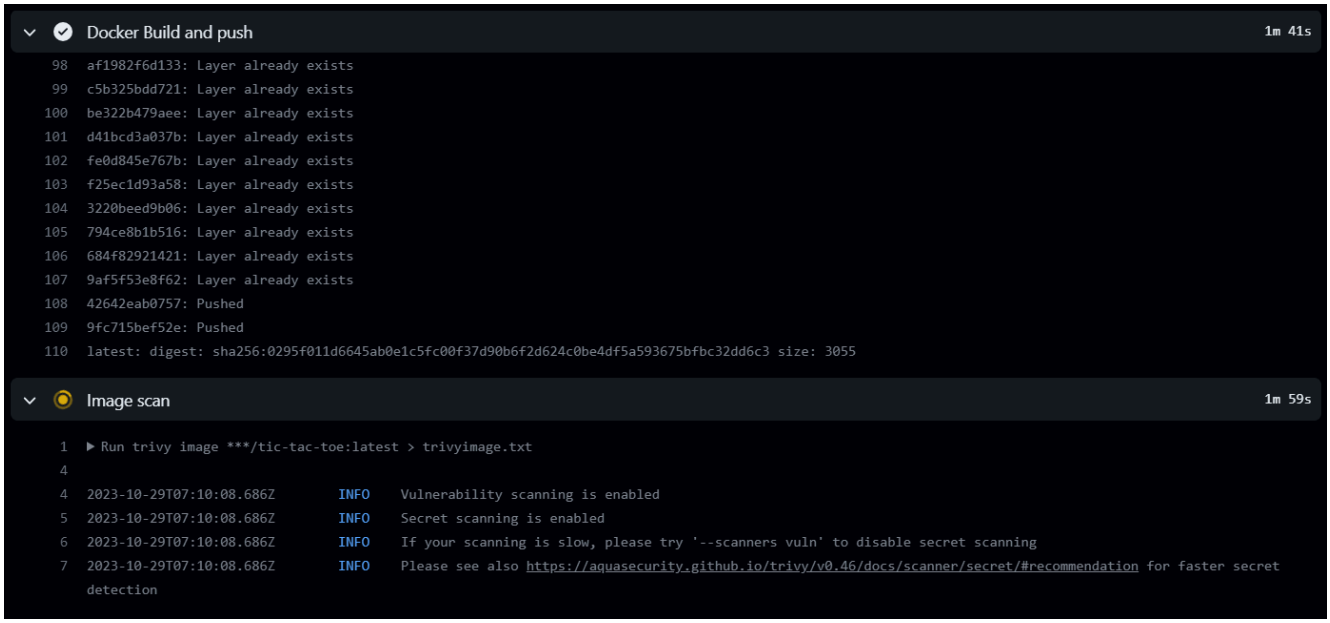
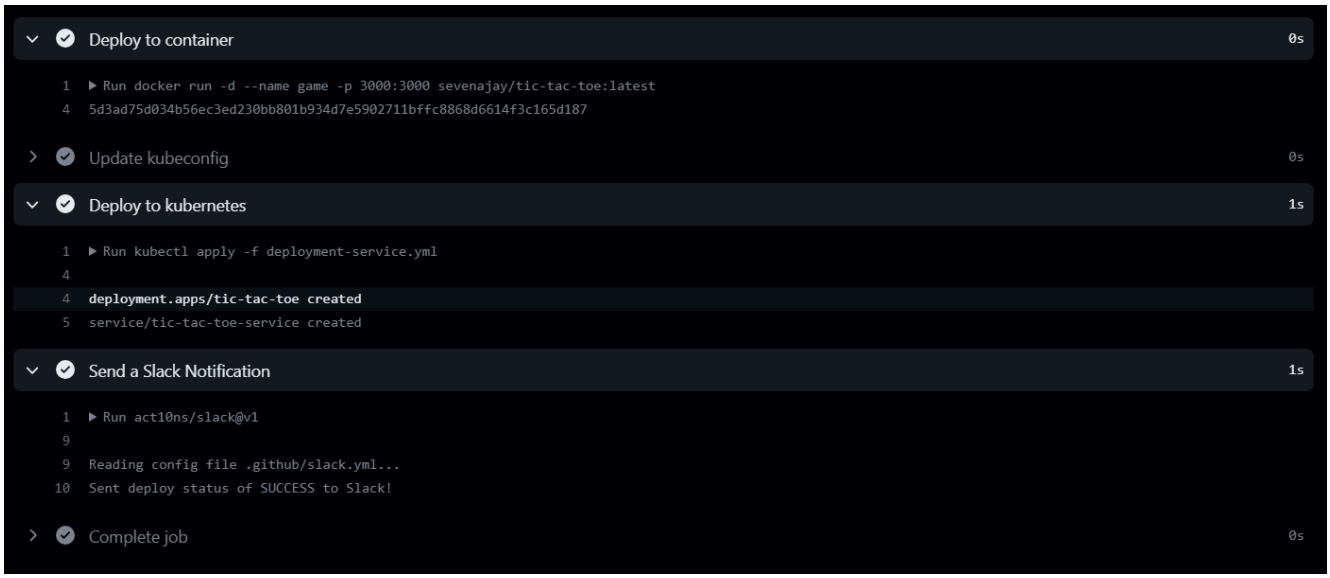


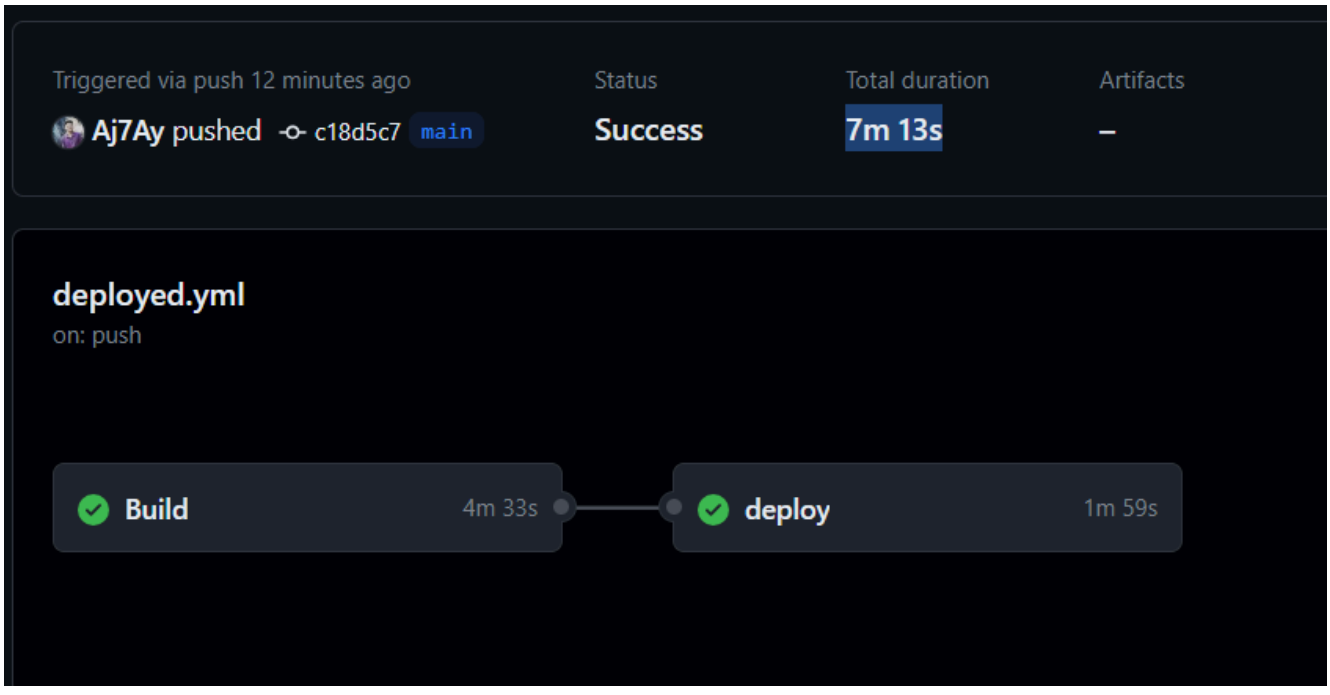
Image scan report

```
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$
ubuntu@ip-172-31-36-122:~/actions-runner/_work/TIC-TAC-TOE/TIC-TAC-TOE$ cat trivyimage.txt

sevenajay/tic-tac-toe:latest (debian 10.13)
==========================================
Total: 1658 (UNKNOWN: 1, LOW: 1066, MEDIUM: 351, HIGH: 227, CRITICAL: 13)

┌─────────┬────────────────┬──────────┬────────┬───────────────────┬───────────────┬──────────────────────────────────────────────────────────────┐
│ Library │ Vulnerability  │ Severity │ Status │ Installed Version │ Fixed Version │                            Title                             │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ apt     │ CVE-2011-3374  │ LOW      │ affected │ 1.8.2.3         │               │ It was found that apt-key in apt, all versions, do not       │
│         │                │          │        │                   │               │ correctly...                                                 │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2011-3374                    │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ bash    │ CVE-2019-18276 │          │        │ 5.0-4             │               │ when effective UID is not equal to its real UID the saved... │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2019-18276                   │
├─────────┼────────────────┼──────────┼────────┼───────────────────┼───────────────┼──────────────────────────────────────────────────────────────┤
│ binutils│ CVE-2017-13716 │          │        │ 2.31.1-16         │               │ binutils: Memory leak with the C++ symbol demangler routine  │
│         │                │          │        │                   │               │ in libiberty                                                 │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2017-13716                   │
│         ├────────────────┤          │        │                   ├───────────────┼──────────────────────────────────────────────────────────────┤
│         │ CVE-2018-1000876 │        │        │                   │               │ integer overflow leads to heap-based buffer overflow in      │
│         │                │          │        │                   │               │ objdump                                                      │
│         │                │          │        │                   │               │ https://avd.aquasec.com/nvd/cve-2018-1000876                 │
```

Deployed to the container.

Deployed to EKS



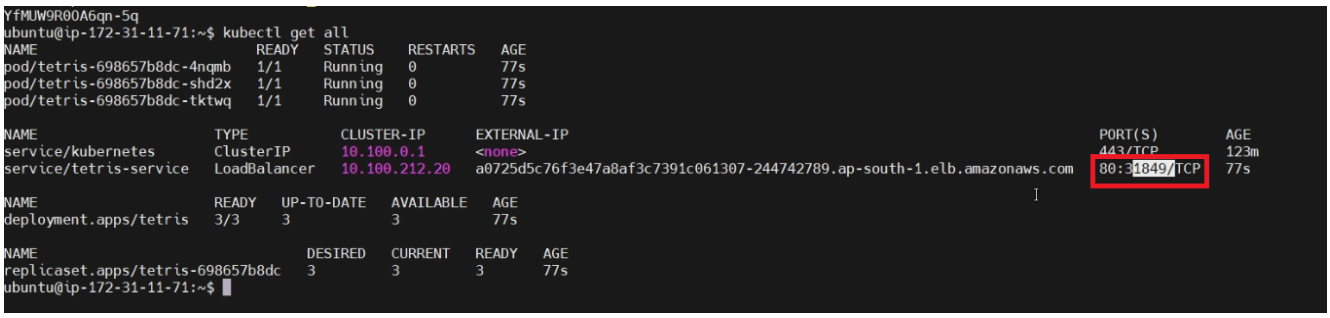


Job completed.

Let's go to the Ec2 ssh connection

Provide this command

```
kubectl get all
```



Open the port in the security group for the Node group instance.

After that copy the external IP and paste it into the browser

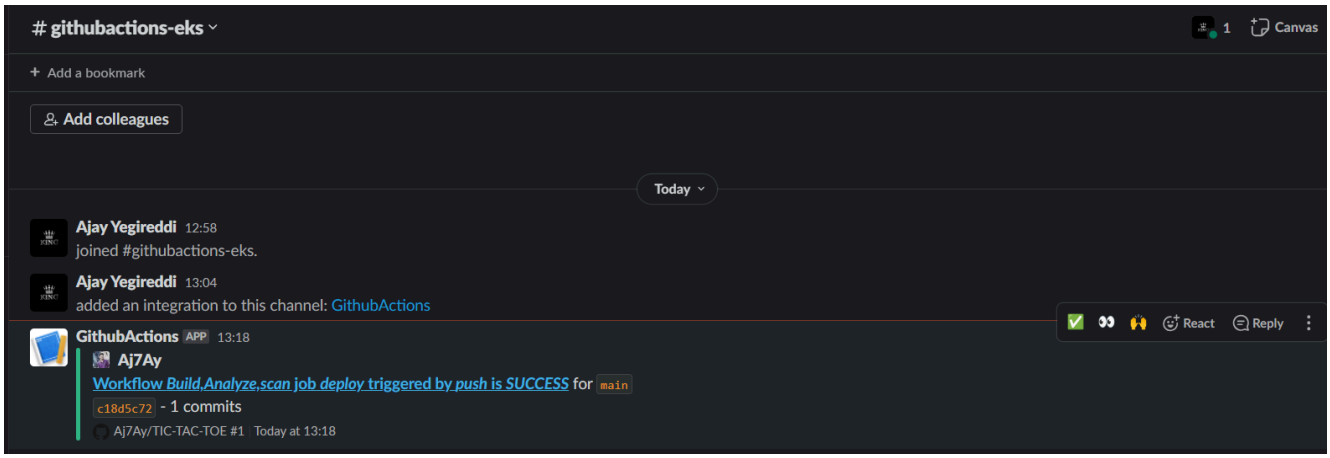
output

Destruction workflow

```
name: Build,Analyze,scan
on:
  push:
    branches:
      - main
jobs:
  build-analyze-scan:
    name: Build
    runs-on: [self-hosted]
    steps:
      - name: Checkout code
        uses: actions/checkout@v2
        with:
          fetch-depth: 0  # Shallow clones should be disabled for a beti
      - name: Deploy to container
        run: |
          docker stop game
```

```
        docker rm game
    - name: Update kubeconfig
      run: aws eks --region ap-south-1 update-kubeconfig --name EKS_CI
    - name: Deploy to kubernetes
      run: kubectl delete -f deployment-service.yml
    - name: Send a Slack Notification
      if: always()
      uses: act10ns/slack@v1
      with:
        status: ${{ job.status }}
        steps: ${{ toJson(steps) }}
        channel: '#githubactions-eks'
      env:
        SLACK_WEBHOOK_URL: ${{ secrets.SLACK_WEBHOOK_URL }}
```

Slack Notification



It will delete the container and delete the Kubernetes deployment.

Stop the self-hosted runner.

Now go inside the TIC-TAC-TOE

To delete the Eks cluster

```
cd /home/ubuntu
cd TIC-TAC-TOE
```

```
cd Eks-terraform
terraform destroy --auto-approve
```

It will take 10 minutes to destroy the EKS cluster

Meanwhile, delete the Dockerhub Token

Once cluster destroys

Delete The ec2 instance and IAM role.

Delete the secrets from GitHub also.

THANKS.

Ajay Kumar Yegireddi is a DevSecOps Engineer and System Administrator, with a passion for sharing real-world DevSecOps projects and tasks. **Mr. Cloud Book**, provides hands-on tutorials and practical insights to help others master DevSecOps tools and workflows. Content is designed to bridge the gap between development, security, and operations, making complex concepts easy to understand for both beginners and professionals.

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